Site Chacterization Workplan
Department of Veteran Affairs
Hudson Valley Healthcare System
Castle Point Campus
Wappingers Falls, New York

Contract No. 36C24222C0141

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Prepared for: Department of Veterans Affairs
Hudson Valley Healthcare System

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CERTIFICATION STATEMENT

I, Bernard T. Delaney, Ph.D., P.E., BCEE, certify that I am currently a NYS Registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Site Characterization Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

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Date: March 10, 2023

Introduction

First Environment, Inc. (First Environment) was retained by the United States Department of Veterans Affairs - Hudson Valley Healthcare System (VAHVHS) to prepare a Site Characterization Work Plan for a portion of the Castle Point Veterans Affairs Medical Center ("Castle Point VAMC"). The portion of the Castle Point VAMC subject to the Site Characterization is referred to herein as the "Remediation Site" or "Site", including the collection of background and outfall samples collected immediately upgradient from the Remediation Site. The work plan has been prepared in accordance with the provisions of a draft Memorandum of Understanding (MOU) between the VAHVHS and the New York State Department of Environmental Conservation (NYSDEC) signed by VAHVHS on August 11, 2022[1].

Specifically, the work plan has been prepared to further characterize the environmental conditions at the former landfill areas of the Castle Point VAMC. The Castle Point VAMC is located at 41 Castle Point Road, Wappingers Falls, Dutchess County, New York in a mixed-use area of residential and commercial parcels. The Remediation Site encompasses approximately 49.8 acres of the Castle Point VAMC. The Remediation Site is not currently listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State but is instead identified as a potential site ("P" site) with a NYSDEC Site Number of 314133. The location of the Castle Point VAMC and the Remediation Site is illustrated on the United States Geological Survey (USGS) 7.5-minute Quadrangle (Wappingers Falls) Map, provided as Figure 1. A site plan depicting attributes of the Remediation Site and pertinent site features is provided as Figure 2.

In April 2019, the NYSDEC Division of Materials Management (DMM) evaluated the Site for emerging contaminants including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. As part of this evaluation, additional monitoring wells were installed at the Site and groundwater samples were collected and analyzed for those parameters. The results of the analyses indicated maximum concentrations of 12 parts per trillion (ppt) and 68 ppt for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS),

[1] The MOU had not yet been signed as of November 28, 2022.

respectively, which exceed the maximum contaminant level (MCL) of 10 ppt for each contaminant. 1,4-Dioxane was not detected. A focus list of private and public well receptors was created in 2019. Subsequent testing of one private supply well and two public supply wells – drinking water sources for the hospital – was conducted in October 2019. The laboratory analytical results revealed no detectable concentrations in the private supply well. Maximum concentrations in the public water supply wells were 5.16 ppt for PFOA and 29.0 ppt for PFOS. The most recent groundwater testing for PFAS was performed on October 27, 2022. The VAHVHS, referred to hereafter as the VA, sampled groundwater from Public Wells PW-B, PW-C, and PW-E. PFOS concentrations were found at PW-B (12.0 ppt), PW-C (19.1 ppt), and PW-E (51.6 ppt). PFOA was detected in all three Public Wells below 10 ppt with PW-C the only active supply well. The New York State Department of Health (NYSDOH) is currently working with the VA to provide additional treatment of the drinking water supply.

Due to the identification of PFOS and PFOA, the Site is classified as a "P" site by the NYSDEC due to concerns related to the potential presence of PFAS and other contaminants associated with former landfill operations. It should also be noted that other potential sources in addition to the landfill may be contributing to PFAS in groundwater. In accordance with the MOU, the goals of this work plan are to supplement the 2014 Site Inspection[2] (2014 SI) and the 2016 Supplemental Site Inspection[3] (2016 SSI) with respect to characterization of contamination at the Site, including PFAS, so that the Site may be evaluated by NYSDEC for potential inclusion in the Registry of Inactive Hazardous Waste Disposal Sites in New York State. PFAS are a group of man-made chemicals that includes PFOA and PFOS as well as many other chemicals. PFAS are reported to be very persistent in the environment and can accumulate in the human body. Although no promulgated regulatory remediation standards have been developed for PFAS for various environmental media (i.e., soil, groundwater, or sediment), the NYSDEC views PFAS as a deleterious chemical that requires site characterization.

[2] Final Site Inspection (SI), Castle Point Campus, Mabbett & Associates, Inc., May 5, 2014.

As noted above, the NYSDEC has not established a remediation standard for PFOA/PFOS. However, in May 2016 the United States Environmental Protection Agency (USEPA) established a health advisory combined concentration level for PFOS and PFOA of 70 ppt. This health advisory level was established based on the USEPA's 2016 Health Effects Support Documents. In early 2016, New York, joined by Vermont and New Hampshire, urged the USEPA to acknowledge that PFOA contamination is a national problem that requires consistent federal guidelines. On May 19, 2016, EPA issued the lifetime health advisory of 70 ppt for long-term exposure to PFOA and PFOS in drinking water. In December 2018, NYSDEC and NYSDOH announced that the New York State Drinking Water Quality Council (Council) had recommended that NYSDOH adopt the nation's most protective MCLs for PFOA, PFOS, as well as the nation's first MCL for 1,4-dioxane. Specifically, the Council recommended MCLs of 10 ppt for PFOA and 10 ppt for PFOS. In July 2019, NYSDEC proposed adoption of the Council's recommendation for community, non-community, and transient non-community water systems. It should be noted that neither the USEPA nor NYSDEC have established a remediation standard or action level for PFOA/PFOS in surface water, sediment, or soil.

In October 2020, NYSDEC published PFOA and PFOS soil guidance values in parts per billion (ppb) depending upon the anticipated site use. These values are shown in the table below. NYSDEC has indicated that these guidance values are to be used when evaluating whether or not PFOA and PFOS are contaminants of concern at a given site and assessing remedial action objectives and clean-up requirements, where appropriate. It is our understanding that Soil Cleanup Objectives (SCOs) for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until such SCOs are in effect, the guidance values shown in the table below are to be used.

[3] Supplemental Site Inspection Report – Department of Veterans Affairs Hudson valley Healthcare System – Castle Point Campus, Mabbett & Associates, Inc., May 2016.

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	1.1	3.7

PFOA & PFOS Guidance Values, October 2020 NYSDEC Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs

Based on the preliminary findings at the Site, NYSDEC may require further site characterization activities be completed to determine the nature and extent of PFAS contamination previously identified at the Site. Additionally, NYSDEC is requiring the VA to further investigate other areas of the Site to confirm the presence or absence of additional PFAS source areas. NYSDEC has also required the investigation of potential sources of other Target Compound List/Target/Analyte List (TCL/TAL) contaminants (e.g., volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], pesticides, polychlorinated biphenyls [PCBs], and metals).

The deliverables associated with this Site Characterization Work Plan include a final report which is required in connection with each work plan that is implemented by the VA.

Castle Point VAMC Operational History

The VA has operated at the facility since 1924 when the former farmland property was acquired. The facility currently consists of 30 buildings and structures, mainly located in the eastern portion of the property. The following areas currently exist at the facility:

- wastewater treatment plant (with NYSDEC State Pollutant Discharge Eliminations System [SPDES] permit to discharge to the Hudson River);
- natural gas boiler plant (with NYSDEC air permit);
- 12 emergency diesel generators;
- 25 aboveground fuel oil storage tanks;
- stormwater management system (with NYSDEC stormwater permit);
- one active drinking water well; 10 offline or abandoned wells;
- 6 former landfills (Designated A through F);
- former boiler plant, incinerator, and steam generator (used until early 1980s, demolished in 2010);
- closed underground storage tanks (formerly stored petroleum).

Since 1924, groundwater wells have been installed to supply drinking water for the facility. Seven wells were previously installed and abandoned over time. Four additional wells were subsequently installed – three of which are currently offline and one in use. The groundwater is stored and treated at the facility before use. A surface water intake from the Hudson River is not used for potable water.

As reported in the 2014 SI report, wastes were generated at the VAMC, since 1924, from the medical facility and a boiler plant/incinerator. Until 1978, the VAMC disposed of the medical wastes and the boiler/incinerator ash in six unlined landfills. Boiler/incinerator ash may also have been disposed in the area around the former boiler plant. The landfills were situated at or below the groundwater table and were reportedly covered with soil excavated during the construction of the new powerhouse and other facilities. The thickness and composition of the soil cover is unknown. The following information is provided for each of the six former landfills, as outlined in the 2014 SI report:

- Former Landfill A:
    - Used for disposal of larger equipment and containers such as medical equipment, drums, batteries, cylinders, and waste oil containers.
    - Reportedly contained paints, oils, solvents, mercury, asbestos, medical and surgical infectious waste, batteries (lead acid), laboratory chemicals, pharmaceuticals, incinerator ash, building debris, mechanical equipment, and paper products.
    - Approximate volume is estimated to be 130,000 cubic feet or 39,625 cubic meters.
    - Gravel/soil cover placed late 1970s/early 1980s.
- Former Landfill B:
    - Located adjacent to/west of Former Landfill A; property north of the VAMC property line is now used for Castle Point Park, owned by the Town of Wappingers Falls.
    - Refuse dump that reportedly contained construction debris, solvents, household trash, tires, and drums.
    - Approximate volume is estimated to be 9,000 cubic feet or 255 cubic meters.
    - Gravel/soil cover placed – date unknown.
- Former Landfill C:
    - Located adjacent to/west of Former Landfill B; property north of the VAMC property line is now used for Castle Point Park, owned by the Town of Wappingers Falls.
    - Fire training facility included fire pit (200 feet [61 meters] l x 100 [30.5 meters] feet w x 10 [3.1 meters] feet deep).
    - Reportedly contained construction debris, fill dirt, maintenance chemicals, oils, mechanical parts, electrical devises, and paper products.
    - Gravel/soil cover placed – date unknown.
- Former Landfill D:
    - Located south of Boggy Pond – surrounding the southern tip and extending to the main campus road.
    - Reportedly contained construction debris, fill dirt, pipe tunnels, and an old graveyard.
    - Approximate volume is estimated to be 30,000 cubic feet or 850 cubic meters.
    - Gravel/soil cover placed – date unknown.

- Former Landfill E:
    - Located south of the former boiler plant adjacent to the southern border of the VAMC facility where a former pond existed. As of 1991, stormwater runoff and treated wastewater released from the campus passed through the Former Landfill E.
    - Reportedly used for illegal dumping – contained construction debris and household/other trash, similar to the adjacent property containing refrigerators, cars, and bottles.
    - Approximate volume is estimated to be 5,000 cubic feet or 142 cubic meters.
    - Gravel/soil cover placed – date unknown.
- Former Landfill F:
    - Located along the road between the water plant and wastewater treatment plant.
    - Reportedly contained construction debris, fill dirt from on-site excavations, paints, solvents, mercury, medical waste (syringes), and grass clippings.
    - Approximate volume is estimated to be 12,000 cubic feet or 340 cubic meters.

Physical Setting

Site Description/Land Use

The Site is located at 41 Castle Point Road, Wappingers Falls, Dutchess County, New York (Figure 1) in a mixed-use area of commercial and residential parcels. To the north of the Site is Castle Point Park and undeveloped land, to the east is Route 9D and residential housing, to the south is residential housing, and to the west are railroad tracks and the Hudson River.

Site Topography and Drainage

The topography of the Site and the surrounding area is generally flat with a minimal (<5%) west-facing slope, toward the Hudson River (Figure 1).

Geology and Hydrogeology

Regional and Site Geology

As outlined in the 2014 SI report, the Pleistocene-origin overburden consists of lacustrine silt and clay deposits in the northwestern portion of the Site and of glacial outwash sand and gravel deposits in the southeastern portion of the Site. The glacial outwash deposits are considered to be unstratified drift consisting of clay, cobbles, and boulders at a thickness of approximately 200 feet or 61 meters. The overburden overlies Paleozic-age bedrock of the Hudson River Formation, consisting primarily of slate and shale, with chert/sandstone, limestone, and conglomerate beds. The thickness of this formation in the vicinity of the Site is unknown but generally ranges from a few feet to thousands of feet.

Site Hydrogeology

As also outlined in the 2014 SI report, two aquifers exist beneath the Site: the glacial outwash sand and gravel unit and the underlying Hudson River Formation bedrock. Slaty cleavage in the bedrock of the Hudson River Formation produced many small, closely spaced subparallel joints and fractures that store most of the groundwater in the formation and results in an estimated permeability of greater than 10^{-5} centimeters per second, likely toward the Hudson River. The sand and gravel unit also has a permeability of greater than 10^{-5} centimeters per second. Water flow in the sand and

gravel unit likely moves by gravity from higher to lower elevations. Groundwater recharge to both the sand and gravel unit as well as the Hudson River Formation bedrock occurs primarily through precipitation. Groundwater discharge occurs from wells, natural seepage, and evapotranspiration. The Site is located in the HUC 12 Wicopee Creek-Fishkill Creek watershed within the HUC 8 Hudson-Wappinger watershed. As reported in the 2014 SI, the general depth-to-groundwater at the Site is 4.9 feet or 1.5 meters below ground surface.

Site groundwater flows from east to west, discharging to the Hudson River, as shown in Figure 3.

2014 and 2016 Site Investigation Findings

The 2014 SI was conducted[4] to evaluate the Site as a candidate for the National Priority List (NPL). Subsurface soil samples were collected from the potential waste disposal areas (Landfills A through F and the former boiler plant area) to identify source areas, hazardous substances, and pathways to groundwater, surface water, and air. Findings from the 2014 SI indicated that hazardous substances found in the source area landfills were also found in several of the nearest on-site potable groundwater wells which were used to supply drinking water (post-treatment) at the Castle Point VAMC. The detected contaminants in groundwater wells, including chromium, copper, cyanide, lead, nickel, potassium, and zinc, were at concentrations below the federal primary drinking water MCLs. Additionally, there were several factors in the groundwater sampling that led to uncertainty regarding interpretation of the data including analysis of only unfiltered groundwater samples (with a potential high bias to data); monitoring wells were not developed prior to sampling; and background conditions were determined based on data from only a single monitoring well.

The 2016 SSI included a geophysical survey that found no large, well-defined areas of subsurface anomalies within the suspected landfill areas, only smaller, localized, and presumed historically surficial deposits. The groundwater investigation consisted of sampling at five monitoring wells (and one background well [MW-4]). Exceedances of the lead MCL (15 micrograms per liter [µg/L] or parts per billion) were detected at MW-3 and MW-6 at concentrations of 17.7 ppb and 495 ppb, respectively. Manganese and several other metals exceeded the federal recommended Secondary Maximum Contaminant Levels (SMCLs) at various, select monitoring wells.

At the time of the 2016 SSI, the Castle Point VAMC operated two production wells for their drinking water supplies. Sampling of the two wells showed concentrations of more than three times the background levels (at MW-4) for copper, iron, manganese, nickel, and sodium. When compared to a background sample from the Hudson River (upstream), the production wells contained three times the background levels for

[4] Following up on the 1991 Screening Site Inspection.

copper, nickel, and zinc. There were no production well samples with post-treatment concentrations above Superfund Chemical Data Matrix (SCDM) level, MCLs, or federal Tap Water Screening Levels.

As with the 2014 SI, the 2016 SSI resulted in a Hazard Ranking System (HRS) score that was driven by groundwater migration. Although the 2016 SSI found no contaminants above the SCDM level, it resulted in a recommendation to characterize groundwater proximate to, and hydraulically upgradient of, the known disposal areas to define the boundaries of the metal exceedances. The 2014 SI and the 2016 SSI did not address PFAS in any environmental media.

Health and Safety

First Environment prepared a site-specific health and safety plan (HASP) in accordance with NYSDEC guidance[5], incorporating the tasks to be completed as outlined in this Work Plan. The HASP is a requirement of the federal Occupational Safety and Health Administration (OSHA) and is not subject to the approval of NYSDEC. The HASP is included as Appendix A of this Work Plan.

Prior to initiating any on-site intrusive activities, First Environment, or its subcontractors, will complete the required public utility mark-out and notifications.

[5] DER Technical Guidance for Site Investigation and Remediation dated May 2010 (NYSDEC DER-10).

Quality Assurance Project Plan (QAPP)

Samples obtained by First Environment will be collected in accordance with the NYSDEC Department of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation dated May 2010 (NYSDEC DER-10) and NYSDEC PFAS Sampling Guidance. Following sample collection, sample containers will be placed into shipping coolers provided by the laboratory and chilled to 4ºC. Each cooler will be accompanied by a completed chain-of-custody record. The samples will be stored and shipped within 24 hours to York Analytical Laboratories (a NYSDOH ELAP-certified laboratory). Laboratory analyses will be performed using accepted and current USEPA analytical methods. Samples collected for PFAS analysis will be analyzed via USEPA Method 1633 with Category B deliverables. Samples collected for TCL/TAL will also have Category B deliverables. The data will be provided in an electronic data deliverable (EDD) format under the NYSDEC EQUIS Environmental Data Management System.

Samples will be handled and analyzed in compliance with sample holding times, method detection limits, and precision and accuracy criteria for the analytical method. Pursuant to NYSDEC guidance, the scope-of-work (SOW) includes quality assurance procedures to be followed for sampling and analysis. Quality assurance/ quality control (QA/QC) procedures required by NYSDEC are to be documented in the QAPP. The minimum requirements for the QAPP for this project include details of:

i. The project scope and project goals as well as how the project relates to the overall site investigation or remediation strategy.

ii. Project organization, including the designation of a project manager, quality assurance officer, and field analyst (if field analysis is planned). Resumes of these individuals may be included.

iii. Sampling procedures, data quality usability objectives, and equipment decontamination procedures.

iv. Site map showing sample locations.

v. An "Analytical Methods/Quality Assurance Summary Table"[6] which must include the following information for all environmental, performance evaluation, and quality control samples:

(1) matrix type;
(2) number or frequency of samples to be collected per matrix;
(3) number of field and trip blanks per matrix;
(4) analytical parameters to be measured per matrix;
(5) analytical methods to be used per matrix with minimum reporting requirements; and
(6) number and type of matrix spike and matrix spike duplicate samples to be collected.

The QA/QC procedures will be conducted as described in the QAPP provided as Appendix B.

Data Validation

The analytical data package from the laboratory will be reviewed by an inspector to determine compliance with the NYSDEC requirements. The review of the analytical data will be submitted separately upon its completion.

[6] Currently, there are no standard USEPA methods for analyzing PFAS in surface water, non-potable groundwater, wastewater, or solids. For non-drinking water samples, NYSDEC is now requiring all work plans approved after November 1, 2022 to use USEPA Method 1633. This method has no consistent sample collection guidelines and has not been validated or systematically assessed for data quality.

Scope-of-Work

First Environment has prepared the following SOW in compliance with the draft MOU between NYSDEC and the VAHVHS. The MOU requires the supplementation of the 2014 SI and the 2016 SSI to characterize the Site for the presence of PFAS in environmental media as well as laboratory testing 15 percent of the PFAS sample volume for TCL/TAL VOCs, SVOCs, pesticides, metals, and PCBs. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, First Environment will follow accepted procedures as outlined in previous NYSDEC DER technical guidance pertaining to PFAS as well as the most recent November2022 draft.[7]

The investigation focuses the characterization of soil, sediment, surface water, and groundwater at 11 areas across the site, focusing on the six former landfills (A,B,C,D,E,F), former Medical Incinerator, Sewage Treatment Plant (STP), Boggy Pond, Outfalls, and Stream. In addition, First Environment will collect background soil samples upgradient to the areas described above.

This SOW provides a site characterization plan for PFAS and other potential contaminants in the environmental media at the Site. In total, 59 soil, sediment, and surface water sample locations have been proposed at former Landfills A through F, Boggy Pond, former Medical Incinerator, STP, Former Boiler Plant, Outfalls/Stream, and background/upgradient of the former landfills. Thirty-seven of the sample locations consist of soil borings that will extend to the water table. At each soil boring location soil will be collected from 0 to 6 inches below vegetative cover and six inches above the water table for PFAS laboratory analysis using USEPA Method 1633. Six background surface soil samples will also be collected for PFAS from 0 to 6 inches below vegetative cover. In total, 80 soil samples and up to 15 sediment and 16 surface water samples are being proposed for PFAS analysis at the 59 sample locations. In addition to laboratory sample analysis for PFAS, a select number representing 15 percent of the samples will be submitted to a New York State certified laboratory for the TCL/TAL analyses. It should be noted that TCL/TAL sample collection will be biased at former landfill areas

within the Remediation Site. In addition to PFAS, if surface soil samples are collected for TCL, such samples will be collected from 0 to 6 inches below vegetative and TAL surface soil samples will be collected from 0 to 2 inches below vegetative cover. First Environment anticipates the collection of 17 quality assurance, duplicate, and field blank samples for PFAS and 15 duplicate, field blank, and trip samples for TCL/TAL.

First Environment is also proposing to install seven monitoring wells (four shallow and three deep). Three well locations will include a well couplet to evaluate the presence of PFAS below the water table as well as to measure the vertical hydraulic gradient. In addition to the seven proposed monitoring wells, ten existing wells identified on-site will be included in the groundwater sampling event. The wells proposed for groundwater monitoring wells are located at Landfill E (PW-B, PW-C, PW-D and PW-E), MW-1 at former Landfill A, MW-5 downgradient of former Landfill D, MW-2 at the former Boiler Plant/Water Intake Building, MW-3 located side-gradient of former Landfill B and C, MW-4 downgradient of former Landfill F, and MW-6 at the northern extension of former Landfill F. In all, First Environment is proposing to sample groundwater from 17 monitoring and production wells. Samples will be submitted to a New York State certified laboratory for PFAS analysis using USEPA Method 1633 as well as the submission of 15 percent of those samples for TCL/TAL laboratory analysis.

Table 1 includes a Summary Location, Media, and Laboratory Analyses for samples and well installations. Table 2 includes a proposed schedule for implementation of the work plan. Figures 4 through 7 illustrate the locations where soil boings, well installations, and environmental media are proposed for sample collection and analysis.

Soil Assessment

First Environment will collect six background soil samples upgradient from the former landfill locations as shown in Figure 4. A stainless-steel trowel will be used to collect surface soil samples. All samples are expected to be collected in areas where vegetative cover is present. Soil samples will be analyzed for PFAS and serve to

[7] SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS Under NYSDEC's Part 375 Remedial Programs, November 2022).

establish background levels upgradient from the former landfill areas. First Environment will retain a drilling subcontractor to conduct soil borings at 37 locations. The proposed soil boring locations where the drilling is expected to take place is shown in Figure 5. Based on field conditions, First Environment's geologist will select and finalize the locations where drilling will occur. First Environment does not expect the location to change significantly but could change slightly due to site conditions from what is proposed in Figure 5.

A 7822 track-mounted geoprobe will be used to perform drilling at the specified locations. The sampling equipment used to collect samples at soil borings will consist of steel dual-tube DT-21/22 sampling technology. A macrocore barrel will be used with a PVC liner to collect the soil samples continuously as the steel dual-tube casing is advanced to the top rock. If bedrock is encountered, the soil boring will be terminated. The soil will be classified and reported in a field book by a First Environment geologist using the Unified Soil Classification System (USCS) and screened using a Photoionization Detector (PID).

At each soil boring one surface soil sample will be collected at 0 to 6 inches and one additional sample will be collected immediately above the water table. Each sample will be submitted to a NYSDOH certified laboratory for PFAS analysis using USEPA Method 1633. If elevated VOC levels are encountered by the PID, soil sample collection for TCL/TAL will be biased toward those locations at each landfill where the highest levels were encountered. If the highest VOC level is encountered by the PID in the sample immediately above the water table, VOC samples will be collected in both the 0 to 6 inch interval and the sample immediately above the water table. No more than two TCL/TAL samples will be collected at each landfill. A total of 15 percent of the PFAS samples in each media (soil, groundwater, surface water, and sediment) will be collected for TCL/TAL analysis, as specified in the QAPP. Surface soil samples for PFAS and TCL will be collected 0 to 6 inches below vegetative cover and samples for TAL will be collected from 0 to 2 inches below vegetative cover.

Once the soil boring is terminated and soil samples are collected, the soil borings will be backfilled with soil, sand, and bentonite. Each sample location will be staked and surveyed by a licensed surveyor for horizontal control.

Sediment & Surface Water Assessment

The proposed site characterization includes the collection of up to 16 surface water and 15 sediment samples at locations illustrated in Figure 6. A total of up to eight sediment and surface water will be collected at outfall locations, as well as up to six locations along the stream/culvert, including one at Boggy Pond. At the time groundwater sampling is performed, First Environment will collect a surface water sample from the Hudson River adjacent to the active water supply well PW-C.

The sediment samples will be collected at the streams bank immediately adjacent to the stream where fine sediment has collected. Sediment samples differ from soil samples as a result of being deposited by the fluvial process associated with the stream. The samples collected will be submitted to a NYSDOH certified laboratory for PFAS analysis by USEPA Method 1633. First Environment intends to collect up to three sediment and three surface water samples for TCL/TAL analysis, as specified in the QAPP. Each sample location will be staked and surveyed by a licensed surveyor for horizontal control.

Groundwater Assessment

As part of the site characterization, First Environment will install additional monitoring wells to evaluate the horizontal and vertical flow, perform slug tests to assess the hydraulic characteristics of the water-bearing zone, perform groundwater sampling at monitoring wells for PFAS, and at two monitoring wells collect additional samples for VOC, SVOC, pesticides, metals, and PCB analysis.

