Site Characterization Work Plan

Location:

Old Palmyra Landfill
Garnsey Road
Palmyra, New York 14522

Prepared for:

Town of Palmyra
1180 Canandaigua Road
Palmyra, New York 14522

LaBella Project No. 2191764

May 1, 2020

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CERTIFICATIONS

"I, Daniel Noll, certify that I am currently a Qualified Environmental Professional 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)."

081996	4/30/2020	
NYS Professional Engineer #	Date	Signature

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1.0 Introduction

LaBella Associates, D.P.C. (LaBella) is pleased to submit this Site Characterization Work Plan (SCWP) to conduct investigation at the Old Palmyra Landfill Site, Garnsey Road, Town of Palmyra, Wayne County, New York, herein after referred to as the "Site." The Site is listed as a New York State Department of Environmental Conservation (NYSDEC) Potential Site ("P-Site") and identified with tracking No. 859008. A Site Location Map is included as Figure 1.

LaBella recently completed a records search efforts and prepared a Records Search Report, dated December 19, 2019, for the Old Palmyra Landfill, located on the northeast side of Garnsey Road. This Records Search Report provided a better understanding of the types of waste disposed of at the Site, the timeframe that the Site was active, and the final closure procedures performed at the Site. The information in the Records Search Report was used in support of the preparation of this SCWP.

The goals of this Site Characterization (SC) are as follows:

- To determine the presence of hazardous waste and whether that waste poses a significant threat to human health or the environment;
- To determine if contamination that may be present at the Site is migrating off-Site;
- To develop a list of contaminants of concern for the Site; and
- To adequately determine depth and direction of groundwater flow at the Site.

This SCWP details all of the investigative activities required to meet the goals of the project in accordance with NYSDEC regulations and program policy. The activities in this SCWP will be carried out in accordance with the NYSDEC's Department of Environmental Remediation (DER)-10 (*Technical Guidance for Site Investigation and Remediation*) issued May 3, 2010.

2.0 Site Description and History

2.1 Site Description and Surrounding Properties

The Old Palmyra Landfill is a 6.8-acre Site located approximately ½ mile west of State Route 31 along Garnsey Road in southwestern Wayne County. The topography of the Site is relatively flat on the west side and gets progressively steeper on the east side until it levels out at an old railroad trolley bed located directly east of the Site. Directly east of this trolley bed is a State and Federally-regulated freshwater wetland. The current zoning of the Site and the surrounding parcels is agricultural/residential. There are currently no buildings located at the Site.

The following properties are located adjacent to the Site:

Direction	Description
North	Residential/Agricultural Property and State/Federal Freshwater Wetland
East	Old Trolley Bed and State/Federal Freshwater Wetlands with Agricultural Land Beyond
South	Garnsey Road with Residential/Agricultural Property Beyond and the Closed 'New' Palmyra Landfill*
West	Garnsey Road with Residential/Agricultural Property Beyond

*A separate Town of Palmyra-owned municipal landfill ("New Palmyra Landfill") is located south of the Site on the opposite side of Garnsey Road. This New Palmyra Landfill was permitted, operated and properly closed by the Town under the NYSDEC oversight through the Part 360 program and is not part of the Old Palmyra Landfill Site.

The closest dwellings are approximately 100 feet west of the Old Landfill across Garnsey Road. These dwellings appear to be upgradient of the former landfill. The closest dwelling in the apparent downgradient direction of the former landfill is approximately 150 feet south; however, this property is currently vacant.

2.2 Site History

Waste disposal began at the Old Palmyra Landfill sometime in 1954 based on available documentation. Prior to 1954, there is no evidence that dumping took place at the Site. Beginning in 1954, the Site was owned and operated by the Village of Palmyra. In 1957, the Village and Garlock Packaging Company signed an agreement allowing Garlock to dispose of waste, including fly ash, at the Site. The Village continued to own and operate the Site until 1974, when the Town of Palmyra assumed control of the Site. In 1975, the Site was officially sold to the Town. The Town continued to operate the landfill until 1978, when the landfill was officially closed to waste disposal on October 1, 1978. NYSDEC had notified the Town that additional waste disposal would not be permitted at the Site in 1977, and the Town was granted several time extensions to continue disposal at the Site until its ultimate closure. In 1980, final grading and seeding of the Site was completed.