Monitoring Well Installation

The groundwater investigation will include the installation of three shallow monitoring wells at former Landfills A, B, and C. One additional monitoring well will be installed downgradient of MW-2 at the Boiler Plant/Water Intake Building (also downgradient of former Landfill A). To determine the vertical hydraulic gradient, deep horizontal

groundwater flow direction, and potential PFAS contaminant impacts below the water table, First Environment intends to install three deep monitoring well couplets at former Landfill C, downgradient of Landfill D, and next to the PW-C assuming such deep wells can be installed in the unconsolidated aquifer immediately below the existing wells. The installation of shallow and deep monitoring wells is proposed to fill data gaps to further evaluate groundwater conditions in the shallow and deep-water bearing zones at each of the three well couplet locations. Figure 7 illustrates the approximate location of the seven proposed shallow and deep monitoring wells, including the existing monitoring wells that will be sampled and analyzed for PFAS.

First Environment will retain a drilling subcontractor to install the monitoring wells using a Geoprobe track-mounted 7822 drill rig. The installation of seven monitoring wells will be completed over an estimated 5- to 7-day period. The benefits of the Geoprobe track rig are that the rig is small, maneuverable, remote-controlled, and allows for continuous soil collection using a dual-tube methodology. The soil will be classified by a First Environment geologist using the USCS and screened using a PID.

The shallow monitoring wells will be constructed using two-inch PVC riser (Schedule 40) together with 10 feet of two-inch 0.010 slotted PVC screen. The shallow wells will be installed in such a manner that the screened interval will bridge the water table with approximately three feet of screening above and seven feet below the average water table.

The proposed deep monitoring wells will be installed adjacent to the designated shallow monitoring wells. The deep monitoring wells are not expected to extend to a depth greater than 30 feet (9 meters) below ground surface. The wells will also be constructed using two-inch PVC riser (Schedule 40) together with 10 feet (3.1 meters) of two-inch 0.010 slotted PVC screen. Monitoring wells will be installed using four feet of steel protective casing and monitoring wells and painted yellow. The purpose of the steel protective casing is to facilitate locating the monitoring wells and protect them from lawn cutting practices and potential other vehicular traffic.

Upon completion of the well installation, each well will be developed until a sediment-free discharge is achieved. The existing and newly installed monitoring wells will be surveyed by a licensed surveyor for vertical and horizontal control.

Investigation Derived Waste (IDW)

Drill cuttings from wells will be stockpiled at a central location either in drums or on top of protective sheeting and properly covered until site characterization of the soil is completed. Once obtained from the laboratory, waste characterization results will be provided to the NYSDEC project manager along with a completed request for an importation form for approval of on-site reuse. Investigation derived waste (IDW) for groundwater, unless groundwater is observed to contain visible waste, free product, NAPL, sheens, or are otherwise grossly contaminated, will return to ground un-containerized. If groundwater is encountered, under those circumstances where contamination is visible as described above, well development and purge water will be containerized for subsequent characterization following Table 5.4(e)10 in DER-10.

Groundwater Sampling & Analysis

Once the seven proposed monitoring wells have been installed, the newly installed monitoring wells and ten existing wells will be sampled and submitted to a NYSDOH certified laboratory for PFAS analysis by USEPA Method 1633. First Environment intends to collect up to three groundwater samples for TCL/TAL analysis. Sample selection for TCL/TAL will be biased toward monitoring wells that exhibit the highest levels of VOCs in the monitoring well head space. Sampling procedures are specified in the QAPP.

Aquifer Characterization (Slug Tests)

Slug tests will be conducted at existing and newly installed monitoring wells (not supply wells) in accordance with the requirements outlined in DER-10. The primary objective of the slug tests is to provide data necessary for estimating the hydraulic conductivity of the aquifer. First Environment will conduct rising head, in-situ hydraulic conductivity tests (slug tests) at each newly installed monitoring well. Falling head aquifer tests will not be conducted as this is not an appropriate test for wells where the screened interval spans the water table in unconfined aquifer conditions such as those present on-site.

All downhole equipment (pressure transducer and slug) will be thoroughly decontaminated to prevent potential cross-contamination issues. The static water level within each well will be measured and recorded. A pressure transducer will then be placed into the well to a depth immediately above the base of the well. The transducer will be allowed to thermally equilibrate and be connected to an in-situ Hermit data logger for data logging purposes. One slug volume of groundwater will be removed from the well with a PFAS-compatible non-Teflon bailer. Following removal, the resulting water level rise will be continuously logged via the pressure transducer and data logger. The water level will be allowed to recover to a minimum of 90 percent of the pre-slug removal water level condition.

Upon recovery of the water level, the test/data logging will be stopped, and the in-situ portion of the testing will be deemed complete. The data collected during the aquifer testing will be analyzed using Aqtesolv for Windows Version 3.0 using the Bouwer and Rice Method to calculate the resulting hydraulic conductivity (permeability). The results of the hydraulic conductivity will be provided in the Final Report submittal summarizing the findings.

Report Summary

First Environment will provide a Site Characterization Report of the investigation work performed and findings for work activities.

Schedule

Subsequent to NYSDEC's review and approval of the Site Characterization Work Plan (SCWP), First Environment will immediately initiate the SCWP activities. Table 1 identifies the sample media, number of samples, sample location, and laboratory analysis samples to be submitted to a New York State Certified Laboratory. Table 2 identifies the estimated completion schedule for work activities. Subsequent to NYSDEC's review and approval of the SCWP, First Environment will immediately initiate the site characterization activities by coordinating with drilling and other subcontractors.

Upon NYSDEC approval, First Environment estimates completion of the Site Characterization, as described herein, within 120 days culminating with the submittal of a final report to the NYSDEC.

TABLES

TABLE 1
Summary Table
Sample Location Description, Number of Samples by Media and Laboratory Analyses

Sample Area	No. of locations	Soil Samples	Sediment Samples	Ground Water Samples	Surface Water Samples	New Well Installs	Laboratory Analysis	Sample Description	Comments
Landfill A	10	20		2		1	PFAS, TCL/TAL	Ten soil borings (A-1 to A-10). Collect 10 surface soil and 10 soil samples six inches above the water table. Sample groundwater from two monitoring wells.	Install one shallow well. Also, sample from pre-existing MW-1.
Landfill B	5	10		1		1	PFAS, TCL/TAL	Five soil borings (B-1 to B-5). Collect 5 surface soil and 5 soil samples six inches above the water table. Sample groundwater from one monitoring well.	Install one shallow monitoring well.
Landfill C	4	8		3		2	PFAS, TCL/TAL	Four soil borings (C1 to C4). Collect 4 surface soil and 4 soil samples six inches above the water table. Sample groundwater from three monitoring wells.	Install a shallow and deep monitoring well couplet and sample from MW-3 side-gradient from former Landfill C.
Landfill D	5	10		2		1	PFAS TCL/TAL	Five soil borings (D-1 to D-5). Collect 5 surface soil and 5 soil samples six inches above the water table. Sample groundwater from two monitoring wells.	MW-5 was identified during the Site walk and therefore will be utilized for groundwater sampling. One additional deep well will be installed adjacent to MW-5.
Landfill E	5	10		5		1	PFAS TCL/TAL	Five soil borings (E-1 to E-5). Collect 5 surface soil and 5 soil samples six inches above the water table. Collect five groundwater samples.	Install one deep monitoring well adjacent to PW-E that exhibited the highest PFOS concentrations. Four supply wells and one newly installed deep monitoring well will be sampled for PFAS laboratory analysis.
Landfill F	5	10		1			PFAS TCL/TAL	Five soil borings(F-1 to F-5). Collect 5 surface soil and 5 soil samples six inches above the water table.	Sample pre-existing monitoring well MW-6
Boggy Pond	1		1		1		PFAS TCL/TAL	Collect one sediment (SED-1) and one surface water sample (SW-1).	
Sewage Treatment Plant	1	2					PFAS TCL/TAL	One soil boring (STP-1). Collect 1 surface soil and 1 soil sample six inches above the water table.	
Former Medical Incinerator	1	2		1			PFAS TCL/TAL	One soil boring (MED-1). Collect 1 surface soil and 1 soil sample six inches above the water table. Sample one monitoring well.	Sample pre-existing monitoring well MW-4
Water Intake Building/Former Boiler Plant	1	2		2		1	PFAS TCL/TAL	One soil boring (BP-1). Collect 1 surface soil and one soil sample six inches above the water table.	Install one shallow monitoring wells northwest of MW-2. Collect two shallow groundwater samples.

TABLE 1
Summary Table
Sample Location Description, Number of Samples by Media and Laboratory Analyses

Sample Area	No. of locations	Soil Samples	Sediment Samples	Ground Water Samples	Surface Water Samples	New Well Installs	Laboratory Analysis	Sample Description	Comments
Outfalls / Stream	14		14		14		PFAS TCL/TAL	Fourteen sediment (SED 2 to SED-15) and 14 surface water (SW-2 to SW-15) samples to be collected for PFAS from 8 outfall locations and 6 stream/swale locations.	
Background Soil Samples (upgradient of Landfills)	6	6					PFAS TCL/TAL	Six surface soil samples collected for PFAS as background. Samples BG-1 to BG-6 are located upgradient of the former landfills.	
Hudson River	1				1		PFAS	One surface water sample will be collected at the time groundwater samples are collected to evaluate PFAS water quality in the Hudson River as a potential source of PFAS to PW-C.	
	59	80	15	17	16	7			

Sample Locations at Sample Areas are identified in Figures 4, 5, 6 and 7.

The exact number and location of samples for laboratory analysis may be subject to change based on field conditions and sampling equipment operation.

Final sample locations may be determined in the field in consultation with the NYSDEC representative.

Soil borings will be advanced continuously to the water table or refusal and examined in the field for visual, olfactory, or PID field screening evidence of potential contamination.

15% of all PFAS samples collected for laboratory analysis in each media will also be analyzed for TCL/TAL. TCL/TAL may not be collected at every location area as described above

PFAS and VOCs surface soil samples will be collected from 0-6 inches below vegetative cover consistent with NYSDEC PFAS Sampling Guidance as well as DER-10.

For other compounds, surface soil samples will be collected from 0-2 inches below vegetative cover.

Water table is expected between 5 and 8 feet bgs

Wells (Current Status)

1. Well PW-B (NYSDOH deactivated well due to elevated PFOS readings)
2. Well PW-C (only well currently in use)
3. Well PW-D (inactive, ongoing permitting process to use the well on a permanent basis)
4. Well PW-E (Inactive, available for Emergency Use, ongoing permitting process to use the well on a permanent basis)

TABLE 2
Site Characterization
2022-2023 Work Activity Schedule

Milestone	Estimated Duration	Estimated Completion Date
Final Work Plan Submission to NYSDEC	1 day	10 March 2023
Mark-out – Site Visit	1 day	
Soil Borings	6 days	
Surface water & Sediment Sample Collection	1 day	
Monitoring Well Installations & Well Development	5 days	
Slug Tests	4 days	
Well Survey	1 days	
Groundwater Sampling	1 day	
Data Evaluation	30 days	
IDW Handling & Characterization	30 days	
Site Characterization Report	60 days	

Estimated task durations and completions are tentative and are subject to modification based onsite work, progress, weather delays and other considerations such contractor availability as Airport access.

TBD – To Be Determined

FIGURES

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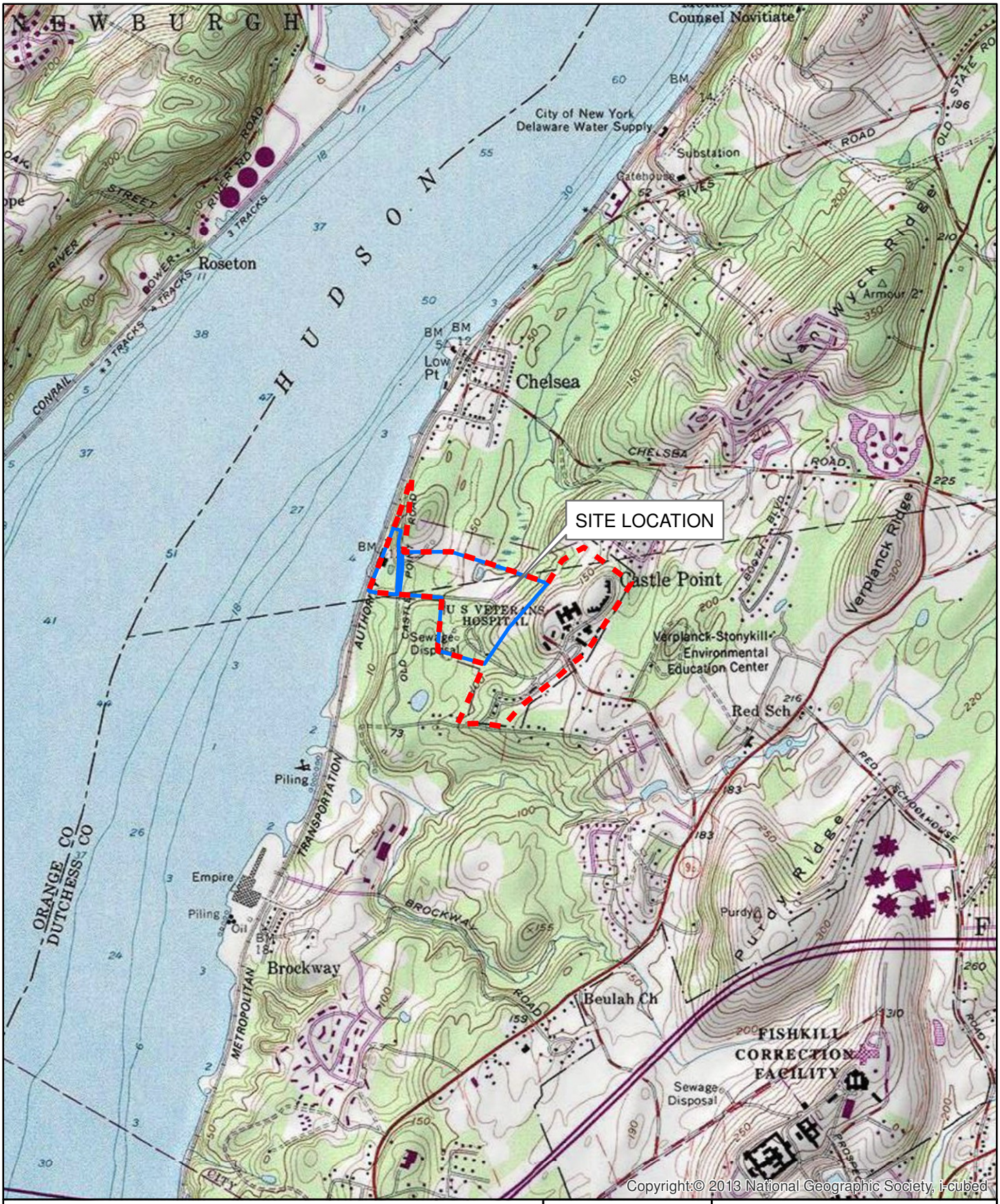
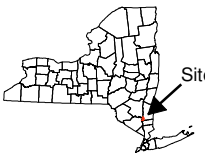




United States Geological Survey,
Wappingers Falls NY Topographic Quadrangle, 1981, Photorevised 1982

1 inch = 2,000 feet

FIRST ENVIRONMENT

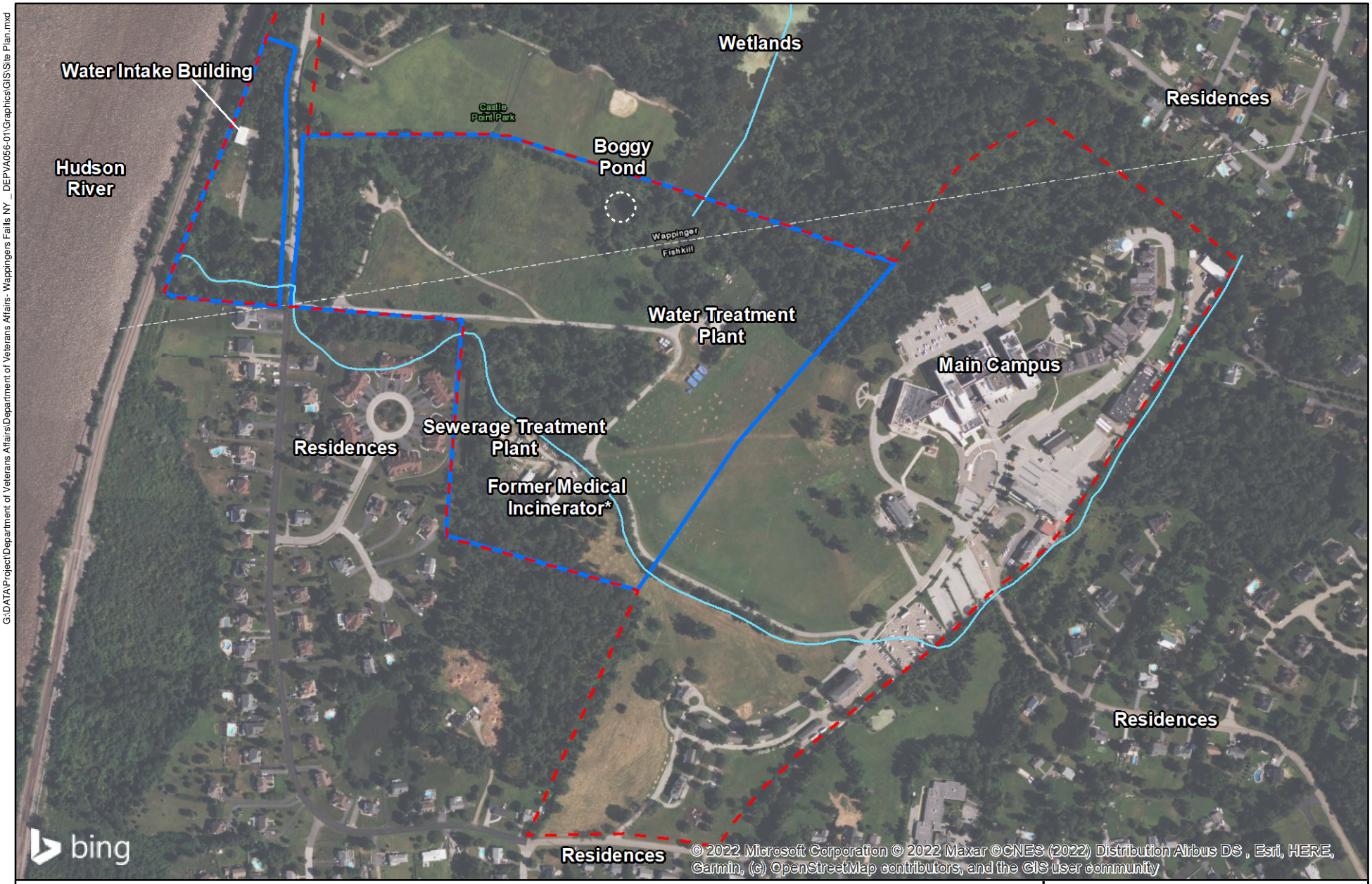
10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

VA - CASTLE POINT CAMPUS

41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

FIGURE 1
SITE LOCATION
TOPOGRAPHIC MAP

Revised	Drawn	Checked	Approved	Date
	CL	CR	SG	1/4/2023



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Legend

- Approximate Facility Boundary
- Approximate Stream Location
- Remediation Site Border

*Note: Medical Incinerator is no longer in use since 1978

0 500 Feet

1 inch = 500 feet

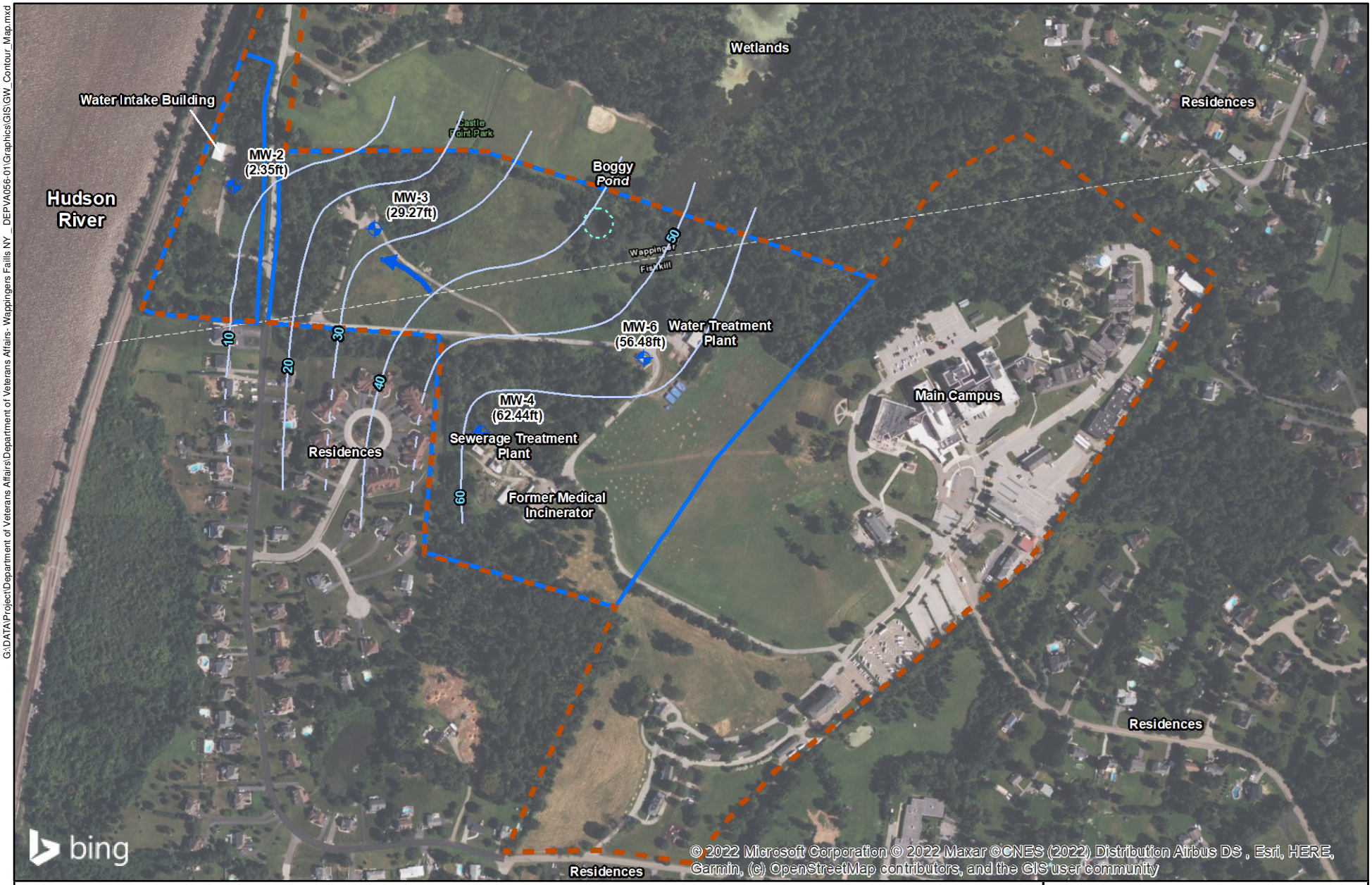
1 centimeter = 60 meters

VA - CASTLE POINT CAMPUS

41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

FIGURE 2
SITE PLAN

Revised	Drawn	Checked	Approved	Date
	CL	SG	SG	1/3/2023



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Legend

- Monitoring Well Location
- Groundwater Contours
- Approximate Facility Boundary
- Groundwater Flow Direction
- Remediation Site Border

Source: May 2016 SUPPLEMENTAL SITE INSPECTION REPORT prepared by Mabbett for the VA.

N W E S

0 500 Feet

1 inch = 500 feet

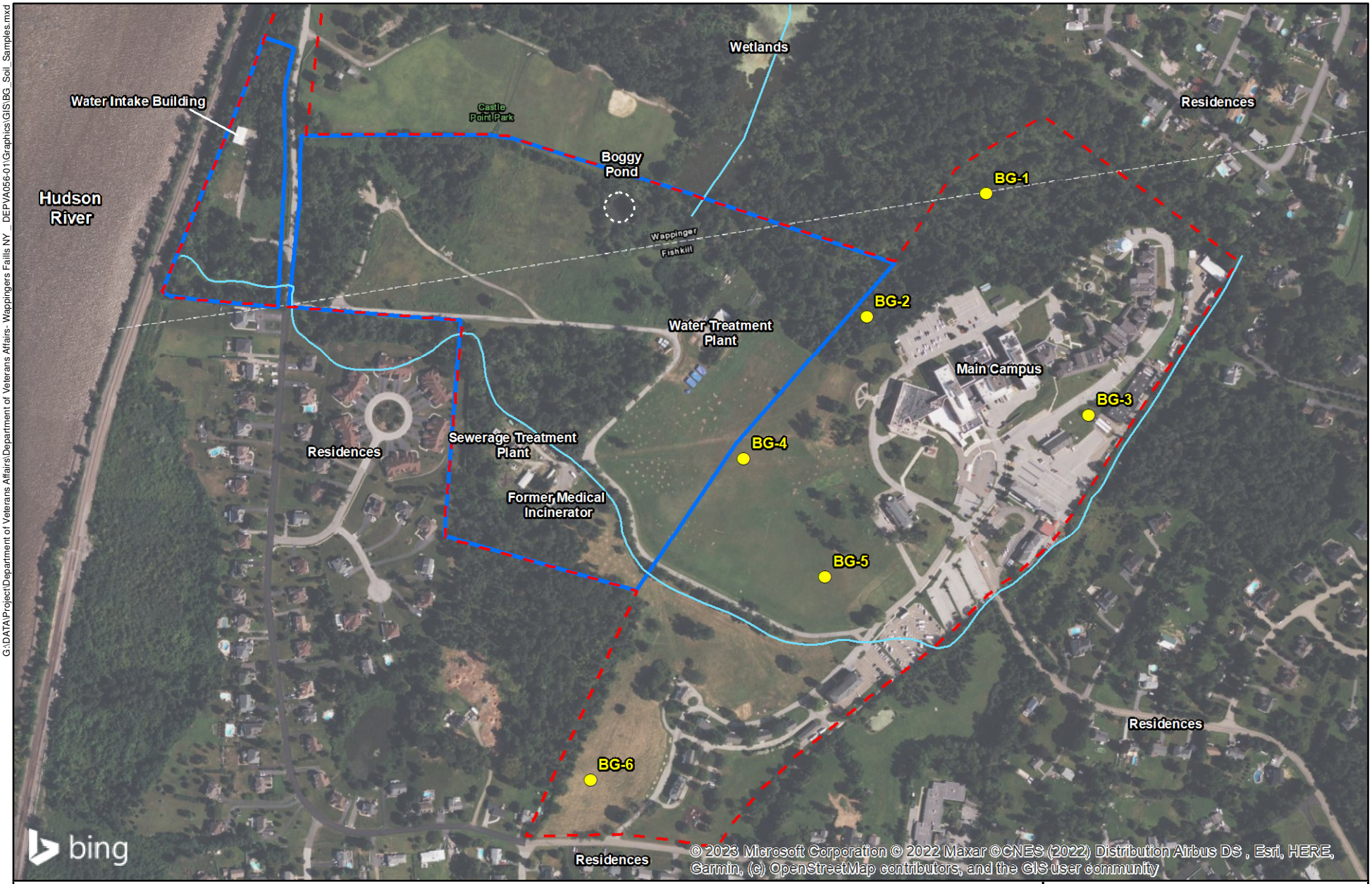
1 centimeter = 60 meters

VA - CASTLE POINT CAMPUS

41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

FIGURE 3
GROUNDWATER ELEVATION AND FLOW MAP

Revised	Drawn	Checked	Approved	Date
	CL			1/4/2023



Legend

- Background Soil Sample
- Approximate Facility Boundary
- Approximate Stream Location
- Remediation Site Border

N
W E
S

0 500 Feet

1 inch = 500 feet

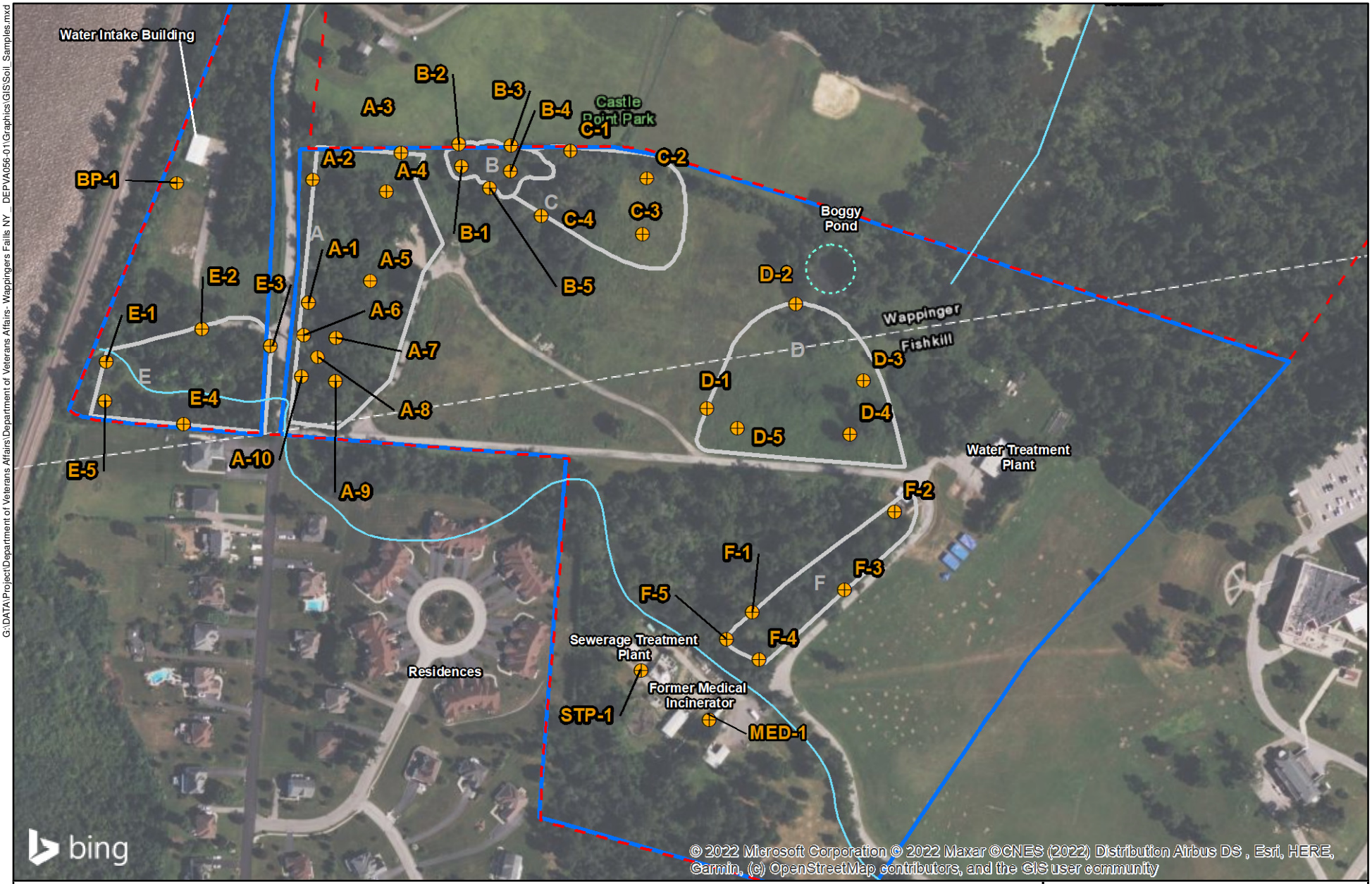
1 centimeter = 60 meters

VA - CASTLE POINT CAMPUS

41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

FIGURE 4
BACKGROUND SOIL SAMPLE LOCATIONS MAP

Revised	Drawn	Checked	Approved	Date
	CL	SC	SC	2/28/2023



Legend

- Portable Well
- Soil Boring Location
- Approximate Stream Location
- Approximate Facility Boundary
- Remediation Site Border
- Landfill Areas

N
W E
S

0 300 Feet

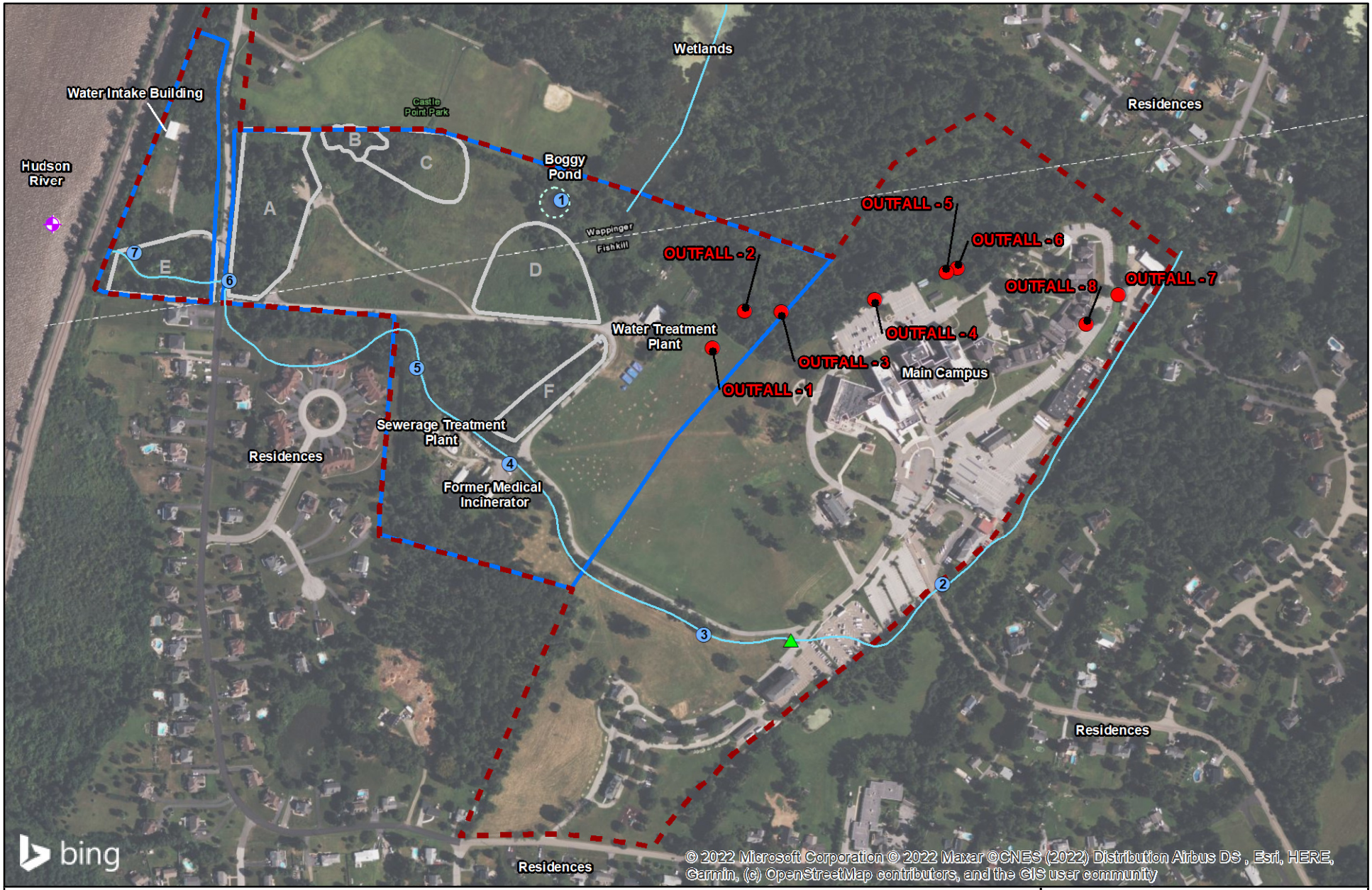
1 centimeter = 36 meters

VA - CASTLE POINT CAMPUS

41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

FIGURE 5
SOIL BORING LOCATION MAP

Revised	Drawn	Checked	Approved	Date
	CL	SG	SG	1/4/2023



VA - CASTLE POINT CAMPUS

41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

FIGURE 6
SURFACE WATER & SEDIMENT SAMPLE LOCATION MAP

Revised	Drawn	Checked	Approved	Date
	CL	SG	SG	1/5/2023

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Legend

- Previously Installed Wells
- Proposed Deep Monitoring Wells
- Proposed Shallow Monitoring Wells
- Approximate Stream Location
- Approximate Facility Boundary
- Former Landfill Area
- Remediation Site Border

N
W E
S

0 300 Feet

1 centimeter = 31 meters

VA - CASTLE POINT CAMPUS

41 CASTLE POINT ROAD, WAPPINGERS FALLS, NY.

FIGURE 7
GROUNDWATER WELL LOCATION MAP

Revised	Drawn	Checked	Approved	Date
	CL	SG	SG	1/4/2023

APPENDIX A

HASP TRACKING SHEET

Project Number: DEPVA056

List all tasks at the site for which a HASP is required. Add tasks as needed for project:

Task Code	Task Description	Date added to HASP	Date(s) Task Revised in HASP	Reason(s) for Revision
A	Soil, sediment, groundwater and surface water sample collection	10/03/22		
B				
C				
D				
E				
F				
G				

Add more tasks as needed

Complete prior to each field effort:

Dates of Field Effort	Task Code(s) Included in Effort	Task Descriptions	Contractor on site for work? (Y,N)	Hazard Level	Completed by:	Field Team Leader/Field Health and Safety Officer

Dates of Field Effort	Task Code(s) Included in Effort	Task Descriptions	Contractor on site for work? (Y,N)	Hazard Level	Completed by:	Field Team Leader/Field Health and Safety Officer

Add more as needed

Site Health and Safety Plan[1]

Section 1: General Information

Site Name:	Castle Point VA Hospital	**Project Manager:**	Devin Demarko
Project Name:	Castle Point VA Hospital	**Site Emer Contact:**	Dave Luer
Project Number:	DEPVA056	**Site Emer Contact #:**	973-229-8348
Project Location:	41 Castle Point Road, Wappinger Falls, NY 12590	**HASP Revision #:**	00
Client Name:	US Department of Veterans Affairs - Hudson Valley Healthcare System, Castle Point Campus	**HASP Approval Date:**	
Site Contact:		**HASP Effective Date:**	
Contact #:			

Section 2: Emergency Contact Information

Local Service Contact Numbers

Ambulance:	911	**Poison Control:**	800-462-6642
Fire:	911	**Fire (non-emergency):**	732-745-5254
Police:	911	**Police (non-emergency):**	732-745-5200

Spill Response Information

DOT HazMat Info:	202-366-4488	CHEMTREC	800-424-9300
National Response Center Hotline:	800-424-8802	CMA Chemical Referral Center:	800-262-8200
State Spill Response Hotline Name	NYDEC Emergency Hotline	Emergency Response Contractor Name:	NA
State Spill Response Hotline number:	800-457-7362	Emergency Response Contractor Number:	NA

First Environment Contact Information

Project Manager:	Devin Demarco	FE Office Number:	973-334-0003
Cell Phone:	732-887-4375	Alternate FE Contact:	Scott Green
Home Phone:	NA	Cell Phone:	201-400-2457
FE Medical Consultant:	Jeffrey Liva, M.D.	FE Human Resources Dir:	Scott Kymer
FE Medical Consultant #:	201-444-3060	Cell Phone:	973-632-6741

Hospital Information (Do NOT attempt to transport anyone for anything other than a minor injury in which the individual is ambulatory. Call 911 for an ambulance instead.)

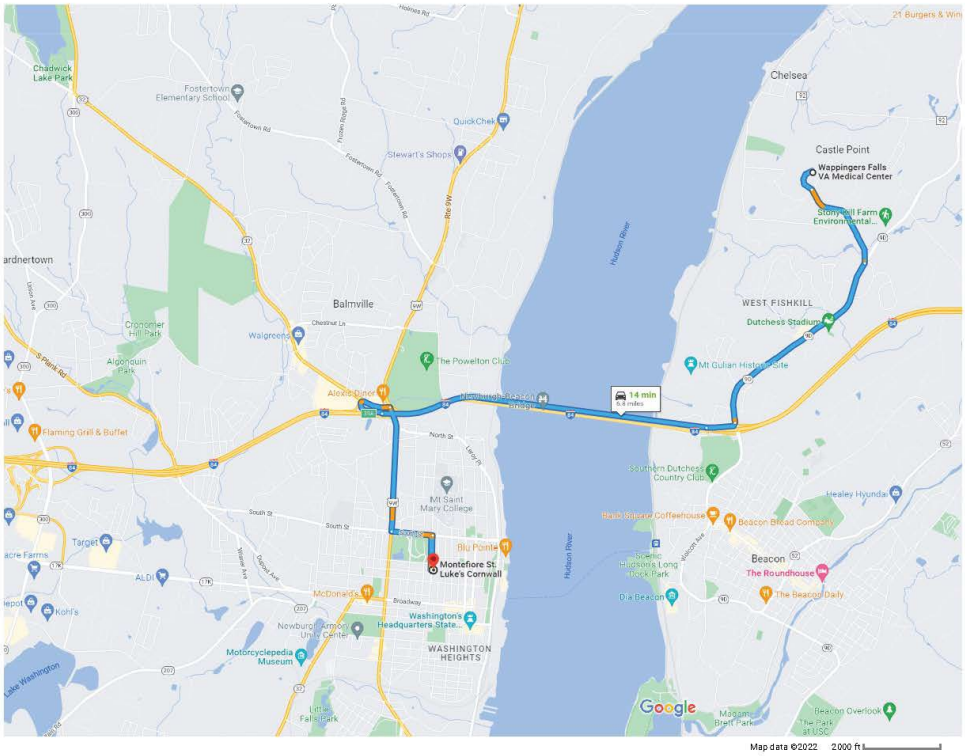
Name:	Montefiore St. Luke's Cornwall		
Address:	70 Dubois Str, Newburgh, NY 12550		
Non-Emerg. Phone:	845 561-4400	Hours of Operation:	24/7
Verified by:	DHFL	Date:	10/3/22

[1] Note: This Health and Safety Plan has been written for the use of First Environment, Inc., its employees, and the tasks to be performed by First Environment employees. The plan is written for specific trained personnel who are under medical surveillance. The plan is applicable for the specific work stated and is representative of conditions believed to exist at the time of its preparation. First Environment, Inc. claims no responsibility for its use by others.

Section 3: Map to Hospital

This page reserved for a map and directions to the hospital.

Google Maps Wappingers Falls VA Medical Center, 41 Castle Point Rd, Wappingers Falls, NY 12590 to Montefiore St. Luke's Cornwall, 70 Dubois St, Newburgh, NY 12550 Drive 6.8 miles, 14 min



Wappingers Falls VA Medical Center
41 Castle Point Rd, Wappingers Falls, NY 12590

Get on I-84 from Castle Point Rd and NY-9D S — 6 min (2.6 mi)

1. Head southwest on Administration Cir toward S River Rd — 0.2 mi
2. Continue straight onto Castle Point Rd — 0.7 mi
3. Slight right onto NY-9D S — 1.5 mi
4. Slight right onto the ramp to Newburgh — 0.2 mi

Continue on I-84 to Newburgh — 7 min (3.6 mi)

5. Merge onto I-84 — 2.3 mi
6. Take exit 39A to merge onto NY-32 S/N Plank Rd toward US-9W S/Newburgh — 0.4 mi

In the event of an injury, incident or release, notify the PM, Senior Management, and HR as soon as safe to do so

Section 4: Site Description

Field Effort Objectives (check those applicable)

Initial Assessment	**X**
Delineate contamination	**X**
Remediate contamination	**X**
Other (list below)	**X**
On-going investigation soil, sediment, groundwater & surface water sample collection	

Site Characteristics (check all that apply)

First Entry		Hazardous (CERCLA/State Superfund)	
Previously Characterized	**X**	Hazardous (RCRA)	
Active	**X**	HAZWOPER	**X**
Inactive		Sanitary or C and D Landfill	
UST/LUST		Secure	
Manufacturing		Other (list below)	
Construction			

Project History

First Environment, Inc. was retained by Department of Veterans Affairs to investigate environmental contamination associated with historic operations at the site. Specifically, the investigation includes evaluation of emerging contaminants PFOS and PFAS at the site and in the immediate vicinity of adjacent off-site properties.

Site Security and Control Measures

None by First Environment.

Section 5: Known General Site Hazards

Potential Chemical Hazards found at Site

Identify suspected compounds and levels if known. If levels are unknown, indicate unknown with **U**. If compounds are not present or not suspected to be present indicate with **NA**. If a class of compounds (in bold) is not present at the site, indicate NA for the class, it is then not necessary to fill in NA for compounds within the class.

Compounds	Known Concentration Ranges			Symptoms of Acute Exposure
	Soil (mg/kg)	W/GW (μg/L)	Indoor Air (ug/m^3)	
Semi-Volatile Organics				
Benzo(a)anthracene	ND–1,400			
Benzo(a)pyrene	ND-1,300			
Indeno(1,2,3-cd)pyrene	ND-890			
PCBs				
Arochlor 1248	ND-9,200			
Metals				
Arsenic	3.6-15.7	4.6		
Lead	ND-910			
Mercury	ND – 30.9			
Thallium	ND – 0.7			
Zinc	ND - 355			
PFOA + PFOS		48		

Potential Physical Hazards Found at Site

Check all that apply. Indicate NA if they do not apply.

Unknown/Partially Characterized	**X**	Stored Energy/Energized Equipment	
Utility Lines	**X**	Confined Space*	
Electrical (other than utilities)	**X**	Oxygen Deficiency	
Fire		Slippery Surfaces/Tripping Hazards	**X**
Explosion*		Fall Potential	**X**
Toxic Gases		Flying or Falling Material	
Ionizing Radiation*		Pinch Points	
Uneven Terrain	**X**	Poor Visibility/Inadequate Light	
Traffic	**X**	Water Hazards (specify)	**X (streams and creeks)**
Heavy Machinery/Moving Equipment/aircraft	**X**	Air or steam emissions	
Crushing Hazard		Biological Waste (specify)	
Venomous Snakes	**X**	Wild Animals	**X**
Poisonous Plants	**X**	Other: Moving vehicles	**X**
Venomous Spiders	**X**		
Mosquitoes, Ticks or other Biting Insects	**X**		

Restroom Facilities Location: N/A

Section 6: Work (Task) Description

If multiple tasks with different hazard profiles and risk controls are planned or as tasks are added , copy Sections 6, 7, and 8 and fill out for each task to identify task related hazards and appropriate controls.

* If this risk is identified, Senior Management must approve the HASP.

Task Code: _A_ (see cover page)

Tasks to be performed by First Environment

Describe Tasks: Site Inspection/Collect Soil, sediment, groundwater & surface water sample collection

Work Plan attached to HASP or provide separately? Separately

Describe roles and responsibilities personnel will perform: Collect soil, sediment, groundwater & surface water samples

Tasks to be performed by First Environment contractors[2]

Task:	Soil, sediment, groundwater & surface water sample analysis	Subcontract Type (place x beneath type of agreement	
		MSA	Individual
			X
Contractor:	Aqua Pro Tech Labs	Effective Dates:	Effective Dates: 6/3/2019

Task:		Subcontract Type (place x beneath type of agreement	
		MSA	Individual
Contractor:		Effective Dates;	Effective Dates:

Task:		Subcontract Type (place x beneath type of agreement	
		MSA	Individual
Contractor:		Effective Dates;	Effective Dates:

Confirm all subcontracts covering tasks to be performed by subcontractors are in place, cover the work to be performed, and are for the time period of the work. Attach to back of HASP.

Section 7: FE Work Hazard Assessment

Task Code: __A__

All chemicals to be brought on site for work	Approximate Amount	Form (liquid, solid, gas)
Alconox	4 oz.	Solid
Gasoline		
Dilute Hydrochloric Acid	<40 mL	Liquid
Methanol		
Dilute Nitric Acid		
Dilute Sulfuric Acid		
Other (specify names)		

[2] Site characteristics to the best of First Environment's knowledge are included in this HASP. Per the subcontractor agreement, each subcontractor must assess hazards associated with their site work and have a site- specific health and safety plan covering their work on site.

Is there a potential for a chemical release beyond an incidental release?
If yes, explain:

Heavy equipment brought on site for work	Check all Applicable
Drill rig	
Geoprobe	X
Excavator	
Backhoe	
Front End Loader	
Injection system	
Dump truck	
Generator	
Other: Moving aircraft and other airport equipment	X

If equipment at the facility is to be relied on, list the equipment and location:

Equipment	Location

Hazards that apply to work to be performed	Check all applicable	Describe work activities to which it applies
Unknown/Partially Characterized	X	Sample collection
Cold Exposure	X	Sample collection
Heat Stress	X	Sample collection
Explosion*		
Fire		
Toxic Gases		
Oxygen Deficiency*		
Confined Space*		
Ionizing Radiation*		
Chemical Dermal Exposure		
Chemical Inhalation		
Chemical Ingestion		
Dust/air emissions		
Air or steam emissions		
Biological Waste (specify)		
Aircraft Traffic		
Extreme weather, heat	X	Sample collection
Stored Energy/Energized Equipment		
Heavy Machinery/Moving Equipment		
Pump Winch		
Slippery Surfaces	X	Sample collection
Fall Potential		
Pinch Points		
Flying or Falling Material/Equipment		

* If this hazard is present, Senior Management must approve the HASP.