Since 1980, the Site has remained undeveloped. The Site is still currently owned and maintained by the Town of Palmyra.

3.0 Previous Investigations

The following environmental reports exist for the Site and were used in developing this SCWP:

- *Hydrogeologic Investigation at the Palmyra Landfill Site, NYSDEC Region 8 – Wayne County, Palmyra, NY,* completed by Parsons Corporation. ("Parsons"), May 2018; and
- *Records Search Report*, completed by LaBella, November 2019

In December 2017 and July 2018, the NYSDEC Division of Materials Management performed groundwater, leachate, and surface water sampling at the Site under the Inactive Landfill Initiative, a program to re-assess the condition of inactive landfills across the State. Results from that investigation are documented in the *Hydrogeologic Investigation at the Palmyra Landfill Site Report* by Parsons dated May 2018 (referenced above). A total of two (2) surface water samples, three (3) seep samples, and five (5) groundwater wells were installed and sampled. Additionally, three (3) existing off-Site groundwater monitoring wells were sampled as part of this investigation. All samples were analyzed for inorganics (i.e. metals), PAHs and 1,4-dioxane, per- and poly-fluoroalkyl substances (PFOS and PFOA), and volatile organic compounds (VOCs). PFOS and PFOA concentrations were compared to the EPA's Health Advisory Level (HAL) of 70 parts per trillion (ppt). Presented below are brief descriptions of the analytical results for each media sampled. A map indicating sample locations and analytical results is presented in Appendix 5, "Historical Data Tables and Figures," Figure 1, "Palmyra Landfill Site Plan."

<u>Groundwater</u>

Groundwater concentrations of PFOS ranged from non-detected to 53.4 ppt and PFOA from non-detect to 4,360 ppt. The highest concentrations of PFOS and PFOA were detected in MW-07 (initially identified as MW-04) and this was the only location that exceeded the USEPA HAL of 70 ppt. A map indicating sample locations and analytical results is presented in Appendix 5, "Historical Data Tables and Figures," Figure 1, "Palmyra Landfill Site Plan."

<u>Surface Water</u>

Surface water concentrations of PFOS ranged from 176 ppt to 177 ppt and PFOA from 540 ppt to 751 ppt. PFOS and PFOA were detected in both surface water samples (SW-01 and SW-02). A map indicating sample locations and analytical results is presented in Appendix 5, "Historical Data Tables and Figures," Figure 1, "Palmyra Landfill Site Plan."

<u>Leachate</u>

Leachate concentrations of PFOS ranged from 52 ppt to 120 ppt and PFOA from 390 ppt to 1,800 ppt and were detected in all three leachate samples (Seep-01, Seep-02, and Seep-03). Other exceedances include, but are not limited to: chloride, ammonia, various other metals, chrysene, and benzo(b)flouranthene. A map indicating sample locations and analytical results is presented in Appendix 5, "Historical Data Tables and Figures," Figure 1, "Palmyra Landfill Site Plan."

Based on the analytical results of this investigation, the main contaminants of concern are PFOS and PFOA and inorganics. Samples analyzed as part of this investigation did not have elevated concentrations of VOCs, PAHs and 1,4-dioxane. Relevant figures and tables from this investigation are included as part of Appendix 5.

In November 2019, LaBella completed the *Records Search Report* which reviewed historical documentation received from the Town of Palmyra, Village of Palmyra, NYSDEC, and NYSDOH. The goal of the report was to try to identify specific areas of concern at the Site based on this historical documentation. The report was not able to identify any discrete areas of concern, but did provide information on the nature of waste disposed of at the Site, a timeline for waste disposal, and information about the nature of the cover material.