Hazards that apply to work to be performed	Check all applicable	Describe work activities to which it applies
Heavy Lifting		
Crushing		
Repetitive Motion		
Venomous Snakes	X	Sample collection
Poisonous Plants	X	Sample collection
Mosquitoes, Ticks or other Biting Insects	**X**	Sample collection
Venomous Spiders	X	Sample collection
Wild Animals	X	Sample collection
On or Near Water	**X**	Surface water sample collection
Other (specify)		

Overall Hazard Evaluation for Task

High		**Medium**		**Low**	X	**Unknown**[3]	
Justification:	Sample collection						

Section 8 Risk Control:

(Must address all hazards identified under Sections 5 and 7, both those existing at the site and those associated with the work to be performed)

Task Code: A

Public Utilities

Utility Markout

Utility	Req.	Company Name	Telephone #
One Call		New York 811	811
Gas:		Con ED	800-752-6633
Electric:		Con Ed	800-752-6633
Water:		White Plains	914-422-1207
Sewer:		Mamaroneck	914-381-7825
Telephone:		Verizon	800-922-0204
Cable:		Verizon	800-922-0204

Markout Ticket Confirmation #	Date
NA	NA

Were non-public utility locations on site marked out or otherwise identified on facility? (Y/N) N

If no, identify activity modifications to address unidentified utilities, on-site utility lines, and other buried anomalies:

Buddy System required? (Y/N) N
If yes, describe circumstances:
If no, describe communication contingencies:

If stored energy/energized equipment is present: N
Is LO–TO required? (Y/N)
Specify equipment to be locked out/tagged out:
Follow the LO-TO procedure. List any differences or additions below:

[3] If unknown, treat as high hazard until sufficient information has been developed

Add photos of equipment subject to LO-TO to back of plan.

If LO-TO is not required, describe actions to ensure stored energy/energized equipment is managed during equipment set up, operation, and demobilization:

Exclusion Zones:
Will exclusion zones be used at the site? (Y/N) N
If yes, indicate zones on the site map.

PPE

Specify primary protective equipment to be worn during this task		Specify applicable activities
Level C		
Level D	**X**	Soil, sediment, groundwater and surface water sampling
Level D Modified		
If PPE beyond Level D is required, consult the Project Manager or Senior Management		

PPE Equipment	Primary	Contingency**	Trigger for Contingency Requirements**
Respiratory			
Respirator (full)			
Respirator (half)		X	
Cartridge type:			
P100			
Combo			
Other			
Dust Mask			
Other (specify)			
Head and Eye			
Safety Glasses	**X**		
Face Shield			
Goggles			
Hard Hat	**X**		
Other (specify)			
Hearing			
Ear plugs/muffs	**X**		
Dual			
Feet			
Overboots			
Safety-toed Workboots	**X**		
Other (specify)			
Hands			
Nitrile Gloves	**X**		
Overgloves			
Other (specify)			
Body			
Tyvek Coverall			
Polycoated Tyvek			
Cold Weather Gear (Carhart)		**X**	
Rain Gear		**X**	

PPE Equipment	Primary	Contingency**	Trigger for Contingency Requirements**
Safety Vest	**X**		
U.S. Coast Guard-approved life jacket or buoyant work vest			
Other (specify)			
Other (specify)			

Other Equipment and Supplies:

Lighting	
Potable Water	
Insect Repellent	
Fire Extinguisher (2.5 lb)	**X**
Fire Extinguisher (5 lb)	
Fire Extinguisher (10 lb)	
Eyewash Kit	
Spill Kit	**X**
First Aid Kit	**X**
Ring Buoys	
Lifesaving Skiff	
Portable Toilet	
Other (specify):	

Operational Control Procedures and Work Instructions: (Attach procedures to back of HASP)

Decontamination Procedures:
Follow the Field Decontamination Procedure. List any differences or additions below.

Discharge Control Measures (Y/N) N
If yes describe Discharge Control Measures:

Waste Disposal Practices:
Specify Waste Management Practices:

Waste Type	Sample	Containerize	Dispose of off Site	Return to Site (tbd)	Dispose in FE Solid Waste
Drill Cuttings	**X**	X		**X**	
Purge Water				**X**	
Soil		**X**	**X**		
PPE and other field related waste					**X**
Other (Specify)					

Additional waste handling instructions:

Other instructions:

General Safe Work Practices:
To ensure the safety of First Environment personnel and the public at a site where fieldwork is being conducted, the Safe Work Practices listed below will be followed.

- Good housekeeping practices are to be maintained.
- A "buddy system" in which another worker is close enough to render immediate aid will be in effect when specified in the HASP.
- In the event of treacherous weather-related working conditions field tasks will be suspended until conditions improve or appropriate protection from the elements is provided.
- Smoking, eating, chewing gum or tobacco, or drinking are forbidden except in clean or designated area.
- Ignition of flammable liquids within or through improvised heating devices is forbidden.
- Contact with samples, excavated materials, or other contaminated materials must be minimized.
- Use of contact lenses is not advisable.
- If drilling equipment is involved, know where the 'kill switch' is.
- All electrical equipment used in outside locations, wet area or near water must be plugged into ground fault circuit interrupter protected outlets.
- Illumination - Work in the early morning or at dusk may require site lighting.

List any differences or additions below:

Emergency Preparedness: (Attach procedures to back of HASP)

Field Emergency Response:
Follow the Field Emergency Response Procedure. List any differences or additions below

Spill Response:
Follow the Field Spill Response Procedure. List any differences or additions below.

Is a stand-by external emergency response contractor required? (Y/N) If yes, explain: N

: Contractor:	Date Contacted:	Contacted by:

H&S Monitoring and Measurement:

H&S field monitoring required? Y/N Y
If so, follow the Health and Safety Monitoring Table below.

Type of Meter/Monitoring	Monitors	Check if to be Used	Surveillance Methodology (select one)		Monitoring Locations	Guidance Action Levels*	Site Action Levels**
			Determined by FTL Based on Site Conditions	Specified Frequency			
Photoionization Detector (PID) 9.8eV 10.2eV 10.6 eV 11.7eV Dust Monitoring	Total Volatile Organics levels Fugitive dust					5 ppm above background - evacuate and notify 100 mg/m^3, above background, halt activity, suppress dust.	
Flame Ionization Detector (FID)	Total Volatile Organics levels					5 ppm above background - evacuate and notify	
Multi-gas meters Oxygen Combustible Gas CO H2S Other Gas (Specify)	 Oxygen levels LEL Toxic gas levels Toxic gas levels					 < 21% - notify < 19.5% - evacuate 10-20% - notify >20% - evacuate >9 ppm – notify >10 ppm – notify	
Other equipment (specify)							

* For notify action levels, move off worksite and contact PM to take corrective action or upgrade PPE. For evacuation, move off worksite and contact PM for further instructions.
**If site levels are different from guidance levels specify reason:

Heat and cold monitoring required: (Y/N) Y
If required, follow precautions in attached heat and cold guides.

Corrective/Preventive Action

In the event that corrective action becomes necessary and is taken in the field or a necessary preventive action is identified, the Field Team must ensure the notification of the PM so that appropriate modifications can be made to the HASP and fieldwork activities. In the event that a corrective or preventive action has application beyond the immediate project and work being performed or in the event of an incident or accident, a PCAN must be filed by the PM or Field Team Leader.

Audits

As part of First Environment's Management System, the HASP and its implementation are subject to internal audit and audit by our third party auditor. Findings are addressed through the PCAN Process.

Section 10: Plan Approval

The HASP must be reapproved for each new task and when a task in the HASP is revised. Minor revisions in the field may be made by the FTL. The FTL make changes, initials the changes, and documents the specifics on the last page of this HASP. Changes are cleared with the Project Manager who ensures others are consulted as necessary.

In signing this plan, the signatories are confirming to the best of their knowledge the accuracy, adequacy, and suitability of the plan to address the H&S risks associated with the planned work.

HASP Initial Tasks

Complete each time a new task is added to the HASP

TASK __A__

Plan Prepared by:	David H. F. Luer	Date:	10/3/2022
Plan Reviewed/Approved by:		Date:	
Project Manager:	Devin Demarko	Date:	

TASK _____

Plan Prepared by:		Date:	
Plan Reviewed/Approved by:		Date:	
Project Manager:		Date:	

TASK _____

Plan Prepared by:		Date:	
Plan Reviewed/Approved by:		Date:	
Project Manager:		Date:	

TASK _____

Plan Prepared by:		Date:	
Plan Reviewed/Approved by:		Date:	
Project Manager:		Date:	

Add additional tasks as required.

HASP Task Revisions

Complete if the HASP is revised for a particular Task or Tasks.

TASK ____

Plan Revised by:		Date:	
Revision Reviewed/Approved by:		Date:	
Project Manager:		Date:	

TASK ____

Plan Revised by:		Date:	
Revision Reviewed/Approved by:		Date:	
Project Manager:		Date:	

TASK ____

Plan Revised by:		Date:	
Revision Reviewed/Approved by:		Date:	
Project Manager:		Date:	

TASK ____

Plan Revised by:		Date:	
Revision Reviewed/Approved by:		Date:	
Project Manager:		Date:	

Add additional tasks as required

Section 11: FE Field Personnel Acknowledgement

First Environment employees assigned to work on site have attended 40-hour HAZWOPER training and annual refreshers, as applicable, per 29 CFR 1910.120, and have been certified medically fit by a qualified occupational physician to work on hazardous sites and to wear a respirator. Medical and training records are maintained by Human Resources.

By signing below, First Environment employees acknowledge that they:

- Have participated in the morning meeting and been briefed on work to be performed and site H&S.
- Have read and understand this Site HASP.
- Have raised and had adequately answered any questions about the HASP and site H&S (all employees are authorized to raise health and safety concerns through the leadership chain and HR if required before beginning or continuing work).
- Meet the training and medical fitness requirements.
- Understand the process of continual improvement and will use the PCAN process.
- Agree to notify the field team leader of any unsafe conditions in the field as soon as they are observed or encountered.

	Name	Responsibilities	Site Task/#	Signature	Date
1		FTL / FT / FHSO			
2		FTL / FT / FHSO			
3		FTL / FT / FHSO			
4		FTL / FT / FHSO			
5		FTL / FT / FHSO			
6		FTL / FT / FHSO			
7		FTL / FT / FHSO			
8		FTL / FT / FHSO			
9		FTL / FT / FHSO			
10		FTL / FT / FHSO			
11		FTL / FT / FHSO			

	Name	Responsibilities	Site Task/#	Signature	Date
12		FTL / FT / FHSO			
13		FTL / FT / FHSO			
14		FTL / FT / FHSO			
15		FTL / FT / FHSO			
16		FTL / FT / FHSO			
17		FTL / FT / FHSO			
18		FTL / FT / FHSO			
19		FTL / FT / FHSO			
20		FTL / FT / FHSO			
21		FTL / FT / FHSO			
22		FTL / FT / FHSO			
23		FTL / FT / FHSO			
24		FTL / FT / FHSO			
25		FTL / FT / FHSO			
26		FTL / FT / FHSO			
27		FTL / FT / FHSO			
28		FTL / FT / FHSO			
29		FTL / FT / FHSO			
30		FTL / FT / FHSO			

	Name	Responsibilities	Site Task/#	Signature	Date
31		FTL / FT / FHSO			
32		FTL / FT / FHSO			
33		FTL / FT / FHSO			
34		FTL / FT / FHSO			
35		FTL / FT / FHSO			
36		FTL / FT / FHSO			
37		FTL / FT / FHSO			
38		FTL / FT / FHSO			
39		FTL / FT / FHSO			
40		FTL / FT / FHSO			
41		FTL / FT / FHSO			
42		FTL / FT / FHSO			
43		FTL / FT / FHSO			
44		FTL / FT / FHSO			
45		FTL / FT / FHSO			
46		FTL / FT / FHSO			
47		FTL / FT / FHSO			
48		FTL / FT / FHSO			

Complete for each day contractor is on site.

Contractor	Responsibilities	Date	Contractor Provided FE Safety Guide[4]	Subcontract on site and correct for tasks to be performed (Y/N)	Contractor HASP on Site (Y/N)[5]	Contractor Participated in Morning Meeting (Y/N)	Describe Corrective Action taken in case of deficiencies. Contractor work cannot proceed until deficiencies are addressed.	Signature FE Field Team Leader

[4] Subcontractor has received our Guide for Subcontractors and Vendors and has signed the Read and Acknowledge Form
[5] Subcontractor is using HASP onsite and has reviewed it with employees

Contractor	Responsibilities	Date	Contractor Provided FE Safety Guide[4]	Subcontract on site and correct for tasks to be performed (Y/N)	Contractor HASP on Site (Y/N)[5]	Contractor Participated in Morning Meeting (Y/N)	Describe Corrective Action taken in case of deficiencies. Contractor work cannot proceed until deficiencies are addressed.	Signature FE Field Team Leader

If review of the plan at the site indicates changes to the HASP are necessary, provide the specifics below (Make changes in the HASP and initial the changes). Notify Project Manager after occurrence for minor changes. Clear major changes with Project Manager prior to performing work.

Date: _____ FTL: _____

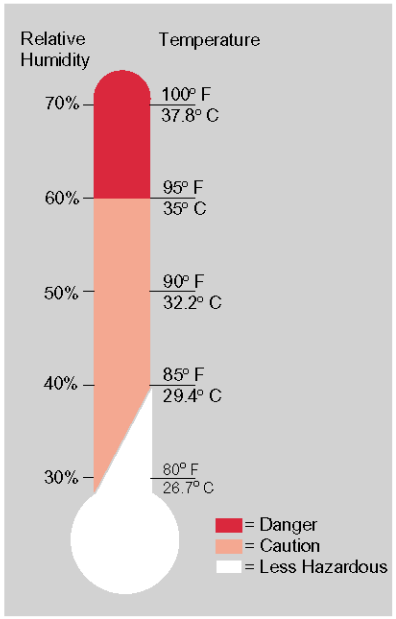
Section 12

Attach current versions of Safety Data Sheets and procedures relevant to site work

THE HEAT EQUATION

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are **heat exhaustion** and **heat stroke**. If actions are not taken to treat heat exhaustion, the illness could progress to heat stroke and possible **death**.



U.S. Department of Labor
Occupational Safety and Health Administration
OSHA 3154
1998

HEAT EXHAUSTION

What Happens to the Body:

HEADACHES, DIZZINESS/LIGHT HEADEDNESS, WEAKNESS, MOOD CHANGES (irritable, or confused/can't think straight), FEELING SICK TO YOUR STOMACH, VOMITING/THROWING UP, DECREASED and DARK COLORED URINE, FAINTING/PASSING OUT, and PALE CLAMMY SKIN.

What Should Be Done:

- Move the person to a cool shaded area to rest. Don't leave the person alone. If the person is dizzy or light headed, lay them on their back and raise their legs about 6-8 inches. If the person is sick to their stomach lay them on their side.
- Loosen and remove any heavy clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water or wet cloth.
- If the person does not feel better in a few minutes call for emergency help (Ambulance or Call 911).

(If heat exhaustion is not treated, the illness may advance to heat stroke.)

HEAT STROKE—A MEDICAL EMERGENCY

What Happens to the Body:

DRY PALE SKIN (no sweating), HOT RED SKIN (looks like a sunburn), MOOD CHANGES (irritable, confused/not making any sense), SEIZURES/FITS, and COLLAPSE/PASSED OUT (will not respond).

What Should Be Done:

- Call for emergency help (Ambulance or Call 911).
- Move the person to a cool shaded area. Don't leave the person alone. Lay them on their back and if the person is having seizures/fits remove any objects close to them so they won't strike against them. If the person is sick to their stomach lay them on their side.
- Remove any heavy and outer clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are alert enough to drink anything and not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water, wet cloth, or wet sheet.
- If ice is available, place ice packs under the arm pits and groin area.

How to Protect Workers

- Learn the signs and symptoms of heat-induced illnesses and what to do to help the worker.
- Train the workforce about heat-induced illnesses.
- Perform the heaviest work in the coolest part of the day.
- Slowly build up tolerance to the heat and the work activity (usually takes up to 2 weeks).
- Use the buddy system (work in pairs).
- Drink plenty of cool water (one small cup every 15-20 minutes)
- Wear light, loose-fitting, breathable (like cotton) clothing.
- Take frequent short breaks in cool shaded areas (allow your body to cool down).
- Avoid eating large meals before working in hot environments.
- Avoid caffeine and alcoholic beverages (these beverages make the body lose water and increase the risk for heat illnesses).

Workers Are at Increased Risk When

- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you when working in hot environments).
- They have had a heat-induced illness in the past.
- They wear personal protective equipment (like respirators or suits).

APPENDIX B

Quality Assurance Project Plan (QAPP)
Department of Veteran Affairs
Hudson Valley Healthcare System
Castle Point Campus
Wappingers Falls, New York

Contract No. 36C24222C0141

March 2023

Prepared for: Department of Veterans Affairs
Hudson Valley Healthcare System

Prepared by: First Environment, Inc.
10 Park Place
Building 1A, Suite 504
Butler, New Jersey 07405

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Introduction

This Quality Assurance Project Plan (QAPP) has been developed as part of the Site Characterization Work Plan that has been prepared on behalf of the Department of Veterans Affairs, Hudson Valley Healthcare System, Castle Point VAMC (the VA), located at 41 Castle Point Road, Wappinger Falls, New York.

Purpose

The purpose of this QAPP is to indicate the prime responsibilities of the Castle Point VAMC and its contractors and subcontractors during implementation of the Site Characterization Work Plan. This QAPP also describes the policy, organization, and specific Quality Assurance (QA) and Quality Control (QC) elements necessary to achieve data quality objectives and fulfill NYSDEC requirements. The QAPP also provides detailed descriptions of the field procedures that will be used during Site Characterization.

In general, there are 10 elements to be addressed in a QAPP to ensure safe, efficient, and effective practices are implemented at contaminated sites. These elements include:

1. The project's scope and complexity and how the project relates to the overall site characterization strategy.
2. The data quality objectives specific to the site and sampling event.
3. Project organization, including the name and telephone number of each of the individuals responsible for overall project coordination, sampling activities, and laboratory analyses.
4. An "Analytical Methods/Quality Assurance Summary Table" (combination of Table 2 and Table 3).
5. A detailed description of the site-specific sampling methods, sample storage in the field, and sampling holding times requirements.
6. A detailed description of all calibration and preventative maintenance procedures for all field instrumentation.
7. A detailed description of the criteria and procedures to obtain duplicate and split samples.
8. A detailed description of the chain-of-custody procedures to be utilized in the field and the laboratory.
9. A detailed description of sample storage procedures to be utilized by the laboratory.
10. Laboratory data deliverable formats to be used.

Scope and Goals Relation to Site Characterization

The scope of the project involves addressing:

- Sampling and laboratory analysis of various media including soil, groundwater, sediment, and surface water at the Castle Point VAMC to evaluate the presence or absence of emerging contaminants at the Site including Per and polyfluoroalkyl substances (PFAS) including perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), and 1,4-dioxane.
- Sampling and laboratory analysis of select soil, groundwater, sediment, and surface water media at the Castle Point VAMC to identify Target Compound List/Target Analyte List (TCL/TAL) + 30 parameters including volatile and semi-volatile organic compounds, pesticides, and metals at the Site.

Data Quality Objectives

In order to ensure that data generated during Site Characterization sampling are of the highest quality, the analytical results of such sampling will be compared to appropriate data quality indicators. These indicators include precision, accuracy, representativeness, completeness, and comparability. Each of these indicators is described below:

1. Precision is the agreement or reproducibility among individual measurements on the same property, usually made under the same conditions.
2. Accuracy is the degree of agreement of a measurement with the true or accepted value.
3. Representativeness is the degree to which a measurement accurately and precisely represents a characteristic of a population, parameter, variations at a sampling point, a process condition, or an environmental condition.
4. Completeness is a measure of the amount of valid data obtained from a measurements' system compared with the amount that was expected to be obtained under correct and normal conditions.
5. Comparability is an expression of the confidence with which one data set can be compared with another data set with regard to the same parameter.

The data quality objectives (DQO) vary according to the specific objectives of each task that is being undertaken. For example, accuracy, precision, and representativeness of data are functions of sample origin, analytical procedures, and specific sample matrices. Quality control practices for the evaluation of these data quality indicators include the use of accepted analytical procedures, adherence to holding times, and the analysis of QC samples (blanks, duplicates, spikes, calibration standards, and reference standards).

Completeness is a function of the number of valid data results generated compared to the number of data results planned. Completeness can be less than 100 percent due to poor

sample recovery, sample damage, or disqualification of results due to results being outside of laboratory control limits. Completeness is documented by including sufficient information in field logs and laboratory reports to allow the data user to assess the quality of the results. The overall completeness goal for each task is difficult to determine prior to data acquisition. However, all reasonable attempts will be made for this project to attain a completeness of 85 percent or better. The completeness goal for the analytical laboratory will be 90 percent or greater.

Comparability is a function of the analytical and field methodologies used. Ensuring comparable data will be accomplished by using standard and accepted methodologies; using methods traceable to the National Institute of Standards and Technologies (NIST), NYSDEC sources or USEPA sources; using appropriate levels of quality control; reporting results in consistent standard units of measure; and participating in studies designed to evaluate laboratory performance.

Table 1 identifies the different levels of quality assurance that are being assigned to each task that will be implemented during the Site Characterization.

Table 1: Levels of Quality Assurance

DQO Level	Description	Associated Activity
I	Level I is the lowest quality data but provides the fastest and least expensive results. Field screening or analysis provides Level I data. The generated data can indicate the presence or absence of certain constituents and is generally qualitative rather than quantitative.	• Health and Safety Monitoring (PID, FID)
II	Level II data are generated by field laboratory analysis using more sophisticated portable laboratory instruments or a mobile laboratory on site. This provides fast results and better-quality data than in Level I.	• Field Analyses (pH, specific conductance, temperature, dissolved oxygen)
III	Level III data may be obtained by a commercial laboratory with or without CLP procedures. The analysis does not usually use the validation or documentation procedures required of CLP (Level IV) analysis. The analyzed parameters are relevant to site characterization, risk assessment, and design and implementation of the remedial action.	• Ongoing Groundwater sampling • Waste Classification Sampling

DQO Level	Description	Associated Activity
IV	Level IV data are typically used for risk assessment, engineering design, and cost-recovery documentation. All analyses are performed in a CLP analytical laboratory and follow CLP procedures. Level IV is characterized by rigorous QC protocols, documentation, and detection limits.	• Post-excavation soil sampling • Soil sampling for soil reuse • Final Groundwater sampling
V	Level V data are those obtained by non-standard analytical procedures. Method development or modification may be required for specific constituents or detection limits.	• Not Applicable
VI	Other methodologies not described above.	• Physical soil description • Geotechnical tests • Water level measurements • Aquifer tests

Project Organization and Responsibilities

First Environment and a qualified team of subcontractors will perform the work activities for this Site Characterization Work Plan under the direction of representatives from the VA. The lead regulatory agency for this project is the NYSDEC with the New York State Department of Health (NYSDOH) providing additional regulatory oversight. First Environment is the primary contractor.

All respective roles for the VA, First Environment, and other appropriate project personnel are described below. The project organization chart for the Site Characterization work is shown in Figure 1.

NYSDEC Project Manager

The NYSDEC Project Manager assigned to this project is Mr. Anthony Bollasina. Mr. Bollasina can be contacted at:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7014
Phone: (518) 402-2754
E-mail: Anthony.bollasina@dec.ny.gov

The Castle Point VAMC

The Castle Point VAMC has the overall responsibility for achieving all project objectives. First Environment will be responsible for initiating project activities; monitoring and adjusting efforts and resources as needed to assure that established schedules, work programs, and costs are maintained; and interfacing with NYSDEC on administrative matters.

Additionally, First Environment will be responsible for retaining a NYSDOH-certified Environmental Laboratory Approval Program (ELAP) and Contract Laboratory Program (CLP) laboratory. All samples will be submitted to the chosen laboratory under the chain-of-custody procedures discussed below. In addition, once the soil and water waste are characterized, First Environment will coordinate with Castle Point VAMC to retain an appropriately licensed and certified waste transporter and disposal subcontractor for disposal of all Site Characterization-derived wastes. If waste disposal is necessary, all wastes generated at the Site will be disposed of in accordance with NYSDEC requirements.

The VA's primary project contact, business address, and telephone number are:

Larry Johnson, Safety / Environmental and Transportation Program Manager
VA Hudson Valley Healthcare System Castle Point Campus
41 Castle Point Road
Wappinger Falls, NY 12590
Phone: (845) 831-2000 x 215469
Cell: (914) 523-3474
E-mail: larry.johnson11@va.gov

First Environment, Inc.

First Environment, Inc. will be the prime contractor implementing the Site Characterization activities. The project responsibilities of First Environment personnel shall be as follows:

B. Tod Delaney, Ph.D., P.E., BCEE is the President of First Environment and will act as the Senior Scientist and Senior Project Manager. Dr. Delaney will provide senior management oversight and provide technical advice and review of all site characterization-related issues. Dr. Delaney has the responsibility of ensuring and overseeing the preparation of all deliverables, staffing, scheduling, coordinating subcontractors, and overseeing all technical project activities.

Mr. Devin DeMarco, CHMM, CPEA, CQM, is a Market Area Director at First Environment and will act as the Project Coordinator. Mr. DeMarco will be responsible for oversight of project operations and review of all deliverables for quality assurance activities.

Mr. Scott Green, P.G. is a Senior Associate at First Environment and will serve as the Project Manager. Mr. Green will be responsible for project coordination, managing day-to-day operations, report preparation, and communication with the VA and New York Department of Environmental Conservation.

Mr. David H. F. Luer, P.G., C.P.G. is a Senior Geologist at First Environment and will act as the Field Manager. Mr. Luer will be responsible for the field activities coordinating subcontractors, and the implementation and oversight of all work being performed in the field. Mr. Luer will be responsible for oversight of all Health and Safety issues during the field activities.

All of the First Environment employees can be contacted at:

First Environment, Inc.
10 Park Place, Bldg. 1A, Suite 504
Butler, NJ 07405
Phone: (973) 334-0003
Fax: (973) 334-0928

Subcontractors

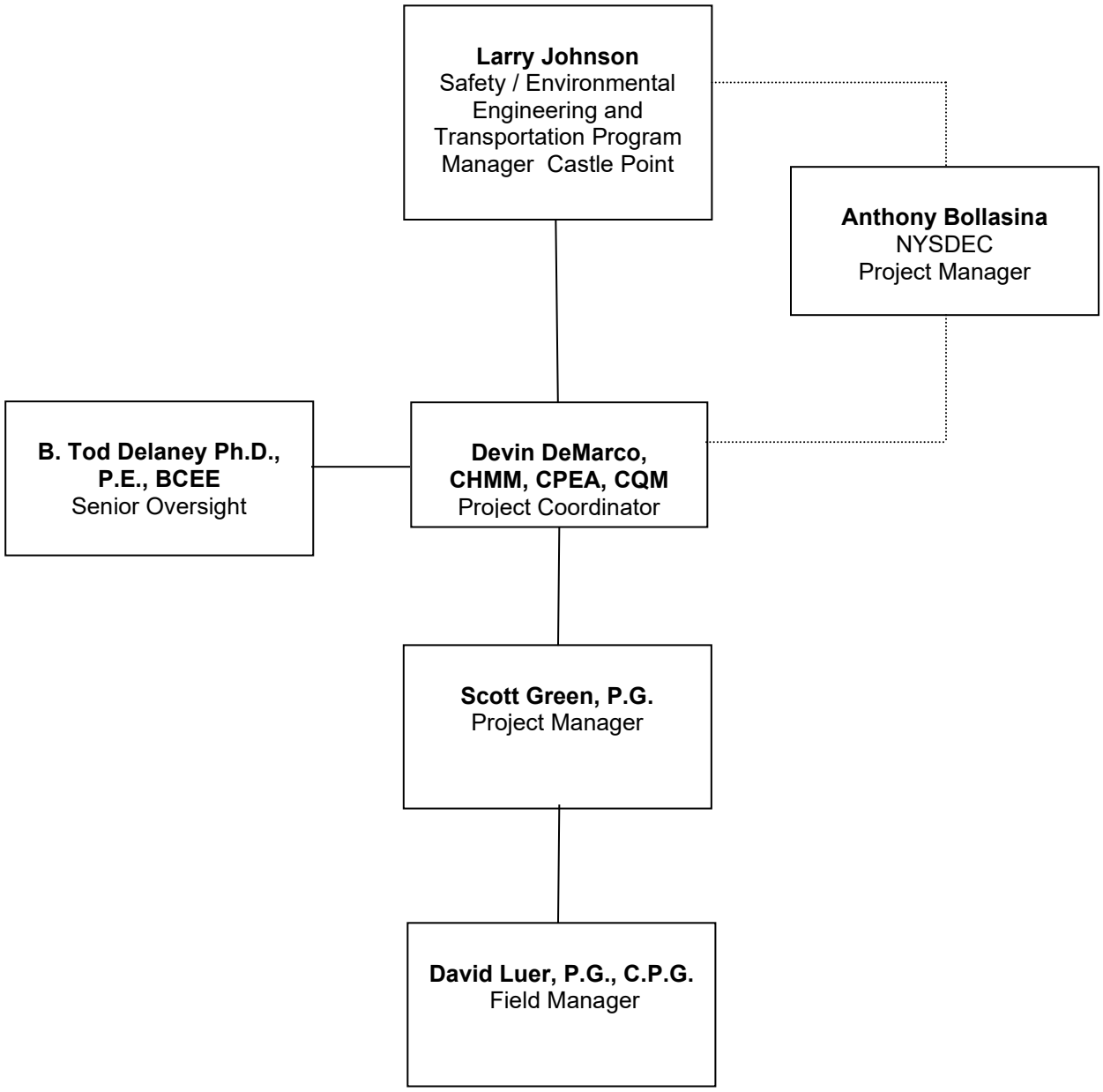
First Environment is in the process of obtaining subcontractors to perform the various duties associated with the Site Characterization. To date, the following Subcontractors have been contracted to perform Site Characterization services:

Analytical Laboratory
York Analytical Laboratories
120 Research Drive
Stratford, CT 06615

Licensed Well Driller
Cascade Drilling
629 Wright Debow Road
Jackson Township, NJ 08527

Land Surveyor
DPK Consulting
200 Metroplex Drive, Suite 285
Edison, NJ 08817

Figure 1: Organization Chart



Analytical Procedures

Method references for the analyses to be performed during the Site Characterization are summarized in Table 2.

Table 2: Method References, Holding Times and Preservation Requirements

Parameters	Matrix	Method Reference	Holding Time	Preservation	Sample Volume	DQO Level
PFAS	Aqueous	USEPA Method 1633	14 days	4°C,	250 ml HDPE or polypropylene bottle	III/IV
PFAS	Soil	USEPA Method 1633	28 days	4°C	8 oz. HDPE or polypropylene bottle	III/IV
VOC	Aqueous	USEPA 8260	14 days	4°C, HCl	40 ml glass vial	III/IV
VOC	Soil	USEPA 8260	14 days	4°C, Methanol*	5 g glass jar	III/IV
VOC	Air	USEPA TO-15	14 days	N/A	2 to 6 L***	IV
SVOCs	Aqueous	USEPA 8270B	7 days	4°C	2 L glass jar	III/IV
SVOCs	Soil	USEPA 8270	14 days	4°C	4 oz glass jar	III/IV
Metals	Aqueous	3010	6 months	4°C, HNO3	250 ml PE jar	III/IV
Metals	Soil	6010/7471A	180 days, 28 days**	N/A	2 oz glass jar	III/IV
Pesticides	Soil	EPA Method 8081A/8021B	14 days	4°C	4 oz glass jar glass jar	III/IV
Pesticides	Aqueous	EPA Method 8081A/8021B	7 days	4°C	2 L glass jar	III/IV
PCBs	Soil	EPA Method 8082	14 days	4°C	4 oz glass jar glass jar	III/IV
PCBs	Aqueous	EPA Method 8082	7 days	4°C	2 L glass jar	III/IV
Dissolved Oxygen	Aqueous	Electrode	Immediate	N/A	N/A	I
Temperature	Aqueous	Thermometer	Immediate	N/A	N/A	I
Turbidity	Aqueous	Electrode	Immediate	N/A	N/A	I
Specific Conductivity	Aqueous	Electrode	Immediate	N/A	N/A	I
Organic Vapor	Air	PID or FID	Immediate	N/A	N/A	I
PH	Aqueous	Electrode	Immediate	N/A	N/A	I

* If sample is not collected using an EnCore™ sampling device
** For Mercury samples only
***Sample to be collected via Summa canister

Field Procedures

The accuracy of the data is dependent upon well-conceived and carefully implemented sampling and analysis procedures. This section presents the procedures with which samples will be collected or measurements made during the execution of this project.

Changes in Procedure

Field conditions may require changes to the QAPP. Significant changes to the sampling procedures specified in the QAPP that become necessary as a result of unanticipated field conditions will be identified to and discussed with the First Environment Project Manager prior to the implementation of any revised procedure. The Project Managers will in turn discuss the needed changes in procedure with the NYSDEC Project Manager. Changes in sampling procedures cannot be implemented unless approval is received from the NYSDEC Project Manager. Minor changes may be made with the concurrence of the First Environment Project Manager but must be documented in the field logbook and/or interoffice memoranda. Any and all changes in sampling procedures will also be documented in the associated report submittal.

Acquisition of Samples

Depending on the specific focus of any one sampling event, sample numbers and frequency will not strictly adhere to a hard number but will be determined by the requirements of that event. In general, a single sample will be collected from each targeted groundwater monitoring well, surface water location, and sediment location during any specific sample event assuming one is available. Further, each soil boring will result in a sample being collected.

All samples will be adequately marked for identification from the time of collection and packaging through handling and storage. Marking for sample identification shall be on a sample label attached to each sample container. Sample identification will include, at a minimum, the following:

- sample identification number;
- analysis required;
- sample date and time; and
- initials of the individual performing the sampling.

A description of the sample will be included in the field logbook.

Alphanumeric codes will be used to identify sample locations. The coding for sample identification numbers should be consistent, identify a single sample location and, unless otherwise directed, use the following naming convention:

FMW-XX	Monitoring Well
TW-XX	Temporary well point
RW-XX	Recovery Well
SB-XX	Soil/Geoprobe Boring
TP-XX	Test Pit
S-XX	Surface soil sample location
Sed-XX	Sediment
OF-XX	Outfall
D-	Drain/Storm Sewer
SW-XX	Surface water sampling location
WCS-XX	Soils Waste Classification
WCW-XX	Water Waste Classification

Where XX is a numerical value.

The laboratory will provide appropriately cleaned and prepared sample containers. Reagents, preservation procedures, and analytical holding times will be in accordance with the published analytical methods.

The specific requirements for sample container preparation, sample preservation, holding times, and any special handling requirements are listed in Table 2. Sample containers will be kept closed until the time each set of sample containers is to be filled. After filling, the sample containers will be securely closed, residue wiped from the sides of the containers, sample identification marked on the container label, and the container immediately placed in a cooler that contains ice. Samples will be kept chilled and delivered to or picked up by the laboratory. Samples of dissimilar matrices will be shipped in separate coolers whenever possible. All reasonable effort will be used to limit the time the sample containers are on the Site to no more than two calendar days.

Calibration Procedures

Laboratory calibration procedures and frequency of calibration will be completed in accordance with the NYSDOH ELAP criteria. These criteria represent accepted techniques to ensure

accurate sampling, monitoring, testing, and documentation as per QA/QC standards. Field instruments such as pH meters, dissolved oxygen meters, and specific conductivity meters will be standardized in accordance with the manufacturer's recommendations against National Institute of Standards and Technology (NIST) traceable standards, where appropriate. During sampling, calibration will be performed at the beginning of each day of use. Appropriate calibration records will be maintained in field logbooks.

Samples that do not contain concentrations of target analytes that exceed instrument calibration range, absent of matrix interference, will be analyzed so as to achieve the lowest practical quantitation limits. Samples that do contain concentrations of target analytes that exceed the instrument calibration range will be diluted in accordance with approved methodologies and good laboratory practice.

Field Sampling Procedures

Field screening will be used to obtain immediate site data that can be used to ensure the health and safety of site workers and/or assist in the selection of soil and groundwater sampling locations and depths. Subsurface characterization involves the collection of samples for analysis by the laboratory. The results generated from these sample analyses will be used to characterize and monitor site conditions. The components of the Site Characterization include:

- soil sampling,
- sediment sampling,
- groundwater sampling, and
- surface-water sampling.

Field sampling procedures when sampling for PFAS will be completed in accordance with the attached sampling protocol as updated November 2022. Items like water proof field notebooks, blue ice packs, Teflon containing materials, gore-tex fabrics, Tyvek are only a few of the items that will be avoided due to the potential presence of PFAS in those items that could interfere with the laboratory results.

Water level monitoring will be completed using a Heron dipper model-T type water level indicator which has a steel sensing probe. All wells will be sampled with dedicated, disposable HDPE bailers. Shallow wells (less than 20 feet deep) will also be purged using dedicated disposable HDPE bailers. Wells greater than 20 feet deep will be purged with a

PFAS free submersible pump and dedicated HDPE tubing. All purge water will be discharged to the ground upon the completion of sampling unless a sheen, odors, or oil are observed. In such cases, purge water will be containerized and characterized for proper disposal.

During sampling for PFAS, one field blank will be collected in the field using water provided by the laboratory. One field duplicate and one matrix spike/matrix spike duplicate will also be collected. All samples will be collected in laboratory supplied containers and placed in coolers on wet ice for overnight shipping to the laboratory or until laboratory pick up. Appropriate chain-of-custody procedures will be followed.

Laboratory Analysis

The field sampling activities for PFAS will follow the PFCs Sampling Checklist identified as Attachments 1 and 2. The samples will be picked up by York Analytical Laboratories, which is a New York State Certified ELAP laboratory. The samples will be analyzed for PFAS by EPA Method 1633 with Category B deliverables. For other analytes, please see the table below for analyses and methods. All analytes will be reported with Category B deliverables.

VOCs	EPA Method 8260
SVOCs	EPA Method 8270
PCBs	EPA Method 8082 or similar
Pesticides	EPA Method 8081 or similar
Cyanide	EPA Method 9010 or similar
Metals	EPA Method 200.7 or similar
Mercury	EPA Method 7473 or similar

VOCs and SVOCs, samples will be analyzed by EPA methods 8260 and 8270 with Category B deliverables. The data will be provided in an electronic data deliverable (EDD) format for the NYSDEC EQUIS Environmental Data Management System. MDLs and RLs from York are included in Attachment 3.

Groundwater Level Measurements

Groundwater levels will be measured during Site Characterization. Synoptic (instantaneous) groundwater level measurements will be collected from all accessible wells and piezometers concurrently with all on-site groundwater sampling events. Groundwater level measurements

will be made using an electronic water level meter or equivalent. The water level meter will be field decontaminated prior to use and between measurements at each well location. Measurements to the depth-of-water will be made to the nearest 0.01-foot relative to the northernmost point at the top of the casing elevation. This measurement will be converted to a groundwater elevation based upon the surveyed casing elevation.

Groundwater Sampling

Groundwater sampling of at monitoring wells will be performed no sooner than two weeks following the development of that monitoring well unless otherwise approved by the NYSDEC, Groundwater sampling at permanent wells for any one sampling event will consist of determining the casing volume, purging, and sample collection as well as field measurement parameters such as PID, pH, Conductivity, DO, and turbidity). These procedures are described below.

Determination of Casing Volume

Casing volume will be determined by measuring the water level in each monitoring well and utilizing well construction information to calculate the volume of standing water in the well. An electronic water level indicator will be used to measure the depth from the top of the innermost casing to the water table to the nearest 0.01 feet. The water level indicator will be decontaminated using phosphate-free detergent and distilled or deionized water prior to its use in any one monitoring well. The depth to the bottom of the monitoring well will be determined during the first sampling event to confirm well construction details. The measurement will be taken with a field-decontaminated electronic water level indicator and recorded to the nearest 0.01 feet.

Purging

One of two groundwater purge techniques may be applied at this Site. The first method is low-flow purge method. This method minimizes data quality interference by suspended solids by purging groundwater at such a low rate so as not to cause sediment in the well to become suspended. To ensure that pore water and not casing water is sampled upon completion of purging, groundwater is purged until several indicator parameters become stable. This technique is described in detail by Puls and Barcelona (“Low-flow (minimal drawdown) groundwater sampling procedures.” EPA/540/S-95/504; April 1996).

If a low-flow purging technique is used, then groundwater will be extracted at a rate that is equal to or less than one liter per minute. Water level will be checked periodically during purging to monitor drawdown and to guide flow rate adjustment. The flow rate will be adjusted to achieve a minimal drawdown that does not exceed 0.1 meters (four inches).

If necessary, in-line water quality will be monitored during purging using a flow-through cell. The water quality indicator parameters that will be monitored will include pH, conductivity, dissolved oxygen (DO), and turbidity. Measurements will be taken every three to five minutes until water quality has stabilized. Stabilization is achieved when three successive readings are within ± 0.1 for pH, ± 3 percent for conductivity, and ± 10 percent for turbidity and DO.

If the low-flow purge technique is not used, then three to five casing volumes of water will be purged from the monitoring wells. The wells will be purged using PFAS free positive displacement pumps such as a submersible pump. A bottom-filled HDPE bailer may also be used to purge a well. If a submersible pump is used, then the pump and power cord will be decontaminated prior to each use using the methods described later in this document. New HDPE polyethylene tubing will be attached to the submersible pump to discharge water from the monitoring well. The tubing will be discarded after use at a monitoring well.

If a well or piezometer diameter is such that a positive displacement pump is not used, a peristaltic pump with dedicated thin HDPE plastic tubing will be used to purge the required volume.

The field parameters pH, specific conductance, temperature, and DO will be measured and recorded prior to purging the monitoring well. During purging, all reasonable effort must be made to keep the purging rate low and to avoid pumping the well to dryness. Monitoring well purging rates will not exceed 5 gpm. In some cases, the evacuation of three casing volumes may not be practical due to slow recovery. If a monitoring well is pumped to near dryness at a rate less than 0.5 gpm, then the monitoring well will be allowed to recover to a volume sufficient for sampling. Sampling will occur within two hours of purging, as long as the well has sufficiently recovered. It may be necessary to allow all such monitoring wells to recover sufficiently for sampling. Details of the monitoring well's recovery rate will be noted on the field form.

The following monitoring well purge data will be recorded on the field form for each monitoring well sampled whenever the “3 to 5 volume” purge method is used:

Before Purging:

- date, time, and weather conditions;
- monitoring well identification number;
- pH, DO, temperature, turbidity, and specific conductivity;
- total monitoring well depth and depth-to-water from the top of the innermost casing; and
- water volume within the monitoring well.

After Purging

- start and end time of purging;
- purge method;
- purge rate (if pumped);
- total volume purged; and

After Sampling

- start and end time of sampling;
- pH, DO, temperature, turbidity, and specific conductivity;
- sampling method;
- pertinent observations regarding sample characteristics (e.g., turbidity, color, odor).

Sampling

If the low-flow purge method is used, then sampling will involve disconnecting the intake hose from the flow-through cell and then using that hose to discharge the sample directly into containers provided by the laboratory.

If the “3 to 5 volume” purge method is used, monitoring well sampling will be performed within two hours of purging unless, as stated earlier, a monitoring well recovers at too slow a rate. Sampling will be performed with a dedicated clean HDPE bailer with a single check valve at the bottom.

To obtain a sample, the bailer will be slowly lowered into the well using the leader and rope until it is submerged and slowly brought back to the surface after filling. The contents of the bailer will then be slowly poured into the sampling containers provided by the laboratory.

The preferred order of sample collection is as follows:

- PFAS;
- TCL/TAL and
- field measurements (temperature, DO, pH, turbidity, and specific conductance).

Surface Water Sampling

To obtain a surface water sample, the sample container will be slowly lowered into the water body by hand until it is submerged and slowly brought back to the surface after filling. Should it prove infeasible to collect the sample by hand due to other conditions, a sample bottle will be attached to the end of a sampling pole using zip ties or other non-PFAS containing method and the above procedure followed. The sample pole will be decontaminated between samples.

All sample containers will consist of laboratory-cleaned bottles (non-glass for PFAS) that, once filled with sample, are to be properly labeled and then placed into coolers and chilled to 4°C using wet ice and not blue pack ice.

Soil & Sediment Sampling

Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (e.g., soil, sediments, and groundwater) are required by DER to hold ELAP certification for PFAS in drinking water by EPA Method 537 or ISO 25101. Labs must also adhere to the requirements and criteria set forth in the Laboratory Guidance for Analysis of PFAS in Non-Potable Water and Solids.

EPA Method 1633 is the method required by NYSDEC for all workplans approved after November 1, 2022 to use for environmental samples due to its ability to achieve very low detection limits. Reporting limits for PFAS in groundwater and soil are to be 2 ng/L (ppt) and 1 ug/kg (ppb), respectively. First Environment understand that contract labs or workplans submitted by responsible parties indicate that they are not able to achieve these reporting limits for the entire list of 40 PFAS compounds, site-specific decisions will need to be made by

the DEC project manager in consultation with the DEC remedial program chemist. Note: Reporting limits for PFOA and PFOS in groundwater should not exceed 2 ng/L. However, in cases where sample dilution is necessary due to high contaminant concentrations these detections limits will not be achievable.

In total, 59 soil, sediment, and surface water sample locations have been proposed at former Landfills A through F, Boggy Pond, former Medical Incinerator, STP, Former Boiler Plant, Outfalls/Stream, and background/upgradient of the former landfills. Thirty-seven of the sample locations consist of soil borings that will extend to the water table. At each soil boring location soil will be collected from 0 to 6 inches below vegetative cover and six inches above the water table for PFAS laboratory analysis using USEPA Method 1633. Six background surface soil samples will also be collected for PFAS from 0 to 6 inches below vegetative cover. In total, 80 soil samples and up to 15 sediment and 16 surface water samples are being proposed for PFAS analysis at the 59 sample locations. In addition to laboratory sample analysis for PFAS, a select number representing 15 percent of the samples will be submitted to a New York State certified laboratory for the TCL/TAL analyses. It should be noted TCL/TAL sample collection will be biased at former landfill areas within the Remediation Site. In addition to PFAS, a select number of surface soil samples will be collected for TCL, such samples will be collected from 0 to 6 inches below vegetative and TAL surface soil samples will be collected from 0 to 2 inches below vegetative cover. First Environment anticipates the collection of 17 quality assurance, duplicate, and field blank samples for PFAS and 15 duplicate, field blank, and trip samples for TCL/TAL.

Samples will be collected using a properly decontaminated stainless steel or HDPE hand scoop/trowel and transferred to the appropriate container. All sample containers will consist of laboratory-cleaned bottles (non-glass for PFAS) that, once filled with sample, are to be properly labeled and then placed into coolers and chilled to 4˚C using wet ice and not blue pack ice.

The soil texture at each soil sampling location shall be logged in accordance with the Unified Soil Classification System (USCS).

Decontamination Procedures

Field sampling procedures for decontamination will be completed in accordance with the attached sampling protocol and checklist for sampling monitoring wells for PFC's (Attachments 1 and 2).

The field sampling equipment will be field decontaminated utilizing the following procedure:

1. non-phosphate detergent and tap water scrub to remove residual particles;
2. generous potable water rinse;
3. distilled/deionized water rinse.

Decontamination of submersible pumps used for monitoring well purging and sampling will use the following procedures:

1. non-phosphate detergent and tap water wash to remove residual particles from the pump casing, hose, and cables;
2. distilled/deionized water rinse;
3. flush a minimum of one gallon of potable water through the pump.

All tubing used for each well will be discarded after use. The submersible pump, associated tubing, and other sampling equipment will be placed on clean polyethylene sheeting prior to use in order to avoid contact with the ground surface.

Waste Handling Procedures

Upon completion of the well installation, each well will be developed until a sediment-free discharge is achieved. The newly installed monitoring wells will be surveyed by a licensed surveyor to horizontal locations and top-of-casing elevation.

Drill cuttings from wells will be stockpiled at a central location either in drums or on top of protective sheeting and properly covered until site characterization of the soil is completed. Once obtained from the laboratory, waste characterization results will be provided to the NYSDEC project manager along with a completed request for an importation form for approval of on-site reuse.

In addition, relative to groundwater, NYSDEC has allowed purge water for well sampling and well development to return to ground un-containerized assuming it meets the criteria

described below. Investigation derived waste (IDW) for groundwater, unless groundwater is observed to contain visible waste, free product, NAPL, sheens, or are otherwise grossly contaminated, will return to ground un-containerized. If groundwater is encountered, under those circumstances where contamination is visible as described above, well development and purge water will be containerized for subsequent characterization following Table 5.4(e)10 in DER-10.

Field Quality Control Procedures

Field Duplicates

Field Duplicate samples are collected to evaluate the laboratory's performance by comparing two separate samples that were collected from the same location. The frequency of duplicate sample collection will be five percent or 1 for every 20 samples, or part thereof, per matrix. If less than 20 samples are collected for a particular matrix, then 1 duplicate will be collected.

The collection of a duplicate groundwater sample will be obtained by alternately filling sample containers from the same sampling device for each parameter. The sample locations that require VOC analysis should have all the VOC sample containers filled from a single sampling device, whenever possible.

Field Blanks

Field Blanks will be collected as a mechanism of control on sample equipment handling, preparation, storage, and shipment. Field Blanks will be collected for all sampling events involving the collection of groundwater. Field Blanks will be collected for sampling events involving the collection of non-aqueous samples only if the samples are to be analyzed for PFAS and VOCs.

Field Blanks will be collected at a frequency of one per day during aqueous sampling events. They will be analyzed for any and all parameters analyzed during a particular sampling event on that day of sampling.

Field Blanks for non-aqueous samples will only be collected when environmental samples are to be analyzed for PFAS and VOCs, and then only for those PFAS and VOCs targeted for analysis in the corresponding environmental samples. In such cases, Field Blanks will be collected at a frequency of five percent of the total number of non-aqueous samples collected over the duration of the sampling event. However, the number of Field Blanks collected will not exceed one per day even if the number of samples collected on a given day exceeds 20.

Field Blank water will be analyte free water provided by the analytical laboratory. The Field Blank water will be transported to the field in bottles that are of the same type as that which is used to contain the Field Blank sample. All Field Blank and sample containers will be

transported to and from the field and handled in a manner that is identical, in every practical aspect, to the manner in which environmental samples and sample containers are handled.

Trip Blanks

A Trip Blank will accompany each environmental sample container (cooler) carrying aqueous samples that are to be analyzed for VOCs. The Trip Blanks will be analyzed for any and all VOC parameters that are targeted for analysis in any sample shipment. Trip Blanks are not required for non-aqueous sampling events.

Trip Blanks will be prepared by the analytical laboratory using analyte-free water. The Trip Blanks will be marked by the laboratory with the date and time of preparation. This date and time will represent the sampling date and time for the Trip Blank that is to be entered into the field logbooks and chain-of-custody forms.

Trip Blanks will accompany the coolers and environmental samples during transport to and from the field. Every practical step should be taken to expose the Trip Blanks to the same conditions as the environmental samples and coolers.