4.0 Standards, Criteria and Guidelines

This section identifies the Standards, Criteria and Guidelines (SCGs) for the Site. The SCGs identified are used in order to quantify the extent of contamination at the Site that require remedial work based on the cleanup goal. The SCGs to be utilized as part of the implementation of this SCWP are identified below:

Soil SCGs: The following SCGs for soil were used in developing this SCWP:

- NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives (RPSCOs) for the Protection of Groundwater;
- NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives (RPSCOs) for Unrestricted Use; and
- NYCRR Subpart 375-6 RPSCOs for the Protection of Public Health/Restricted Residential Use

Groundwater SCGs: The following SCGs for groundwater were used in developing this SCWP:

- NYSDEC Part 703 Groundwater Standards;
- Technical and Operational Guidance Series (TOGS) 1.1.1 Water Quality Standards and Guidance Values; and
- NYSDEC's "Guidelines for Sampling and Analysis of PFAS" (January 2020). This includes:
    - A screening level of 10 ng/L for PFOA;
    - A screening level of 10 ng/L for PFOS;
    - A screening level for any one individual PFAS analyte (besides PFOA or PFOS) of 100 ng/L; and
    - A screening level for total concentration of PFAS of 500 ng/L.

Sediment SCGs: The following SCGs for sediment were used in developing this SCWP:

- NYSDEC Commissioner's Policy (CP)-60, "Screening and Assessment of Contaminated Sediment" (June 2014).

Surface Water SCGs: The following SCGs for surface water were used in developing this SCWP:

- TOGS 1.1.1 Water Quality Standards and Guidance Values.

5.0 Objectives and Rationale

The objective of this SC is to determine the presence of hazardous waste and whether that waste poses a significant threat to human health or the environment. Additionally, this SC aims to determine if contamination that may be present at the Site is migrating off-Site, to develop a list of contaminants of concern for the Site, and to adequately determine the depth and direction of groundwater flow at the Site. Analytical results for this project will be compared with unrestricted SCGs, groundwater standards, or other applicable SCGs for the restricted use of the Site. The SCGs for this Site are presented above in Section 4.0, "Standards, Criteria, and Guidelines."

Areas of Concern

The Records Search Report (RSR) indicated that the Village of Palmyra (Village) and Garlock, Inc. (Garlock) entered into an agreement to dispose of materials from the Garlock Palmyra facility at the Site. The contract indicated "manufacturing and construction" waste would be deposited in a secured area exclusive to Garlock. Various documents also suggest that ash and cinders were being disposed of by Garlock at the Site. After the Town of Palmyra (Town) assumed operations and ownership of the Site, the Town continued to allow Garlock to dispose of fly ash and cinders, including using fly ash as daily cover (possibly mixed with soil). However, no documentation was discovered indicating the location(s) where these materials were disposed of within the Site. Therefore, the Records Search Report did not provide sufficient information to identify any discrete Areas of Concern (AOC).

6.0 Site Characterization Scope

The proposed remedial investigation field activities to be completed as part of the SCWP have been separated into tasks and are presented in this section. A list with contact information for the anticipated personnel involved with the project is included in Appendix 2. Qualifications for the personnel are also included.

During all ground intrusive work conducted at the Site, air monitoring will be conducted in accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP). A copy of this plan is included as Appendix 1.

6.1 Site Characterization Tasks

The SC Field Plan is detailed below:

> **Task 1: Test Pit Installation/Soil Sampling** – This task is designed to determine cover material thickness, nature of cover material and the nature of waste materials below the cover at the Site. Under this task, two (2) days of test pitting work will be conducted at the Site. Each test pit will be named, logged, screened with a photoionization detector (PID) and methane gas meter, and photographic documentation will be collected. A total of six (6) samples will be analzyed: four (4) soil samples analyzed for PFAS parameters only, two (2) soil samples analyzed for full suite parameters. Additional information on analyses to be performed is presented below.
>
> **Task 2: Surface Water/Sediment Sampling** - This task is designed to evaluate whether or not contamination is migrating off-Site via surface water seeps and if these seeps are impacting neighboring water bodies. This task will consist of collecting co-located sediment and surface water samples in the wetland area just to the east of the Site. Additionally, the surface water seeps that originate from the east side of the landfill will be re-sampled as part of this task. A total of seven (7) samples will be analyzed: three (3) surface water samples analyzed for PFAS parameters only, two (2) surface water sample analyzed for full suite parameters only, one (1) sediment sample analyzed for PFAS parameters only, and one (1) sediment sample analyzed for full suite parameters. Additional information on analyses to be performed is presented below.
>
> **Task 3: Surface Soil Sampling** – This task is designed to evaluate surface soil/cover soil conditions along the surface of the landfill to determine if this material is impacted and

poses a threat to humans or the environment. Figure 3B shows proposed sampling grids and sample locations for this task. Composite and discrete surface soil samples will be collected and analyzed as part of this task. A total of six (6) composite samples will be analyzed: four (4) soil samples analyzed for PFAS parameters only, two (2) soil samples analyzed for full suite parameters. Additional information on analyses to be performed is presented below.