Table 3: Quality Assurance Sample Frequency

QA Sample Type	Aqueous	Soil
Duplicate	5%	5%
Field Blank	Daily	5% (VOCs only)[1]
Trip Blank	1 per Cooler (VOCs only)	Not Required

[1] This frequency is for a multi-day sampling event. If the sampling event is only one day in duration, then one field blank is required no matter how many samples are collected on that day. For multi-day sampling events where more than 20 samples are collected in a single day, one field blank per day is permitted.

Chain-of-Custody Procedures and Sample Storage

Chain-of-custody procedures have been established to ensure sample traceability from the time of collection through the completion of analyses. The National Enforcement Investigation/ Remediations Center (NEIC) of USEPA considers a sample to be in custody under the following conditions:

- it is in your possession; or
- it is in your view after being in your possession; or
- it was in your possession and you secured it with a lock; or
- it is in a designated secure area.

All environmental samples will be handled under strict chain-of-custody procedures beginning in the field. The First Environment Field Team Leader will be the Field Sample Custodian and will be responsible for ensuring that the procedures outlined in the applicable workplan and this QAPP will be followed. Sample custody for field activities will include the use of chain-of-custody forms, sample labels, and field logbooks. Dedicated field logbooks will be used throughout the project to document field activities.

Once samples are transported to the laboratory, custodial responsibility is transferred to the Laboratory Sample Manager to ensure that the appropriate procedures and methods are followed.

Data Reduction, Evaluation, and Reporting

The laboratory will submit analytical reports to First Environment. Precision, accuracy, representativeness, comparability, and completeness of the laboratory data will be evaluated based upon adherence to sample holding times and the analysis of QA/QC samples (i.e., duplicates, spikes, and blanks). Data validation of non-CLP reduced deliverables (Category A) will be based upon method-specific QC criteria similar to the criteria of Section 8 of the USEPA 600 series methods provided in 40 CFR Part 136. The overall responsibility for reporting laboratory data lies with the laboratory director. Professional judgment will be used to determine data usability with respect to the Data Quality Objectives. Data validation of CLP deliverables (Category B) will be performed by a third-party verifier and be reported in a Data Usability Summary Report (DUSR) as specified in the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation dated May 2010.

In accordance with Section 502 of the Public Health Law, data upon which decisions impacting human health are based will be analyzed by an ELAP certified lab and documented by Category B deliverables. The following types of samples fall under this category:

- initial groundwater sampling (including both on-site and off-site sampling);
- soil to remain at the site (waste classification for reuse);
- post-excavation sampling; and
- air sampling, including outdoor air, indoor air, sub-slab vapor, and soil vapor samples.

Assessment of accuracy, precision, and completeness of both field and laboratory measurements is based upon obtaining acceptable results from QA/QC samples. Where appropriate, these may include blanks, duplicate samples, laboratory control spikes, or matrix spike/matrix spike duplicate samples. At least one physical set of Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples will be collected and analyzed per 20 samples for each matrix. Duplicates and MS/MSDs will be collected at least once during each major analytical event.

Method blanks, field blanks, and trip blanks are expected not to contain any targeted analytes with concentrations greater than the reported detection limit, with the possible exception of common laboratory contaminants (e.g., methylene chloride and acetone).

Field and laboratory duplicate results will be assessed based upon the relative percent difference (RPD) between values, using the following equation:

$$RPD = \frac{(D1-D2)}{(D1+D2)/2} \times 100$$

where, D1 = Primary sample result; and
D2 = Duplicate sample result.

Laboratory Control Samples will be assessed based upon the percent recovery of spiked analytes. The percent recovery will be calculated using the following equation:

$$\text{Percent Recovery} = \frac{X}{TV} \times 100$$

where, X = observed value of measurement; and,
TV = "true" value of spiked analyte.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) data will be assessed based upon the percent recovery of spiked analytes using the following equation:

$$\text{Percent Recovery} = \frac{(SSR - SR)}{SA} \times 100$$

where, SSA = Spiked sample result for analyte x;
SR = Sample result for analyte x;
SA = Spike of analyte x added.

Laboratory completeness will be assessed based upon the amount of valid data obtained from a particular measurement system. It may be quantitatively expressed using the following equation:

$$\text{Laboratory Completeness} = \frac{N1}{N2} \times 100$$

where, N1 = Number of valid measurements obtained; and,
N2 = Number of measurements validated.

Project Data completeness will be assessed based upon the amount of valid data obtained from field sampling and laboratory analyses. It may be quantitatively expressed using the following equation:

$$\text{Project Completeness} = \frac{N1}{N2} \times 100$$

where, N1 = Number of valid measurements obtained; and
N2 = Number of measurements anticipated in the Site Characterization Work Plan.

The laboratory will assess all QC data with regard to precision and accuracy. Individuals making field measurements will determine whether or not field QC criteria were met. A First Environment data validator will examine laboratory analytical data and field data to determine the usability of this data as well as the data's consistency with Analytical Data Quality Objectives.

Analytical Laboratory and Methods

Analytical Laboratory

York Analytical Laboratories
120 Research Drive
Stratford, Connecticut 06615
Phone: 1-800-306-9675

Analytical Methods

Please refer to Table 2 for the analytical protocols, sample preservation, and holding times for the analyte to be investigated. Detection limits (Method Detection Limits or reporting Limits) for each analysis will be provided with the sample analytical results (see Attachment 3). The data will be provided in an electronic data deliverable (EDD) format for the NYSDEC EQUIS Environmental Data Management System.

Corrective Actions

The need for corrective action will be based upon predetermined limits for acceptability for all aspects of sample collection and analysis. Predetermined limits for acceptability may include, but are not limited to, historical data and precision, accuracy, representativeness, consistency, and completeness criteria.

Laboratory Corrective Actions are described in the laboratory's Quality Assurance Manual. Laboratory personnel will assess laboratory QC samples and, if applicable, re-analyze samples that do not meet Quality Assurance requirements prior to expirations of holding times. Other corrective actions may include collection and analysis of additional samples from the site. Problems that cannot be resolved by the laboratory's managers or QA officers will be brought to the attention of the First Environment Project Manager. The Project Manager, following consulting with NYSDEC, will determine the corrective action to be taken, if any.

The detection of system and performance problems during field activities and the implementation of any resulting corrective actions will be documented in the field logbook and placed in the project file. System and performance problems may include, but not be limited to, field equipment failure, limited or no site access, and unanticipated field conditions. The First Environment Project Manager will be notified of all system and performance problems immediately after field personnel discover them. The Project Manager may consult with the NYSDEC and the VA, if necessary, to determine the corrective action to be taken, if any.

ATTACHMENT 1

PFCs Sampling Checklist

Date: _____

Weather (*temp./precipitation*): _____ Site Name: _____

Field Clothing and PPE:

- ☐ No clothing or boots containing Gore-Tex™
- ☐ All safety boots made from polyurethane and PVC
- ☐ No materials containing Tyvek®
- ☐ Field crew has not used fabric softener on clothing
- ☐ Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- ☐ Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- ☐ No Teflon® or LDPE containing materials on-site
- ☐ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- ☐ No waterproof field books on-site
- ☐ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☐ No adhesives (Post-It Notes) on-site
- ☐ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☐ All sample containers made of HDPE or polypropylene
- ☐ Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- ☐ Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

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

Food Considerations:

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

If any applicable boxes cannot be checked, the Field Lead shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

_____

_____

_____

Field Lead Name: _____

Field Lead Signature: _____ Time: _____

PFC Sampling – Prohibited and Acceptable Items

Prohibited	Acceptable
Field Equipment	
Teflon® containing materials	High-density polyethylene (HDPE) materials
Low density polyethylene (LDPE) materials	Acetate Liners
	Silicon Tubing
Waterproof field books	Loose paper (non-waterproof)
Plastic clipboards, binders, or spiral hard cover notebooks	Aluminum field clipboards or with Masonite
	Sharpies®, pens
Post-It Notes®	
Chemical (blue) ice packs	Regular ice
Field Clothing and PPE	
New cotton clothing or synthetic water resistant, waterproof, or stain-treated clothing, clothing containing Gore-Tex™	Well-laundered clothing made of natural fibers (preferable cotton)
Clothing laundered using fabric softener	No fabric softener
Boots containing Gore-Tex™	Boots made with polyurethane and PVC
Tyvek®	Cotton clothing
No cosmetics, moisturizers, hand cream, or other related products as part of personal cleaning/showering routine on the morning of sampling	**Sunscreens** - Alba Organics Natural Sunscreen, Yes To Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss my face, Baby sunscreens that are "free" or "natural" **Insect Repellents** - Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellant, Herbal Armor, California Baby Natural Bug Spray, BabyGanics **Sunscreen and insect repellant -** Avon Skin So Soft Bug Guard Plus – SPF 30 Lotion
Sample Containers	
LDPE or glass containers	HDPE or polypropylene
Teflon-lined caps	Unlined polypropylene caps
Rain Events	
Waterproof or resistant rain gear	Gazebo tent that is only touched or moved prior to and following sampling activities
Equipment Decontamination	
Decon 90®	Alconox® and/or Liquinox®
Water from an on-site well	Potable water from municipal drinking water supply
Food Considerations	
All food and drink, with exceptions noted on right	Bottled water and hydration fluids (i.e, Gatorade® and Powerade®) to be brought and consumed only in the staging areas

ATTACHMENT 2

Collection of Groundwater Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) from Monitoring Wells Sample Protocol

Samples collected using this protocol are intended to be analyzed for perfluorooctanoic acid (PFOA) and other perfluorinated compounds by Modified (Low Level) Test Method 537.

The procedure used must be consistent with the NYSDEC March 1991 Sampling Guidelines and Protocols http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf with the following materials limitations.

At this time acceptable materials for sampling include: stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Equipment blanks should be generated at least daily. Additional materials may be acceptable if pre-approved by NYSDEC. Requests to use alternate equipment should include clean equipment blanks. **NOTE: Grunfos pumps and bladder pumps are known to contain PFC materials (e.g. Teflon™ washers for Grunfos pumps and LDPE bladders for bladder pumps).** All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent and clean water rinse will be performed for equipment that does come in contact with PFC materials. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and “plumbers thread seal tape” contain PFCs.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory.

1. Fill two pre-cleaned 500 mL HDPE or polypropylene bottle with the sample.
2. Cap the bottles with an acceptable cap and liner closure system.
3. Label the sample bottles.
4. Fill out the chain of custody.
5. Place in a cooler maintained at 4 ± 2º Celsius.

Collect one equipment blank for every sample batch, not to exceed 20 samples.

Collect one field duplicate for every sample batch, not to exceed 20 samples.

Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, not to exceed 20 samples.

Request appropriate data deliverable (Category A or B) and an electronic data deliverable.

ATTACHMENT 3

Analytical Method Information

Printed: 11/15/2022 4:27 pm

Mercury by 7473 in Soil (EPA 7473)

Preservation: Cool 4°C

Container: 06_8 oz. WM Clear Glass Cool to 4° C **Amount Required:** 10 g. **Hold Time:** 28 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Mercury	0.0300	0.0300 mg/kg		35	75-125		67.6-131	

Mercury by 7473 in Water (EPA 7473)

Preservation: Add HNO3 to pH<2, Cool 4°C

Container: 10_250mL Plastic pH <2 w/ HNO3 **Amount Required:** 100 mL **Hold Time:** 28 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Mercury	0.000200	0.000200 mg/L		20	75-125		80-120	

Metals, Target Analyte in Soil (EPA 6010D)

Preservation: Cool 4°C

Container: 06_4 oz. WM Clear Glass Cool to 4° C **Amount Required:** 50 **Hold Time:** 180 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Aluminum	4.17	4.17 mg/kg		35	75-125	35	80-120	
Antimony	2.08	2.08 mg/kg		35	75-125	35	80-120	
Arsenic	1.25	1.25 mg/kg		35	75-125	35	80-120	
Barium	2.08	2.08 mg/kg		35	75-125	35	80-120	
Beryllium	0.0420	0.0420 mg/kg		35	75-125	35	80-120	
Cadmium	0.250	0.250 mg/kg		35	75-125	35	80-120	
Calcium	4.17	4.17 mg/kg		35	75-125	35	80-120	
Chromium	0.417	0.417 mg/kg		35	75-125	35	80-120	
Cobalt	0.333	0.333 mg/kg		35	75-125	35	80-120	
Copper	1.67	1.67 mg/kg		35	75-125	35	80-120	
Iron	20.8	20.8 mg/kg		35	75-125	35	80-120	
Lead	0.417	0.417 mg/kg		35	75-125	35	80-120	
Magnesium	4.17	4.17 mg/kg		35	75-125	35	80-120	
Manganese	0.417	0.417 mg/kg		35	75-125	35	80-120	
Nickel	0.830	0.830 mg/kg		35	75-125	35	80-120	
Potassium	4.17	4.17 mg/kg		35	75-125	35	80-120	
Selenium	2.08	2.08 mg/kg		35	75-125	35	80-120	
Silver	0.420	0.420 mg/kg		35	75-125	35	80-120	
Sodium	41.7	41.7 mg/kg		35	75-125	35	80-120	
Thallium	2.08	2.08 mg/kg		35	75-125	35	80-120	
Vanadium	0.830	0.830 mg/kg		35	75-125	35	80-120	
Zinc	2.08	2.08 mg/kg		35	75-125	35	80-120	
Yttrium 371.029								

Analytical Method Information

(Continued)

Metals, Target Analyte in Water (EPA 6010D)

Preservation: Add HNO3 to pH<2, Cool 4°C

Container: 10_250mL Plastic pH <2 w/ HNO3 **Amount Required:** 200 **Hold Time:** 180 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Aluminum	0.0500	0.0500 mg/L		20		20	80-120	
Antimony	0.0250	0.0250 mg/L		20	75-125	20	80-120	
Arsenic	0.0150	0.0150 mg/L		20	75-125	20	80-120	
Barium	0.0250	0.0250 mg/L		20	75-125	20	80-120	
Beryllium	0.000500	0.000500 mg/L		20	75-125	20	80-120	
Cadmium	0.00300	0.00300 mg/L		20	75-125	20	80-120	
Calcium	0.0500	0.0500 mg/L		20		20	80-120	
Chromium	0.00500	0.00500 mg/L		20	75-125	20	80-120	
Cobalt	0.00400	0.00400 mg/L		20	75-125	20	80-120	
Copper	0.0200	0.0200 mg/L		20	75-125	20	80-120	
Iron	0.250	0.250 mg/L		20	75-125	20	80-120	
Lead	0.00500	0.00500 mg/L		20	75-125	20	80-120	
Magnesium	0.0500	0.0500 mg/L		20		20	80-120	
Manganese	0.00500	0.00500 mg/L		20	75-125	20	80-120	
Nickel	0.0100	0.0100 mg/L		20	75-125	20	80-120	
Potassium	0.0500	0.0500 mg/L		20		20	80-120	
Selenium	0.0250	0.0250 mg/L		20	75-125	20	80-120	
Silver	0.00500	0.00500 mg/L		20	75-125	20	80-120	
Sodium	0.500	0.500 mg/L		20		20	80-120	
Thallium	0.0250	0.0250 mg/L		20	75-125	20	80-120	
Vanadium	0.0100	0.0100 mg/L		20	75-125	20	80-120	
Zinc	0.0250	0.0250 mg/L		20	75-125	20	80-120	
Yttrium 371.029								

Metals, Target Analyte List in Soil (varies)

Preservation: [Group Analysis]

Container: **Amount Required:** **Hold Time:** 5 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD

No Analytes listed

Metals, Target Analyte List in Water (varies)

Preservation: [Group Analysis]

Container: **Amount Required:** **Hold Time:** 5 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD

No Analytes listed

Analytical Method Information

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Metals, Target Analyte, ICPMS in Soil (EPA 6020B)

Preservation: Cool 4°C

Container: 06_4 oz. WM Clear Glass Cool to 4° C **Amount Required:** 200 **Hold Time:** 180 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Antimony	0.100	0.100 mg/kg		35	75-125		80-120	
Arsenic	0.100	0.100 mg/kg		35	75-125		80-120	
Beryllium	0.100	0.100 mg/kg		35	75-125		80-120	
Cadmium	0.0500	0.0500 mg/kg		35	75-125		80-120	
Selenium	0.100	0.100 mg/kg		35	75-125		80-120	
Thallium	0.100	0.100 mg/kg		35	75-125		80-120	

Metals, Target Analyte, ICPMS in Water (EPA 6020B)

Preservation: Add HNO3 to pH<2, Cool 4°C

Container: 10_250mL Plastic pH <2 w/ HNO3 **Amount Required:** 200 **Hold Time:** 180 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Antimony	1.00	1.00 ug/L		20	75-125	20	80-120	
Arsenic	1.00	1.00 ug/L		20	75-125	20	80-120	
Beryllium	0.300	0.300 ug/L		20	75-125	20	80-120	
Cadmium	0.500	0.500 ug/L		20	75-125	20	80-120	
Molybdenum	1.00	1.00 ug/L		20	75-125	20	80-120	
Selenium	1.00	1.00 ug/L		20	75-125	20	80-120	
Thallium	1.00	1.00 ug/L		20	75-125	20	80-120	

Analytical Method Information

Printed: 11/15/2022 4:29 pm

PFAS, NYSDEC Target List in Soil (EPA 537m)

Preservation: Cool 4°C

Container: 10_250mL Plastic Cool to 4° C **Amount Required:** 250 mL **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Perfluorobutanesulfonic acid (PFBS)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorohexanoic acid (PFHxA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluoroheptanoic acid (PFHpA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorohexanesulfonic acid (PFHxS)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorooctanoic acid (PFOA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorooctanesulfonic acid (PFOS)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorononanoic acid (PFNA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorodecanoic acid (PFDA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluoroundecanoic acid (PFUnA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorododecanoic acid (PFDoA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorotridecanoic acid (PFTrDA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluorotetradecanoic acid (PFTA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
N-MeFOSAA	0.250	0.250 ug/kg		30	25-150	35	50-130	30
N-EtFOSAA	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluoropentanoic acid (PFPeA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluoro-1-octanesulfonamide (FOSA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluoro-1-heptanesulfonic acid (PFHpS)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Perfluoro-1-decanesulfonic acid (PFDS)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	0.250	0.250 ug/kg		30	25-200	35	50-200	30
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	0.250	0.250 ug/kg		30	25-200	35	50-200	30
Perfluoro-n-butanoic acid (PFBA)	0.250	0.250 ug/kg		30	25-150	35	50-130	30
Surr: M3PFBS			25-150					
Surr: M5PFHxA			25-150					
Surr: M4PFHpA			25-150					
Surr: M3PFHxS			25-150					
Surr: Perfluoro-n-[13C8]octanoic acid (M8PFOA)			25-150					
Surr: M6PFDA			25-150					
Surr: M7PFUdA			25-150					
Surr: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)			25-150					
Surr: M2PFTeDA			10-150					
Surr: Perfluoro-n-[13C4]butanoic acid (MPFBA)			25-150					
Surr: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)			25-150					
Surr: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)			25-150					
Surr: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)			10-150					
Surr: d3-N-MeFOSAA			25-150					
Surr: d5-N-EtFOSAA			25-150					
Surr: M2-6:2 FTS			25-200					
Surr: M2-8:2 FTS			25-200					
Surr: M9PFNA			25-150					
MPFOA								

Analytical Method Information

Printed: 11/15/2022 4:29 pm

(Continued)

PFAS, NYSDEC Target List in Water (EPA 537m)

Preservation: Cool 4°C

Container: 10_250mL Plastic Cool to 4° C **Amount Required:** 250 mL **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Perfluorobutanesulfonic acid (PFBS)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorohexanoic acid (PFHxA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluoroheptanoic acid (PFHpA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorohexanesulfonic acid (PFHxS)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorooctanoic acid (PFOA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorooctanesulfonic acid (PFOS)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorononanoic acid (PFNA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorodecanoic acid (PFDA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluoroundecanoic acid (PFUnA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorododecanoic acid (PFDoA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorotridecanoic acid (PFTrDA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluorotetradecanoic acid (PFTA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
N-MeFOSAA	2.00	2.00 ng/L		30	25-150	35	50-130	30
N-EtFOSAA	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluoropentanoic acid (PFPeA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluoro-1-octanesulfonamide (FOSA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluoro-1-heptanesulfonic acid (PFHpS)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Perfluoro-1-decanesulfonic acid (PFDS)	2.00	2.00 ng/L		30	25-150	35	50-130	30
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	5.00	5.00 ng/L		30	25-200	35	50-175	30
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	2.00	2.00 ng/L		30	25-200	35	50-175	30
Perfluoro-n-butanoic acid (PFBA)	2.00	2.00 ng/L		30	25-150	35	50-130	30
Surr: M3PFBS			25-150					
Surr: M5PFHxA			25-150					
Surr: M4PFHpA			25-150					
Surr: M3PFHxS			25-150					
Surr: Perfluoro-n-[13C8]octanoic acid (M8PFOA)			25-150					
Surr: M6PFDA			25-150					
Surr: M7PFUdA			25-150					
Surr: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)			25-150					
Surr: M2PFTeDA			10-150					
Surr: Perfluoro-n-[13C4]butanoic acid (MPFBA)			25-150					
Surr: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)			25-150					
Surr: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)			25-150					
Surr: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)			10-150					
Surr: d3-N-MeFOSAA			25-150					
Surr: d5-N-EtFOSAA			25-150					
Surr: M2-6:2 FTS			25-200					
Surr: M2-8:2 FTS			25-200					
Surr: M9PFNA			25-150					
MPFOA		0.100 ng/L						

Analytical Method Information

Printed: 11/15/2022 4:32 pm

Semi-Volatiles, 1,4-Dioxane 8270 SIM-Aqueous in Water (EPA 8270D SIM)

Preservation: Cool 4°C

Container: 09_500 mL Glass Amber **Amount Required:** 500 mL **Hold Time:** 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
1,4-Dioxane	0.200	0.300 ug/L		30	50-130	30	50-130	30
Surr: 1,4-Dioxane-d8	0.200		36.6-118					
1,2-Dichlorobenzene-d4								

Analytical Method Information

Printed: 11/15/2022 4:33 pm

Semi-Volatiles, 1,4-Dioxane 8270 SIM-Soil in Soil (EPA 8270D SIM)

Preservation: Cool 4°C

Container: 06_4 oz. WM Clear Glass Cool to 4° C **Amount Required:** 250 mL **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
1,4-Dioxane	3.70	20.0 ug/kg		30	40-130	30	40-130	30
Surr: 1,4-Dioxane-d8	4.60		39-127.5					
1,2-Dichlorobenzene-d4								

Analytical Method Information

Printed: 11/15/2022 4:30 pm

Semi-Volatiles, 8270 - Comprehensive in Soil (EPA 8270D)

Preservation: Cool 4°C

Container: 06_4 oz. WM Clear Glass Cool to 4° C **Amount Required:** 100 g **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
1,1-Biphenyl	20.9	41.7 ug/kg			10-130	30	18-111	30
1,2,4,5-Tetrachlorobenzene	41.7	83.3 ug/kg			10-133	30	21-131	30
1,2,4-Trichlorobenzene	20.9	41.7 ug/kg			10-127	30	10-140	30
1,2-Dichlorobenzene	20.9	41.7 ug/kg			14-111	30	34-108	30
1,2-Diphenylhydrazine (as Azobenzene)	20.9	41.7 ug/kg			10-144	30	17-137	30
1,3-Dichlorobenzene	20.9	41.7 ug/kg			11-111	30	33-110	30
1,4-Dichlorobenzene	20.9	41.7 ug/kg			10-106	30	32-104	30
2,3,4,6-Tetrachlorophenol	41.7	83.3 ug/kg			30-130	30	30-130	30
2,4,5-Trichlorophenol	20.9	41.7 ug/kg			10-127	30	27-118	30
2,4,6-Trichlorophenol	20.9	41.7 ug/kg			10-132	30	31-120	30
2,4-Dichlorophenol	20.9	41.7 ug/kg			10-128	30	20-127	30
2,4-Dimethylphenol	20.9	41.7 ug/kg			10-137	30	14-132	30
2,4-Dinitrophenol	41.7	83.3 ug/kg			10-171	30	10-171	30
2,4-Dinitrotoluene	20.9	41.7 ug/kg			16-135	30	34-131	30
2,6-Dinitrotoluene	20.9	41.7 ug/kg			18-131	30	31-128	30
2-Chloronaphthalene	20.9	41.7 ug/kg			10-129	30	31-117	30
2-Chlorophenol	20.9	41.7 ug/kg			15-116	30	33-113	30
2-Methylnaphthalene	20.9	41.7 ug/kg			10-147	30	12-138	30
2-Methylphenol	20.9	41.7 ug/kg			10-136	30	10-136	30
2-Nitroaniline	41.7	83.3 ug/kg			10-137	30	27-132	30
2-Nitrophenol	20.9	41.7 ug/kg			10-129	30	17-129	30
3- & 4-Methylphenols	20.9	41.7 ug/kg			10-123	30	29-103	30
3,3-Dichlorobenzidine	20.9	41.7 ug/kg			10-155	30	22-149	30
3-Nitroaniline	41.7	83.3 ug/kg			12-133	30	20-133	30
4,6-Dinitro-2-methylphenol	41.7	83.3 ug/kg			10-155	30	10-143	30
4-Bromophenyl phenyl ether	20.9	41.7 ug/kg			14-128	30	29-120	30
4-Chloro-3-methylphenol	20.9	41.7 ug/kg			10-134	30	24-129	30
4-Chloroaniline	20.9	41.7 ug/kg			10-145	30	10-132	30
4-Chlorophenyl phenyl ether	20.9	41.7 ug/kg			14-130	30	27-124	30
4-Nitroaniline	41.7	83.3 ug/kg			10-147	30	16-128	30
4-Nitrophenol	41.7	83.3 ug/kg			10-137	30	10-141	30
Acenaphthene	20.9	41.7 ug/kg			10-146	30	30-121	30
Acenaphthylene	20.9	41.7 ug/kg			10-134	30	30-115	30
Acetophenone	20.9	41.7 ug/kg			10-116	30	20-112	30
Aniline	83.5	167 ug/kg			10-123	30	10-119	30
Anthracene	20.9	41.7 ug/kg			10-142	30	34-118	30
Atrazine	20.9	41.7 ug/kg			19-115	30	26-112	30
Benzaldehyde	20.9	41.7 ug/kg			10-125	30	21-100	30
Benzidine	83.5	167 ug/kg				30		30
Benzo(a)anthracene	20.9	41.7 ug/kg			10-158	30	32-122	30
Benzo(a)pyrene	20.9	41.7 ug/kg			10-180	30	29-133	30
Benzo(b)fluoranthene	20.9	41.7 ug/kg			10-200	30	25-133	30
Benzo(g,h,i)perylene	20.9	41.7 ug/kg			10-138	30	10-143	30
Benzo(k)fluoranthene	20.9	41.7 ug/kg			10-197	30	25-128	30
Benzoic acid	20.9	41.7 ug/kg			10-166	30	10-140	30
Benzyl alcohol	20.9	41.7 ug/kg			12-124	30	30-115	30
Benzyl butyl phthalate	20.9	41.7 ug/kg			10-154	30	26-126	30
Bis(2-chloroethoxy)methane	20.9	41.7 ug/kg			10-132	30	19-132	30
Bis(2-chloroethyl)ether	20.9	41.7 ug/kg			10-119	30	19-125	30
Bis(2-chloroisopropyl)ether	20.9	41.7 ug/kg			10-139	30	20-135	30
Bis(2-ethylhexyl)phthalate	20.9	41.7 ug/kg			10-167	30	10-155	30
Caprolactam	41.7	83.3 ug/kg			10-132	30	10-127	30
Carbazole	20.9	41.7 ug/kg			10-167	30	35-123	30

Analytical Method Information

Printed: 11/15/2022 4:30 pm

(Continued)

Semi-Volatiles, 8270 - Comprehensive in Soil (EPA 8270D) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	----Matrix Spike---- RPD	--Blank Spike / LCS-- %Rec	--Blank Spike / LCS-- RPD
Chrysene	20.9	41.7 ug/kg			10-156	30	32-123	30
Dibenzo(a,h)anthracene	20.9	41.7 ug/kg			10-137	30	10-136	30
Dibenzofuran	20.9	41.7 ug/kg			10-147	30	29-121	30
Diethyl phthalate	20.9	41.7 ug/kg			20-120	30	34-116	30
Dimethyl phthalate	20.9	41.7 ug/kg			18-131	30	35-124	30
Di-n-butyl phthalate	20.9	41.7 ug/kg			10-137	30	31-116	30
Di-n-octyl phthalate	20.9	41.7 ug/kg			10-180	30	26-136	30
Diphenylamine	41.7	83.3 ug/kg			40-140	30	40-140	30
Fluoranthene	20.9	41.7 ug/kg			10-160	30	33-122	30
Fluorene	20.9	41.7 ug/kg			10-157	30	29-123	30
Hexachlorobenzene	20.9	41.7 ug/kg			10-137	30	21-124	30
Hexachlorobutadiene	20.9	41.7 ug/kg			10-132	30	10-149	30
Hexachlorocyclopentadiene	20.9	41.7 ug/kg			10-106	30	10-129	30
Hexachloroethane	20.9	41.7 ug/kg			10-110	30	28-108	30
Indeno(1,2,3-cd)pyrene	20.9	41.7 ug/kg			10-144	30	10-135	30
Isophorone	20.9	41.7 ug/kg			10-132	30	20-132	30
Naphthalene	20.9	41.7 ug/kg			10-141	30	23-124	30
Nitrobenzene	20.9	41.7 ug/kg			10-131	30	13-132	30
N-Nitrosodimethylamine	20.9	41.7 ug/kg			10-126	30	11-129	30
N-nitroso-di-n-propylamine	20.9	41.7 ug/kg			10-125	30	24-119	30
N-Nitrosodiphenylamine	20.9	41.7 ug/kg			10-177	30	22-152	30
Pentachlorophenol	20.9	41.7 ug/kg			10-153	30	10-139	30
Phenanthrene	20.9	41.7 ug/kg			10-148	30	33-123	30
Phenol	20.9	41.7 ug/kg			10-126	30	23-115	30
Pyrene	20.9	41.7 ug/kg			10-165	30	32-130	30
Pyridine	83.5	167 ug/kg			10-83	30	10-91	30
Total PAH								
Benzo(a)pyrene (BAP)	146	292 ug/kg						
Equivalent-BAPE								
Surr: SURR: 2-Fluorophenol			20-108					
Surr: SURR: Phenol-d5			23-114					
Surr: SURR: Nitrobenzene-d5			22-108					
Surr: SURR: 2-Fluorobiphenyl			21-113					
Surr: SURR: 2,4,6-Tribromophenol			19-110					
Surr: SURR: Terphenyl-d14			24-116					
ISTD: 1,4-Dichlorobenzene-d4								
ISTD: Naphthalene-d8								
ISTD: Acenaphthene-d10								
ISTD: Phenanthrene-d10								
ISTD: Chrysene-d12								
ISTD: Perylene-d12								

Analytical Method Information

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(Continued)

Semi-Volatiles, 8270 - Comprehensive in Water (EPA 8270D)

Preservation: Cool 4°C

Container: 07_1000mL Amber Glass Cool to 4° C **Amount Required:** 1000 mL **Hold Time:** 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
1,1-Biphenyl	2.50	5.00 ug/L			40-140	20	21-102	20
1,2,4,5-Tetrachlorobenzene	2.50	5.00 ug/L			40-140	20	28-105	20
1,2,4-Trichlorobenzene	2.50	5.00 ug/L			31-92	20	35-91	20
1,2-Dichlorobenzene	2.50	5.00 ug/L			31-91	20	42-85	20
1,2-Diphenylhydrazine (as Azobenzene)	2.50	5.00 ug/L			40-140	20	16-137	20
1,3-Dichlorobenzene	2.50	5.00 ug/L			24-93	20	45-80	20
1,4-Dichlorobenzene	2.50	5.00 ug/L			26-95	20	42-82	20
2,3,4,6-Tetrachlorophenol	2.50	5.00 ug/L			30-130	20	30-130	20
2,4,5-Trichlorophenol	2.50	5.00 ug/L			44-96	20	36-112	20
2,4,6-Trichlorophenol	2.50	5.00 ug/L			39-107	20	41-107	20
2,4-Dichlorophenol	2.50	5.00 ug/L			38-99	20	43-92	20
2,4-Dimethylphenol	2.50	5.00 ug/L			10-116	20	25-92	20
2,4-Dinitrophenol	2.50	5.00 ug/L			10-168	20	10-149	20
2,4-Dinitrotoluene	2.50	5.00 ug/L			26-120	20	41-114	20
2,6-Dinitrotoluene	2.50	5.00 ug/L			28-118	20	49-106	20
2-Chloronaphthalene	2.50	5.00 ug/L			33-99	20	40-96	20
2-Chlorophenol	2.50	5.00 ug/L			25-106	20	35-84	20
2-Methylnaphthalene	2.50	5.00 ug/L			29-102	20	33-101	20
2-Methylphenol	2.50	5.00 ug/L			10-118	20	10-90	20
2-Nitroaniline	2.50	5.00 ug/L			48-99	20	31-122	20
2-Nitrophenol	2.50	5.00 ug/L			36-103	20	37-97	20
3- & 4-Methylphenols	2.50	5.00 ug/L			10-102	20	10-101	20
3,3-Dichlorobenzidine	2.50	5.00 ug/L			10-140	20	25-155	20
3-Nitroaniline	2.50	5.00 ug/L			10-169	20	29-128	20
4,6-Dinitro-2-methylphenol	2.50	5.00 ug/L			10-142	20	10-135	20
4-Bromophenyl phenyl ether	2.50	5.00 ug/L			35-109	20	38-116	20
4-Chloro-3-methylphenol	2.50	5.00 ug/L			20-117	20	28-101	20
4-Chloroaniline	2.50	5.00 ug/L			24-116	20	10-154	20
4-Chlorophenyl phenyl ether	2.50	5.00 ug/L			31-112	20	34-112	20
4-Nitroaniline	2.50	5.00 ug/L			24-143	20	15-143	20
4-Nitrophenol	2.50	5.00 ug/L			10-119	20	10-112	20
Acenaphthene	0.0500	0.0500 ug/L			17-132	20	24-114	20
Acenaphthylene	0.0500	0.0500 ug/L			13-124	20	26-112	20
Acetophenone	2.50	5.00 ug/L			40-140	20	47-92	20
Aniline	2.50	5.00 ug/L			10-133	20	10-107	20
Anthracene	0.0500	0.0500 ug/L			40-105	20	35-114	20
Atrazine	0.500	0.500 ug/L			40-140	20	43-101	20
Benzaldehyde	2.50	5.00 ug/L			40-140	20	17-117	20
Benzidine	10.0	20.0 ug/L				20		20
Benzo(a)anthracene	0.0500	0.0500 ug/L			23-141	20	38-127	20
Benzo(a)pyrene	0.0500	0.0500 ug/L			46-118	20	30-146	20
Benzo(b)fluoranthene	0.0500	0.0500 ug/L			22-133	20	36-145	20
Benzo(g,h,i)perylene	0.0500	0.0500 ug/L			10-126	20	10-163	20
Benzo(k)fluoranthene	0.0500	0.0500 ug/L			18-152	20	16-149	20
Benzoic acid	25.0	50.0 ug/L			10-162	20	30-130	20
Benzyl alcohol	2.50	5.00 ug/L			10-114	20	18-75	20
Benzyl butyl phthalate	2.50	5.00 ug/L			31-121	20	28-129	20
Bis(2-chloroethoxy)methane	2.50	5.00 ug/L			23-110	20	27-112	20
Bis(2-chloroethyl)ether	2.50	5.00 ug/L			10-132	20	24-114	20
Bis(2-chloroisopropyl)ether	2.50	5.00 ug/L			12-132	20	21-124	20
Bis(2-ethylhexyl)phthalate	0.500	0.500 ug/L			14-131	20	10-171	20
Caprolactam	2.50	5.00 ug/L			40-140	20	10-29	20
Carbazole	2.50	5.00 ug/L			10-169	20	49-116	20

Analytical Method Information

(Continued)

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Semi-Volatiles, 8270 - Comprehensive in Water (EPA 8270D) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	----Matrix Spike---- RPD	--Blank Spike / LCS-- %Rec	--Blank Spike / LCS-- RPD
Chrysene	0.0500	0.0500 ug/L			30-127	20	33-120	20
Dibenzo(a,h)anthracene	0.0500	0.0500 ug/L			10-131	20	10-149	20
Dibenzofuran	2.50	5.00 ug/L			37-103	20	42-105	20
Diethyl phthalate	2.50	5.00 ug/L			41-106	20	38-112	20
Dimethyl phthalate	2.50	5.00 ug/L			38-105	20	49-106	20
Di-n-butyl phthalate	2.50	5.00 ug/L			24-121	20	36-110	20
Di-n-octyl phthalate	2.50	5.00 ug/L			25-141	20	12-149	20
Diphenylamine	2.50	5.00 ug/L			40-140	25	40-140	20
Fluoranthene	0.0500	0.0500 ug/L			29-123	20	33-126	20
Fluorene	0.0500	0.0500 ug/L			20-133	20	28-117	20
Hexachlorobenzene	0.0200	0.0200 ug/L			24-120	20	27-120	20
Hexachlorobutadiene	0.500	0.500 ug/L			26-98	20	25-106	20
Hexachlorocyclopentadiene	2.50	5.00 ug/L			10-103	20	10-99	20
Hexachloroethane	0.500	0.500 ug/L			11-102	20	33-84	20
Indeno(1,2,3-cd)pyrene	0.0500	0.0500 ug/L			10-130	20	10-150	20
Isophorone	2.50	5.00 ug/L			19-113	20	29-115	20
Naphthalene	0.0500	0.0500 ug/L			26-104	20	30-99	20
Nitrobenzene	0.250	0.250 ug/L			25-107	20	32-113	20
N-Nitrosodimethylamine	0.500	0.500 ug/L			10-110	20	10-63	20
N-nitroso-di-n-propylamine	2.50	5.00 ug/L			16-127	20	36-118	20
N-Nitrosodiphenylamine	2.50	5.00 ug/L			46-116	20	27-145	20
Pentachlorophenol	0.250	0.250 ug/L			10-181	20	19-127	20
Phenanthrene	0.0500	0.0500 ug/L			29-121	20	31-112	20
Phenol	2.50	5.00 ug/L			10-107	20	10-37	20
Pyrene	0.0500	0.0500 ug/L			34-129	20	42-125	20
Pyridine	2.50	5.00 ug/L			10-73	20	10-46	20
Surr: SURR: 2-Fluorophenol			19.7-63.1					
Surr: SURR: Phenol-d5			10.1-41.7					
Surr: SURR: Nitrobenzene-d5			50.2-113					
Surr: SURR: 2-Fluorobiphenyl			39.9-105					
Surr: SURR: 2,4,6-Tribromophenol			39.3-151					
Surr: SURR: Terphenyl-d14			30.7-106					
ISTD: 1,4-Dichlorobenzene-d4								
ISTD: Naphthalene-d8								
ISTD: Acenaphthene-d10								
ISTD: Phenanthrene-d10								
ISTD: Chrysene-d12								
ISTD: Perylene-d12								

Analytical Method Information

Printed: 11/15/2022 4:30 pm

Volatile Organics, 8260 - Comprehensive in Soil (EPA 8260C)

Preservation: Cool 4°C

Container: 03_5035 Vial Set **Amount Required:** 20 g. **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
1,1,1,2-Tetrachloroethane	2.5	5.0 ug/kg			15-161	33	75-129	30
1,1,1-Trichloroethane	2.5	5.0 ug/kg			42-145	30	71-137	30
1,1,2,2-Tetrachloroethane	2.5	5.0 ug/kg			16-167	56	79-129	30
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	2.5	5.0 ug/kg			11-160	31	58-146	30
1,1,2-Trichloroethane	2.5	5.0 ug/kg			44-145	40	83-123	30
1,1-Dichloroethane	2.5	5.0 ug/kg			46-142	36	75-130	30
1,1-Dichloroethylene	2.5	5.0 ug/kg			30-153	31	64-137	30
1,1-Dichloropropylene	2.5	5.0 ug/kg			40-133	28	77-127	30
1,2,3-Trichlorobenzene	2.5	5.0 ug/kg			10-157	47	81-140	30
1,2,3-Trichloropropane	2.5	5.0 ug/kg			38-155	48	81-126	30
1,2,4,5-Tetramethylbenzene	2.5	5.0 ug/kg			10-138	44	63-156	30
1,2,4-Trichlorobenzene	2.5	5.0 ug/kg			10-151	52	80-141	30
1,2,4-Trimethylbenzene	2.5	5.0 ug/kg			10-170	242	84-125	30
1,2-Dibromo-3-chloropropane	2.5	5.0 ug/kg			36-138	54	74-142	30
1,2-Dibromoethane	2.5	5.0 ug/kg			40-142	39	86-123	30
1,2-Dichlorobenzene	2.5	5.0 ug/kg			10-147	52	85-122	30
1,2-Dichloroethane	2.5	5.0 ug/kg			48-133	32	71-133	30
1,2-Dichloropropane	2.5	5.0 ug/kg			47-141	37	81-122	30
1,3,5-Trimethylbenzene	2.5	5.0 ug/kg			10-150	62	82-126	30
1,3-Dichlorobenzene	2.5	5.0 ug/kg			10-144	51	84-124	30
1,3-Dichloropropane	2.5	5.0 ug/kg			43-142	36	83-123	30
1,4-Dichlorobenzene	2.5	5.0 ug/kg			10-160	52	84-124	30
1,4-Dioxane	50	100 ug/kg			10-191	196	10-228	30
2,2-Dichloropropane	2.5	5.0 ug/kg			38-130	31	67-136	30
2-Butanone	2.5	5.0 ug/kg			10-189	67	58-147	30
2-Chlorotoluene	2.5	5.0 ug/kg			14-144	49	78-127	30
2-Hexanone	2.5	5.0 ug/kg			10-181	60	70-139	30
4-Chlorotoluene	2.5	5.0 ug/kg			15-138	39	79-125	30
4-Methyl-2-pentanone	2.5	5.0 ug/kg			10-166	47	72-132	30
Acetone	5.0	10 ug/kg			10-196	150	36-155	30
Acrolein	5.0	10 ug/kg			10-192	128	10-238	30
Acrylonitrile	2.5	5.0 ug/kg			13-161	48	66-141	30
Benzene	2.5	5.0 ug/kg			43-139	64	77-127	30
Bromobenzene	2.5	5.0 ug/kg			23-142	44	77-129	30
Bromochloromethane	2.5	5.0 ug/kg			38-145	30	74-129	30
Bromodichloromethane	2.5	5.0 ug/kg			38-147	37	81-124	30
Bromoform	2.5	5.0 ug/kg			29-156	51	80-136	30
Bromomethane	2.5	5.0 ug/kg			10-166	42	32-177	30
Carbon disulfide	2.5	5.0 ug/kg			10-131	36	10-136	30
Carbon tetrachloride	2.5	5.0 ug/kg			35-145	31	66-143	30
Chlorobenzene	2.5	5.0 ug/kg			21-154	32	86-120	30
Chloroethane	2.5	5.0 ug/kg			15-160	40	51-142	30
Chloroform	2.5	5.0 ug/kg			47-142	29	76-131	30
Chloromethane	2.5	5.0 ug/kg			10-159	31	49-132	30
cis-1,2-Dichloroethylene	2.5	5.0 ug/kg			42-144	30	74-132	30
cis-1,3-Dichloropropylene	2.5	5.0 ug/kg			18-159	39	81-129	30
Cyclohexane	2.5	5.0 ug/kg			70-130	30	70-130	30
Dibromochloromethane	2.5	5.0 ug/kg			10-179	41	10-200	30
Dibromomethane	2.5	5.0 ug/kg			47-143	41	83-124	30
Dichlorodifluoromethane	2.5	5.0 ug/kg			10-145	34	28-158	30
Ethyl Benzene	2.5	5.0 ug/kg			11-158	42	84-125	30
Hexachlorobutadiene	2.5	5.0 ug/kg			10-158	45	83-133	30
Isopropylbenzene	2.5	5.0 ug/kg			10-162	57	81-127	30

Analytical Method Information

(Continued)

Volatile Organics, 8260 - Comprehensive in Soil (EPA 8260C) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	----Matrix Spike---- RPD	--Blank Spike / LCS-- %Rec	--Blank Spike / LCS-- RPD
Methyl acetate	2.5	5.0 ug/kg			10-149	64	41-143	30
Methyl tert-butyl ether (MTBE)	2.5	5.0 ug/kg			42-152	47	74-131	30
Methylcyclohexane	2.5	5.0 ug/kg			70-130	30	70-130	30
Methylene chloride	5.0	10 ug/kg			28-151	49	57-141	30
Naphthalene	2.5	10 ug/kg			10-158	95	86-141	30
n-Butylbenzene	2.5	5.0 ug/kg			10-162	96	80-130	30
n-Propylbenzene	2.5	5.0 ug/kg			10-155	56	74-136	30
o-Xylene	2.5	5.0 ug/kg			10-158	51	83-123	30
p- & m- Xylenes	5.0	10 ug/kg			10-156	47	82-128	30
p-Diethylbenzene	2.5	5.0 ug/kg			10-146	39	70-144	30
p-Ethyltoluene	2.5	5.0 ug/kg			10-135	40	84-123	30
p-Isopropyltoluene	2.5	5.0 ug/kg			10-147	60	85-125	30
sec-Butylbenzene	2.5	5.0 ug/kg			10-157	56	83-125	30
Styrene	2.5	5.0 ug/kg			13-171	39	86-126	30
tert-Butyl alcohol (TBA)	2.5	5.0 ug/kg			34-179	35	70-130	30
tert-Butylbenzene	2.5	5.0 ug/kg			10-160	79	80-127	30
Tetrachloroethylene	2.5	5.0 ug/kg			30-167	33	80-129	30
Toluene	2.5	5.0 ug/kg			21-160	50	85-121	30
trans-1,2-Dichloroethylene	2.5	5.0 ug/kg			29-153	30	72-132	30
trans-1,3-Dichloropropylene	2.5	5.0 ug/kg			18-155	30	78-132	30
trans-1,4-dichloro-2-butene	2.5	5.0 ug/kg			17-154	30	75-135	30
Trichloroethylene	2.5	5.0 ug/kg			24-169	30	84-123	30
Trichlorofluoromethane	2.5	5.0 ug/kg			35-142	30	62-140	30
Vinyl acetate	2.5	5.0 ug/kg			10-119	82	67-136	30
Vinyl Chloride	2.5	5.0 ug/kg			12-160	35	52-130	30
Xylenes, Total	7.5	15 ug/kg						
Chlorodifluoromethane (Freon 22)	2.5	5.0 ug/kg				30		30
Surr: SURR: 1,2-Dichloroethane-d4			77-125					
Surr: SURR: Toluene-d8			85-120					
Surr: SURR: p-Bromofluorobenzene			76-130					
ISTD: Fluorobenzene								
ISTD: Chlorobenzene-d5								
ISTD: 1,2-Dichlorobenzene-d4								

Analytical Method Information

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(Continued)

Volatile Organics, 8260 - Comprehensive in Water (EPA 8260C)

Preservation: Add HCl to pH<2; Store cool at 4°C

Container: 00_40mL Clear Vial (pre-pres.) HCl; Cool t **Amount Required:** 80 mL **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
1,1,1,2-Tetrachloroethane	0.20	0.50 ug/L			45-161	30	82-126	30
1,1,1-Trichloroethane	0.20	0.50 ug/L			70-146	30	78-136	30
1,1,2,2-Tetrachloroethane	0.20	0.50 ug/L			74-121	30	76-129	30
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.20	0.50 ug/L			21-217	30	54-165	30
1,1,2-Trichloroethane	0.20	0.50 ug/L			59-146	30	82-123	30
1,1-Dichloroethane	0.20	0.50 ug/L			54-146	30	82-129	30
1,1-Dichloroethylene	0.20	0.50 ug/L			44-165	30	68-138	30
1,1-Dichloropropylene	0.20	0.50 ug/L			82-134	30	83-133	30
1,2,3-Trichlorobenzene	0.20	0.50 ug/L			40-161	30	40-130	30
1,2,3-Trichloropropane	0.20	0.50 ug/L			74-127	30	77-128	30
1,2,4,5-Tetramethylbenzene	0.20	0.50 ug/L			27-190	30	85-140	30
1,2,4-Trichlorobenzene	0.20	0.50 ug/L			41-161	30	65-137	30
1,2,4-Trimethylbenzene	0.20	0.50 ug/L			72-129	30	82-132	30
1,2-Dibromo-3-chloropropane	0.20	0.50 ug/L			31-151	30	45-147	30
1,2-Dibromoethane	0.20	0.50 ug/L			75-125	30	83-124	30
1,2-Dichlorobenzene	0.20	0.50 ug/L			63-122	30	79-123	30
1,2-Dichloroethane	0.20	0.50 ug/L			68-131	30	73-132	30
1,2-Dichloropropane	0.20	0.50 ug/L			77-121	30	78-126	30
1,3,5-Trimethylbenzene	0.20	0.50 ug/L			69-126	30	80-131	30
1,3-Dichlorobenzene	0.20	0.50 ug/L			74-119	30	86-130	30
1,3-Dichloropropane	0.20	0.50 ug/L			77-119	30	81-125	30
1,4-Dichlorobenzene	0.20	0.50 ug/L			70-124	30	85-130	30
1,4-Dioxane	40	40 ug/L			10-310	30	10-349	30
2,2-Dichloropropane	0.20	0.50 ug/L			10-160	30	56-152	30
2-Butanone	0.20	0.50 ug/L			10-193	30	49-152	30
2-Chlorotoluene	0.20	0.50 ug/L			70-126	30	79-130	30
2-Hexanone	0.20	0.50 ug/L			53-133	30	51-146	30
4-Chlorotoluene	0.20	0.50 ug/L			69-124	30	79-128	30
4-Methyl-2-pentanone	0.20	0.50 ug/L			38-150	30	57-145	30
Acetone	1.0	2.0 ug/L			13-149	30	14-150	30
Acrolein	0.20	0.50 ug/L			10-195	30	10-153	30
Acrylonitrile	0.20	0.50 ug/L			37-165	30	51-150	30
Benzene	0.20	0.50 ug/L			38-155	30	85-126	30
Bromobenzene	0.20	0.50 ug/L			72-122	30	78-129	30
Bromochloromethane	0.20	0.50 ug/L			75-121	30	77-128	30
Bromodichloromethane	0.20	0.50 ug/L			70-129	30	79-128	30
Bromoform	0.20	0.50 ug/L			66-136	30	78-133	30
Bromomethane	0.20	0.50 ug/L			30-158	30	43-168	30
Carbon disulfide	0.20	0.50 ug/L			10-138	30	68-146	30
Carbon tetrachloride	0.20	0.50 ug/L			71-146	30	77-141	30
Chlorobenzene	0.20	0.50 ug/L			81-117	30	88-120	30
Chloroethane	0.20	0.50 ug/L			51-145	30	65-136	30
Chloroform	0.20	0.50 ug/L			80-124	30	82-128	30
Chloromethane	0.20	0.50 ug/L			16-163	30	43-155	30
cis-1,2-Dichloroethylene	0.20	0.50 ug/L			76-125	30	83-129	30
cis-1,3-Dichloropropylene	0.20	0.50 ug/L			58-131	30	80-131	30
Cyclohexane	0.20	0.50 ug/L			70-130	30	63-149	30
Dibromochloromethane	0.20	0.50 ug/L			71-129	30	80-130	30
Dibromomethane	0.20	0.50 ug/L			76-120	30	72-134	30
Dichlorodifluoromethane	0.20	0.50 ug/L			30-147	30	44-144	30
Ethyl Benzene	0.20	0.50 ug/L			72-128	30	80-131	30
Hexachlorobutadiene	0.20	0.50 ug/L			34-166	30	67-146	30
Isopropylbenzene	0.20	0.50 ug/L			66-139	30	76-140	30