Task 4: Groundwater Monitoring Well Installation – This task is designed to evaluate groundwater conditions upgradient and downgradient of the Site, and to determine if groundwater has been impacted by the Site. This task will also include collection of groundwater elevations at on- and off-Site wells associated with the Site to adequately determine the depth and direction of groundwater flow at the Site. One (1) upgradient well and two (2) downgradient wells will be installed at the Site as part of this task. Proposed well installation locations are provided in Figure 3A. A total of eight (8) groundwater samples will be analyzed: five (5) groundwater samples analyzed for PFAS parameters only, three (3) groundwater samples analyzed for full suite parameters. Additional information on analyses for be performed is presented below.

Task 5: Reporting: This task will consist of interpreting and summarizing the analytical sampling results and preparing a Site Characterization Report (SCR). This report will aid NYSDEC in determining whether or not contamination exists at the Site, if and how any potential contamination is migrating off-Site, and will provide a starting point for any potential future remedial actions.

Based on the NYSDEC Division of Materials Management investigation completed in 2018, poly- and perfluorinated compounds (PFAS) are a concern for the Site. Therefore, all samples collected as part of this SCWP will be analyzed for PFAS. Additionally, 20% of all samples collected will be analyzed for the "full suite" of contaminants which is defined below. A breakdown of samples to be collected as part of each task are presented below in Sections 6.1.1 through 6.1.4. Sections 6.1.1 through 6.1.5 provide additional details regarding how each task will be performed.

Sampling procedures which require poly- and perfluorinated (PFAS) parameters only will include the following analyses:

- Poly- and perfluorinated compounds (PFAS) using either USEPA Method 537.1.
    - For aqueous samples, the reporting limit will be no higher (for PFOA and PFOS) than 2 ng/L.
    - For soil/sediment samples, the reporting limit will be no higher (for PFOA and PFOS) than 0.5 µg/kg.
    - Analysis of PFAS will be performed by a laboratory that holds ELAP certification for PFOA and PFOS in drinking water by USEPA Method 537.1 or ISO 25101.

Sampling procedures which require "full suite" parameters will include the following analyses:

- USEPA Target Compound List (TCL) and New York State Department of Environmental Conservation (NYSDEC) Commissioner Policy (CP-)51 VOCs including tentatively identified compounds (TICs) using United States Environmental Protection Agency (USEPA) Method 8260;
- USEPA TCL and NYSDEC CP-51 SVOCs including TICs using USEPA Method 8270;

- Target Analyte List (TAL) metals using USEPA Methods 6010/7470/7471;
- Cyanide using USEPA Method 9012;
- PCBs using USEPA Method 8082;
- Pesticides using USEPA Method 8081; and
- 1,4-dioxane using USEPA Method 8270 SIM (for aqueous samples); and
    - The reporting limit for 1,4-dioxane will be no higher than 0.35 µg/L.
- 1,4-dioxane using USEPA Method 8270 (for soil/sediment samples).
    - The reporting limit for 1,4-dioxane will be no higher than 0.1 mg/kg.
- Poly- and perfluorinated compounds (PFAS) using either USEPA Method 537.1.
    - For aqueous samples, the reporting limit will be no higher (for PFOA and PFOS) than 2 ng/L.
    - For soil/sediment samples, the reporting limit will be no higher (for PFOA and PFOS) than 0.5 µg/kg.
    - Analysis of PFAS will be performed by a laboratory that holds ELAP certification for PFOA and PFOS in drinking water by USEPA Method 537.1 or ISO 25101.

Refer to Table 2 for the anticipated sampling schedule for the SCWP. Additional details of samples to be collected under each task can be found in Sections 6.1.1 through 6.1.4. Refer to Table 3 for a schedule of QA/QC samples to be collected for each task. All QA/QC samples will be analyzed for full suite parameters. Refer to Figure 3A for proposed sampling locations.

6.1.1 *Task 1: Test Pit Installation/Soil Sampling*

In order to fully determine the cover material thickness, nature of cover material, and the nature of waste materials below the cover, test pit excavations will take place at various locations throughout the Site. Additionally, the Records Search Report indicated that there is the potential for drain tile to exist at the Site and that this could be the cause of several surface water seeps that originate at the Site. One of the objectives of this task is to identify whether or not drain tile is present at the Site. Two (2) days of test pitting will take place at the Site, and will consist of the following activities:

1. A *Dig Safely New York* stakeout will be initiated at the Site to locate subsurface utilities in the areas where the subsurface investigation will take place.
2. Test pitting investigation will be completed at the Site. Two (2) days (i.e. approximately up to 8-hours on-Site) is anticipated for this task. Test pits are proposed at the locations shown in attached Figure 3A, but may be adjusted based on field observations and conditions. These proposed locations are intended to assess the nature and thickness of the cover material and the nature of the waste below the cover. The test pitting will be done in a controlled manner and will be completed slowly in order to remove any cover material separately from the underlying waste material. Cover soil will be placed to one side of the test pit while waste material will be placed on poly on a separate side of the test pit.
3. Soils from each test pit will be continuously assessed for visible or olfactory indications of impairment, and/or indication of detectable VOCs with a PID and landfill gas meter. Positive indications from any of these screening methods are collectively referred to as “evidence of impairment.” Soil sampling will be conducted as part of the test pitting to assess the nature of the soil/waste material below the cover. A total of six (6) samples

and one (1) QA/QC sample will be collected as part of this task:

- Four (4) soil samples will be analyzed for PFAS parameters only as defined in Section 6.1; and
- Two (2) soil samples will be analyzed for full suite parameters as defined in Section 6.1.
- One (1) field duplicate sample and one (1) MS/MSD sample will be collected at a location where full suite parameters are being analyzed. These QA/QC samples will be analyzed for full suite parameters.

Proposed test pit locations can be found in Figure 3A.

4. Samples collected will be biased towards excavations that exhibit "evidence of impairment." Field personnel may collect additional samples and use field screening results to determine which samples are ultimately analyzed by the laboratory. All sampling equipment will be PFAS-free to avoid cross-contamination (additional information is provided in Section 6.4). Sampling for PFAS in soil will be conducted in accordance with NYSDEC's "Guidelines for Sampling and Analysis of PFAS," dated January 2020, Appendix B, "Sampling Protocols for PFAS in Soils, Sediments and Solids." This guidance document is provided in Appendix 6 of this SCWP. Additional information on project-specific PFAS sampling procedures and QA/QC procedures is provided in Appendix 4 – QCP.
5. At the completion of the project, the excavations will be backfilled with excavated material to match the existing Site grades to the extent practicable. Excavated waste will be placed back into the excavation first, with cover material segregated and placed along the surface such that waste material does not protrude through the repaired cover areas.
6. Test pit equipment (i.e. excavator bucket, shovels, etc.) will be decontaminated prior to use and between test pits, using an Alconox® and potable water solution.
7. Test pit locations will be located with a global positioning system or tape-measured from existing Site features. Each test pit will be designated a unique naming convention, photographic evidence of each test pit will be collected and placed into a photo log, and test pit logs will be generated for each location.
8. During each test pit installation, Community Air Monitoring Plan (CAMP) monitors will be utilized to ensure that any dust or potential airborne contamination does not migrate off-Site. A total of two (2) CAMP monitoring stations (one [1] upwind and one [1] downwind) will be set up at each test pit excavation. Each station will consist of a dust monitor, a PID, and a landfill gas meter (at the downwind location only). All data will be recorded and provided as part of the SCR. In the event that visible dust is generated during test pit excavation or that the CAMP monitors indicate that action levels have been reached, work will be stopped and re-evaluated in order to prevent the migration of dust off-Site.
9. The presence of ACM may be detected by visual methods by an asbestos project monitor (APM). The APM will possess valid certifications and a company license issued by the New York State Department of Labor (NYSDOL). Personnel should perform the work in such a manner that dust is not generated during intrusive work. An APM will be on-Site at all times to monitor all intrusive work for the presence of ACM. If ACM is encountered during intrusive

work, the APM will stop all work, any ACM will be placed back into the excavation without generating dust, and work procedures will be re-evaluated.