Analytical Method Information

(Continued)

Printed: 11/15/2022 4:30 pm

Volatile Organics, 8260 - Comprehensive in Water (EPA 8260C) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	----Matrix Spike---- RPD	--Blank Spike / LCS-- %Rec	--Blank Spike / LCS-- RPD
Methyl acetate	0.20	0.50 ug/L			10-200	30	51-139	30
Methyl tert-butyl ether (MTBE)	0.20	0.50 ug/L			75-128	30	76-135	30
Methylcyclohexane	0.20	0.50 ug/L			70-130	30	72-143	30
Methylene chloride	1.0	2.0 ug/L			57-128	30	55-137	30
Naphthalene	1.0	2.0 ug/L			39-158	30	50-147	30
n-Butylbenzene	0.20	0.50 ug/L			61-138	30	79-132	30
n-Propylbenzene	0.20	0.50 ug/L			66-134	30	78-133	30
o-Xylene	0.20	0.50 ug/L			69-126	30	78-130	30
p- & m- Xylenes	0.50	1.0 ug/L			67-130	30	77-133	30
p-Diethylbenzene	0.20	0.50 ug/L			52-150	30	84-134	30
p-Ethyltoluene	0.20	0.50 ug/L			76-127	30	88-129	30
p-Isopropyltoluene	0.20	0.50 ug/L			64-137	30	81-136	30
sec-Butylbenzene	0.20	0.50 ug/L			53-155	30	79-137	30
Styrene	0.20	0.50 ug/L			69-125	30	67-132	30
tert-Butyl alcohol (TBA)	0.50	1.0 ug/L			10-130	30	25-162	30
tert-Butylbenzene	0.20	0.50 ug/L			65-139	30	77-138	30
Tetrachloroethylene	0.20	0.50 ug/L			64-139	30	82-131	30
Toluene	0.20	0.50 ug/L			76-123	30	80-127	30
trans-1,2-Dichloroethylene	0.20	0.50 ug/L			79-131	30	80-132	30
trans-1,3-Dichloropropylene	0.20	0.50 ug/L			55-130	30	78-131	30
trans-1,4-dichloro-2-butene	0.20	0.50 ug/L			25-155	30	63-141	30
Trichloroethylene	0.20	0.50 ug/L			53-145	30	82-128	30
Trichlorofluoromethane	0.20	0.50 ug/L			61-142	30	67-139	30
Vinyl acetate	0.20	0.50 ug/L			10-87	30	60-130	30
Vinyl Chloride	0.20	0.50 ug/L			31-165	30	58-145	30
Xylenes, Total	0.60	1.5 ug/L						
Chlorodifluoromethane (Freon 22)	0.20	0.50 ug/L				30		30
Surr: SURR: 1,2-Dichloroethane-d4			69-130					
Surr: SURR: Toluene-d8			81-117					
Surr: SURR: p-Bromofluorobenzene			79-122					
ISTD: Fluorobenzene								
ISTD: Chlorobenzene-d5								
ISTD: 1,2-Dichlorobenzene-d4								

Analytical Method Information

Printed: 11/16/2022 5:33 pm

Pesticides, 8081 target list in Soil (EPA 8081B)

Preservation: Cool 4°C

Container: 06_4 oz. WM Clear Glass Cool to 4° C **Amount Required:** 100 g **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
4,4'-DDD	0.330	0.330 ug/kg			30-150	30	40-140	30
4,4'-DDD [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
4,4'-DDE	0.330	0.330 ug/kg			30-150	30	40-140	30
4,4'-DDE [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
4,4'-DDT	0.330	0.330 ug/kg			30-150	30	40-140	30
4,4'-DDT [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Aldrin	0.330	0.330 ug/kg			30-150	30	40-140	30
Aldrin [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
alpha-BHC	0.330	0.330 ug/kg			30-150	30	40-140	30
alpha-BHC [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
alpha-Chlordane	0.330	0.330 ug/kg			30-150	30	40-140	30
alpha-Chlordane [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
beta-BHC	0.330	0.330 ug/kg			30-150	30	40-140	30
beta-BHC [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Chlordane, total	6.60	6.60 ug/kg						30
Chlordane, total [2C]	6.60	6.60 ug/kg				30		30
delta-BHC	0.330	0.330 ug/kg			30-150	30	40-140	30
delta-BHC [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Dieldrin	0.330	0.330 ug/kg			30-150	30	40-140	30
Dieldrin [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Endosulfan I	0.330	0.330 ug/kg			30-150	30	40-140	30
Endosulfan I [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Endosulfan II	0.330	0.330 ug/kg			30-150	30	40-140	30
Endosulfan II [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Endosulfan sulfate	0.330	0.330 ug/kg			30-150	30	40-140	30
Endosulfan sulfate [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Endrin	0.330	0.330 ug/kg			30-150	30	40-140	30
Endrin [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Endrin aldehyde	0.330	0.330 ug/kg			30-150	30	40-140	30
Endrin aldehyde [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Endrin ketone	0.330	0.330 ug/kg			30-150	30	40-140	30
Endrin ketone [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
gamma-BHC (Lindane)	0.330	0.330 ug/kg			30-150	30	40-140	30
gamma-BHC (Lindane) [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
gamma-Chlordane	0.330	0.330 ug/kg			30-150	30	40-140	30
gamma-Chlordane [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Heptachlor	0.330	0.330 ug/kg			30-150	30	40-140	30
Heptachlor [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Heptachlor epoxide	0.330	0.330 ug/kg			30-150	30	40-140	30
Heptachlor epoxide [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Methoxychlor	1.65	1.65 ug/kg			30-150	30	40-140	30
Methoxychlor [2C]	0.330	0.330 ug/kg			30-150	30	40-140	30
Toxaphene	16.7	16.7 ug/kg				30		30
Toxaphene [2C]	33.0	33.0 ug/kg				30		30
Mirex	0.330	0.330 ug/kg			30-150	30	40-140	30
Surr: Decachlorobiphenyl			30-150					
Surr: Decachlorobiphenyl [2C]			30-150					
Surr: Tetrachloro-m-xylene			30-150					
Surr: Tetrachloro-m-xylene [2C]			30-150					

Analytical Method Information

Printed: 11/16/2022 5:33 pm

(Continued)

Pesticides, 8081 target list in Water (EPA 8081B)

Preservation: Cool 4°C

Container: 07_1000mL Amber Glass Cool to 4° C **Amount Required:** 1000 mL **Hold Time:** 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
4,4'-DDD	0.00400	0.00400 ug/L			30-150	20	40-140	20
4,4'-DDD [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
4,4'-DDE	0.00400	0.00400 ug/L			30-150	20	40-140	20
4,4'-DDE [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
4,4'-DDT	0.00400	0.00400 ug/L			30-150	20	40-140	20
4,4'-DDT [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Aldrin	0.00400	0.00400 ug/L			30-150	20	40-140	20
Aldrin [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
alpha-BHC	0.00400	0.00400 ug/L			30-150	20	40-140	20
alpha-BHC [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
alpha-Chlordane	0.00400	0.00400 ug/L			30-150	20	40-140	20
alpha-Chlordane [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
beta-BHC	0.00400	0.00400 ug/L			30-150	20	40-140	20
beta-BHC [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Chlordane, total	0.0200	0.0200 ug/L				20		20
Chlordane, total [2C]	0.0200	0.0200 ug/L				20		20
delta-BHC	0.00400	0.00400 ug/L			30-150	20	40-140	20
delta-BHC [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Dieldrin	0.00200	0.00200 ug/L			30-150	20	40-140	20
Dieldrin [2C]	0.00200	0.00200 ug/L			30-150	20	40-140	20
Endosulfan I	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endosulfan I [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endosulfan II	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endosulfan II [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endosulfan sulfate	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endosulfan sulfate [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endrin	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endrin [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Endrin aldehyde	0.0100	0.0100 ug/L			30-150	20	40-140	20
Endrin aldehyde [2C]	0.0100	0.0100 ug/L			30-150	20	40-140	20
Endrin ketone	0.0100	0.0100 ug/L			30-150	20	40-140	20
Endrin ketone [2C]	0.0100	0.0100 ug/L			30-150	20	40-140	20
gamma-BHC (Lindane)	0.00400	0.00400 ug/L			30-150	20	40-140	20
gamma-BHC (Lindane) [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
gamma-Chlordane	0.0100	0.0100 ug/L			30-150	20	40-140	20
gamma-Chlordane [2C]	0.0100	0.0100 ug/L			30-150	20	40-140	20
Heptachlor	0.00400	0.00400 ug/L			30-150	20	40-140	20
Heptachlor [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Heptachlor epoxide	0.00400	0.00400 ug/L			30-150	20	40-140	20
Heptachlor epoxide [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Methoxychlor	0.00400	0.00400 ug/L			30-150	20	40-140	20
Methoxychlor [2C]	0.00400	0.00400 ug/L			30-150	20	40-140	20
Toxaphene	0.100	0.100 ug/L				20		20
Toxaphene [2C]	0.100	0.100 ug/L				20		20
Mirex	0.00400	0.00400 ug/L			30-150	20	40-140	20
Surr: Decachlorobiphenyl			30-150					
Surr: Decachlorobiphenyl [2C]			30-150					
Surr: Tetrachloro-m-xylene			30-150					
Surr: Tetrachloro-m-xylene [2C]			30-150					

Analytical Method Information

Printed: 11/16/2022 5:34 pm

Polychlorinated Biphenyls (PCB) in Soil (EPA 8082A)

Preservation: Cool 4°C

Container: 06_8 oz. WM Clear Glass Cool to 4° C **Amount Required:** 100g **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Aroclor 1016	0.0167	0.0167 mg/kg			40-140	50	40-130	25
Aroclor 1016 (1)								
Aroclor 1016 (2)								
Aroclor 1016 (3)								
Aroclor 1016 (4)								
Aroclor 1016 (5)								
Aroclor 1016 [2C]	0.0167	0.0167 mg/kg			40-140	50	40-130	25
Aroclor 1016 (1) [2C]								
Aroclor 1016 (2) [2C]								
Aroclor 1016 (3) [2C]								
Aroclor 1016 (4) [2C]								
Aroclor 1016 (5) [2C]								
Aroclor 1221	0.0167	0.0167 mg/kg						
Aroclor 1221 (1)								
Aroclor 1221 (2)								
Aroclor 1221 (3)								
Aroclor 1221 [2C]	0.0167	0.0167 mg/kg						
Aroclor 1221 (1) [2C]								
Aroclor 1221 (2) [2C]								
Aroclor 1221 (3) [2C]								
Aroclor 1232	0.0167	0.0167 mg/kg						
Aroclor 1232 (1)								
Aroclor 1232 (2)								
Aroclor 1232 (3)								
Aroclor 1232 (4)								
Aroclor 1232 (5)								
Aroclor 1232 [2C]	0.0167	0.0167 mg/kg						
Aroclor 1232 (1) [2C]								
Aroclor 1232 (2) [2C]								
Aroclor 1232 (3) [2C]								
Aroclor 1232 (4) [2C]								
Aroclor 1232 (5) [2C]								
Aroclor 1242	0.0167	0.0167 mg/kg						
Aroclor 1242 (1)								
Aroclor 1242 (2)								
Aroclor 1242 (3)								
Aroclor 1242 (4)								
Aroclor 1242 (5)								
Aroclor 1242 [2C]	0.0167	0.0167 mg/kg						
Aroclor 1242 (1) [2C]								
Aroclor 1242 (2) [2C]								
Aroclor 1242 (3) [2C]								
Aroclor 1242 (4) [2C]								
Aroclor 1242 (5) [2C]								
Aroclor 1248	0.0167	0.0167 mg/kg						
Aroclor 1248 (1)								
Aroclor 1248 (2)								
Aroclor 1248 (3)								
Aroclor 1248 (4)								
Aroclor 1248 (5)								
Aroclor 1248 [2C]	0.0167	0.0167 mg/kg						
Aroclor 1248 (1) [2C]								
Aroclor 1248 (2) [2C]								
Aroclor 1248 (3) [2C]								

Analytical Method Information

(Continued)

Polychlorinated Biphenyls (PCB) in Soil (EPA 8082A) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	----Matrix Spike---- RPD	--Blank Spike / LCS-- %Rec	--Blank Spike / LCS-- RPD
Aroclor 1248 (4) [2C]								
Aroclor 1248 (5) [2C]								
Aroclor 1254	0.0167	0.0167 mg/kg				50		25
Aroclor 1254 (1)								
Aroclor 1254 (2)								
Aroclor 1254 (3)								
Aroclor 1254 (4)								
Aroclor 1254 (5)								
Aroclor 1254 [2C]	0.0167	0.0167 mg/kg						
Aroclor 1254 (1) [2C]								
Aroclor 1254 (2) [2C]								
Aroclor 1254 (3) [2C]								
Aroclor 1254 (4) [2C]								
Aroclor 1254 (5) [2C]								
Aroclor 1260	0.0167	0.0167 mg/kg			40-140	50	40-130	25
Aroclor 1260 (1)								
Aroclor 1260 (2)								
Aroclor 1260 (3)								
Aroclor 1260 (4)								
Aroclor 1260 (5)								
Aroclor 1260 [2C]	0.0167	0.0167 mg/kg			40-140	50	40-150	25
Aroclor 1260 (1) [2C]								
Aroclor 1260 (2) [2C]								
Aroclor 1260 (3) [2C]								
Aroclor 1260 (4) [2C]								
Aroclor 1260 (5) [2C]								
Aroclor 1262	0.0167	0.0167 mg/kg						
Aroclor 1262 (1)								
Aroclor 1262 (2)								
Aroclor 1262 (3)								
Aroclor 1262 (4)								
Aroclor 1262 (5)								
Aroclor 1262 [2C]	0.0167	0.0167 mg/kg						
Aroclor 1262 (1) [2C]								
Aroclor 1262 (2) [2C]								
Aroclor 1262 (3) [2C]								
Aroclor 1262 (4) [2C]								
Aroclor 1262 (5) [2C]								
Aroclor 1268	0.0167	0.0167 mg/kg						
Aroclor 1268 (1)								
Aroclor 1268 (2)								
Aroclor 1268 (3)								
Aroclor 1268 (4)								
Aroclor 1268 (5)								
Aroclor 1268 [2C]	0.0167	0.0167 mg/kg						
Aroclor 1268 (1) [2C]								
Aroclor 1268 (2) [2C]								
Aroclor 1268 (3) [2C]								
Aroclor 1268 (4) [2C]								
Aroclor 1268 (5) [2C]								
Total PCBs	0.0167	0.0167 mg/kg						
Total PCBs [2C]	0.0167	0.0167 mg/kg						
Surr: Tetrachloro-m-xylene			30-140					
Surr: Tetrachloro-m-xylene [2C]			30-140					
Surr: Decachlorobiphenyl			30-140					
Surr: Decachlorobiphenyl [2C]			30-140					

Analytical Method Information

Printed: 11/16/2022 5:34 pm

(Continued)

Polychlorinated Biphenyls (PCB) in Water (EPA 8082A)

Preservation: Cool 4°C

Container: 07_1000mL Amber Glass Cool to 4° C **Amount Required:** 1000 mL **Hold Time:** 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Aroclor 1016	0.0500	0.0500 ug/L		50	40-140	50	40-120	30
Aroclor 1016 (1)								
Aroclor 1016 (2)								
Aroclor 1016 (3)								
Aroclor 1016 (4)								
Aroclor 1016 (5)								
Aroclor 1016 [2C]	0.0500	0.0500 ug/L		50	40-140	50	40-120	30
Aroclor 1016 (1) [2C]								
Aroclor 1016 (2) [2C]								
Aroclor 1016 (3) [2C]								
Aroclor 1016 (4) [2C]								
Aroclor 1016 (5) [2C]								
Aroclor 1221	0.0500	0.0500 ug/L						
Aroclor 1221 (1)								
Aroclor 1221 (2)								
Aroclor 1221 (3)								
Aroclor 1221 [2C]	0.0500	0.0500 ug/L						
Aroclor 1221 (1) [2C]								
Aroclor 1221 (2) [2C]								
Aroclor 1221 (3) [2C]								
Aroclor 1232	0.0500	0.0500 ug/L						
Aroclor 1232 (1)								
Aroclor 1232 (2)								
Aroclor 1232 (3)								
Aroclor 1232 (4)								
Aroclor 1232 (5)								
Aroclor 1232 [2C]	0.0500	0.0500 ug/L						
Aroclor 1232 (1) [2C]								
Aroclor 1232 (2) [2C]								
Aroclor 1232 (3) [2C]								
Aroclor 1232 (4) [2C]								
Aroclor 1232 (5) [2C]								
Aroclor 1242	0.0500	0.0500 ug/L						
Aroclor 1242 (1)								
Aroclor 1242 (2)								
Aroclor 1242 (3)								
Aroclor 1242 (4)								
Aroclor 1242 (5)								
Aroclor 1242 [2C]	0.0500	0.0500 ug/L						
Aroclor 1242 (1) [2C]								
Aroclor 1242 (2) [2C]								
Aroclor 1242 (3) [2C]								
Aroclor 1242 (4) [2C]								
Aroclor 1242 (5) [2C]								
Aroclor 1248	0.0500	0.0500 ug/L						
Aroclor 1248 (1)								
Aroclor 1248 (2)								
Aroclor 1248 (3)								
Aroclor 1248 (4)								
Aroclor 1248 (5)								
Aroclor 1248 [2C]	0.0500	0.0500 ug/L						
Aroclor 1248 (1) [2C]								
Aroclor 1248 (2) [2C]								
Aroclor 1248 (3) [2C]								

Analytical Method Information

(Continued)

Polychlorinated Biphenyls (PCB) in Water (EPA 8082A) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	----Matrix Spike---- RPD	--Blank Spike / LCS-- %Rec	--Blank Spike / LCS-- RPD
Aroclor 1248 (4) [2C]								
Aroclor 1248 (5) [2C]								
Aroclor 1254	0.0500	0.0500 ug/L		50		50		30
Aroclor 1254 (1)								
Aroclor 1254 (2)								
Aroclor 1254 (3)								
Aroclor 1254 (4)								
Aroclor 1254 (5)								
Aroclor 1254 [2C]	0.0500	0.0500 ug/L						
Aroclor 1254 (1) [2C]								
Aroclor 1254 (2) [2C]								
Aroclor 1254 (3) [2C]								
Aroclor 1254 (4) [2C]								
Aroclor 1254 (5) [2C]								
Aroclor 1260	0.0500	0.0500 ug/L		50	40-140	50	40-120	30
Aroclor 1260 (1)								
Aroclor 1260 (2)								
Aroclor 1260 (3)								
Aroclor 1260 (4)								
Aroclor 1260 (5)								
Aroclor 1260 [2C]	0.0500	0.0500 ug/L		50	40-140	50	40-120	30
Aroclor 1260 (1) [2C]								
Aroclor 1260 (2) [2C]								
Aroclor 1260 (3) [2C]								
Aroclor 1260 (4) [2C]								
Aroclor 1260 (5) [2C]								
Aroclor 1262	0.0500	0.0500 ug/L						
Aroclor 1262 (1)								
Aroclor 1262 (2)								
Aroclor 1262 (3)								
Aroclor 1262 (4)								
Aroclor 1262 (5)								
Aroclor 1262 [2C]	0.0500	0.0500 ug/L						
Aroclor 1262 (1) [2C]								
Aroclor 1262 (2) [2C]								
Aroclor 1262 (3) [2C]								
Aroclor 1262 (4) [2C]								
Aroclor 1262 (5) [2C]								
Aroclor 1268	0.0500	0.0500 ug/L						
Aroclor 1268 (1)								
Aroclor 1268 (2)								
Aroclor 1268 (3)								
Aroclor 1268 (4)								
Aroclor 1268 (5)								
Aroclor 1268 [2C]	0.0500	0.0500 ug/L						
Aroclor 1268 (1) [2C]								
Aroclor 1268 (2) [2C]								
Aroclor 1268 (3) [2C]								
Aroclor 1268 (4) [2C]								
Aroclor 1268 (5) [2C]								
Total PCBs	0.0500	0.0500 ug/L						
Total PCBs [2C]	0.0500	0.0500 ug/L						
Surr: Tetrachloro-m-xylene			30-120					
Surr: Tetrachloro-m-xylene [2C]			30-120					
Surr: Decachlorobiphenyl			30-120					
Surr: Decachlorobiphenyl [2C]			30-120					

Analytical Method Information

Printed: 11/16/2022 5:35 pm

Cyanide, Total in Soil (EPA 9014/9010C)

Preservation: Cool 4°C

Container: 06_4 oz. WM Clear Glass Cool to 4° C **Amount Required:** 10 g. **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Cyanide, total	0.500	0.500 mg/kg		15	79.6-107		72.9-112	

Cyanide, Total in Water (SM 4500 CN C-2016 / E-2016)

Preservation: Dechlorinate; NaOH to pH>10

Container: 10_250 mL Plastic NAOH pH>10 Cool 4° C **Amount Required:** 100 **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Cyanide, total	0.0100	0.0100 mg/L		15	79-105		80-120	

APPENDIX C

Community Air Monitoring Plan (CAMP)
Department of Veterans Affairs
Hudson Valley Healthcare System
Castle Point Campus
Wappingers Falls, New York

Contract No. 36C24222C0141

March 2023

Prepared for: Department of Veterans Affairs, Hudson Vally Healthcare System
Wappingers Falls, New York

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Introduction

In addition to the precautions outlined in the Health and Safety Plan, the following measures will be taken to evaluate and control, as necessary, potential fugitive particulates and volatile organic compounds (VOC) potentially generated during ground intrusive activities. Accordingly, the following Community Air Monitoring Plan (CAMP) was developed using the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan in combination with site-specific information and proposed activities.

Depending on the type of activity, the levels of airborne particulates will be monitored and recorded in real-time at both the upwind and downwind perimeters of the immediate work area. In addition, VOCs will be monitored at the immediate work area as well as periodically upgradient and downgradient during the day The purpose of the CAMP is to protect the downwind community from potential release of contaminants to the air generated during the activities. The action levels developed by the NYSDOH will be followed as part of the CAMP.

If the recorded levels approach pre-established action levels, or if airborne particulates are visually observed migrating off-site or towards sensitive receptors, suppression measures will be implemented immediately. Suppression measures may include misting the particulate source with water, use of particulate suppression materials, wetting the work area prior to initiating the activities, or stopping work activities until recorded levels fall below the action level.

Scope-of-Work

This CAMP addresses the intrusive activities that will occur at the Castle Point Veterans Affairs Medical Center including the installation of soil borings and monitoring wells. Continuous monitoring will be required for these activities considered ground intrusive.

Air Monitoring Procedures

Intrusive Activities

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the Site at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 microns in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level (Thermo MIE pDR-1000 or equivalent). The equipment will include an audible alarm or other means of alerting the operator to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 levels are greater than 150 mcg/m3 above the upwind level, work will be stopped, and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for State (New York State Department of Environmental Conservation and NYSDOH) personnel to review.

VOC Monitoring, Response Levels, and Actions

The VOC monitoring for intrusive activities will be conducted at the work area and will follow the same response levels and actions for VOCs as outlined below. The measurements will be collected from the immediate work area using a MiniRAE 2000 photoionization detector or equivalent.

VOCs will be periodically monitored at the downwind perimeter of the work area, or exclusion zone, during soil boring and well installation activities using a MiniRAE 2000 photoionization

detector or equivalent. Upwind measurements will also be collected prior to the start of work each day and periodically throughout the day at locations away from the work areas to establish background conditions. A minimum of three background measurements will be collected daily. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily against a standard VOC calibrations gas appropriate for the contaminants of concern and for concentrations which will be comparable to the levels specified below. The monitoring, response levels, and actions for VOCs are as follows:

- If the ambient air concentration of total organic vapors in the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels in the work area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the Site 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.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.

Weather Monitoring

In order to identify the specific upgradient and downgradient sampling locations, meteorological data will be collected daily. The Hudson Valley Airport eight miles away will be used as a resource to collect weather data as necessary.