10. Methane levels will be continuously monitored during test pit excavation. Although methane is not expected to be a major concern during the work, the nature of the Site dictates that methane be monitored during all intrusive work and that all on-Site personnel be aware of the risks. Additional information regarding worker health and safety is provided in the Health and Safety Plan (HASP) in Appendix 3.

6.1.2 *Task 2: Surface Water/Sediment Sampling*

As mentioned in Section 6.1.2, there are several surface water seeps that originate at the Site and discharge along the eastern portion of the Site towards a large surface water/wetland feature located directly to the east of the Site. These seeps were previously sampled in 2017; under this task, these will be re-sampled. Additionally, the surface water/wetland feature will be sampled to determine whether or not contamination has migrated off-Site and impacted this area. Under this task, the following work will be performed:

1. Three (3) surface water seeps originating from the Site will be sampled (see Figure 3A). These seeps will be sampled in approximately the same locations where the original samples were collected. Samples collected will be analyzed for PFAS parameters only as defined in Section 6.1. Proposed surface water sample locations can be found in Figure 3A.
2. Two (2) co-located surface water and sediment samples (for a total of four [4] samples) will be collected from the surface water/wetland feature located to the east of the Site. One co-located pair of surface water and sediment samples will be analyzed for PFAS parameters only as defined in Section 6.1. The other co-located pair of surface water and sediment samples will be analyzed for full suite parameters as defined in Section 6.1. Proposed sediment sample locations can be found in Figure 3A.
3. All sampling equipment will be decontaminated prior to use and between boring locations, using an Alconox® and potable water solution.

   All sampling equipment will be PFAS-free to avoid cross-contamination (additional information is provided in Section 6.4). Sampling for PFAS in sediment and surface water will be conducted in accordance with NYSDEC's "Guidelines for Sampling and Analysis of PFAS," dated January 2020, Appendix B, "Sampling Protocols for PFAS in Soils, Sediments and Solids," and Appendix D, "Sampling Protocols for PFAS in Surface Water," respectively. This guidance document is provided in Appendix 6 of this SCWP. Additional information on project-specific PFAS sampling procedures and QA/QC procedures is provided in Appendix 4 – QCP.

6.1.3 *Task 3: Surface Soil Sampling*

In order to assess whether the surface soils at the Site are impacted and pose a threat to humans or the environment, surface soil sampling will be conducted as part of this task. In order to assess the cover soils, a proposed sampling grid has been developed and is presented in Figure 3B. Under this task, the following work will be performed:

1. A total of six (6) composite samples will be collected at a frequency of one (1) composite sample per sampling grid. Each composite sample will be comprised of five discrete

locations composited into one sample, with samples being collected in the approximate sample locations proposed in Figure 3B.

2. Samples will be collected from a depth of 0 – 6 inches below the vegetative cover.
3. Four (4) of the six (6) composite samples will be analyzed for PFAS parameters only as defined in Section 6.1.
4. Two (2) of the six (6) composite samples will be analyzed for the full suite parameters as defined in Section 6.1. Under NYSDEC DER-10 guidance, VOC samples must be discrete sample locations. Therefore, VOC samples collected as part of the full suite samples will be collected from the centerpoint of the sampling grid, unless field evidence (odors, staining or PID readings) indicate biasing the sample to a different location.
5. All sampling equipment will be decontaminated prior to use and between boring locations, using an Alconox® and potable water solution.
6. All sampling equipment will be PFAS-free to avoid cross-contamination (additional information is provided in Section 6.4). Sampling for PFAS in soil will be conducted in accordance with NYSDEC's "Guidelines for Sampling and Analysis of PFAS," dated January 2020, Appendix B, "Sampling Protocols for PFAS in Soils, Sediment and Solids." This guidance document is provided in Appendix 6 of this SCWP. Additional information on project-specific PFAS sampling procedures and QA/QC procedures is provided in Appendix 4 – QCP.

6.1.4 *Task 4: Groundwater Monitoring Well Installation and Sampling*

In order to fully assess potential impacts to groundwater at the Site, groundwater monitoring well installation and sampling will be conducted as part of this task. Based on the previous work at the Site, and as stated above, one (1) upgradient well and two (2) downgradient wells will be installed. Proposed well installation locations are provided in Figure 3A.

Under this task, the following procedures will be performed:

Overburden Groundwater Monitoring Well Installation:

1. A *Dig Safely New York* stakeout will be conducted at the Site to locate subsurface utilities in the areas where the monitoring well installations will take place.
2. Hollow-stem soil borings/monitoring wells will be implemented at the Site. Each soil boring will be advanced to a depth similar to previous well depths, which were between16 and 35-feet BGS.
3. During all intrusive work (i.e. work that disturbs the soil), the Community Air Monitoring Plan (CAMP) will be implemented. This includes dust and VOC monitoring at upwind and downwind locations. Additional information on CAMP monitoring can be found in Appendix 1.
4. Drilling equipment will be decontaminated prior to use and between boring locations, using an Alconox® and potable water solution.
5. Soils from the borings/monitoring wells will be continuously assessed for visible or olfactory indications of impairment, and/or indication of detectable volatile organic compounds (VOCs) with a photo ionization detector (PID) and landfill gas meter. Positive

indications of any of these screening methods are collectively referred to as “evidence of impairment.” Continuous soil screening will be conducted, soil boring/monitoring well logs will be generated, and all readings will be documented as part of these logs.

6. One (1) subsurface soil sample will be collected from each boring and analyzed for PFAS parameters only. Samples will be collected at a zone of evident contamination or directly above the water table.
7. Subsequent to advancing the borings approximately 10-feet into the apparent water table, permanent overburden groundwater monitoring wells will be installed in the borehole. Wells will be 2-inches in diameter. Each well will be completed with 10 to 15 feet of 0.010-slot well screen connected to an appropriate length of solid PVC well riser to complete each well. Each annulus will be sand packed with quartz sand to a nominal depth of two feet above the screen section. A bentonite seal will be placed above the sand pack to several inches below ground surface (BGS). Wells will be finished with flush-mounted curb boxes.
8. One (1) groundwater sample will be collected from each new well. The following samples will be collected as part of this task:
    - Three (3) groundwater samples will be analyzed for full suite parameters as defined in Section 6.1.
9. As part of this task, the five (5) existing groundwater monitoring wells associated with the Site will be re-sampled for PFAS parameters only, as defined in Section 6.1.
10. In addition to groundwater sampling, the field crew will collect water levels from existing wells in the vicinity of the Site in order to characterize groundwater direction and depth at the Site. This water level reading round will completed in one (1) day at the following wells:

Table 1: Water Level Monitoring Locations

On-Site Wells	Off-Site Wells
MW-04	MW-01
MW-05	MW-02
MW-06	MW-03
MW-07	--
MW-08	--
MW-09 (to be installed)	--
MW-10 (to be installed)	--
MW-11 (to be installed)	--

Prior to collection of the water level at each well, the elevation of the well casing will be collected using a global positioning system (GPS) capable of collecting elevation. GPS accuracy is anticipated to be ±0.1 inches, with accuracy dependent on weather conditions. GPS accuracy at time of collection will be noted, and elevations will not be collected unless accuracy is within ±0.3 inches. The elevation at each well casing will be noted. Water levels will be measured from the northern end of the well casing.

This water level measurement event will take place approximately two (2) weeks after well installation and development.

Overburden Groundwater Sampling:

Groundwater sampling procedures are as follows:

1. Following installation, overburden groundwater monitoring wells will be developed by purging a minimum three (3) well volumes or until dry using a dedicated bailer or pump (depending on well volumes). Purging will take place using PFAS-free equipment (additional information is provided in Section 6.4). Sampling for PFAS in groundwater will be conducted in accordance with NYSDEC's "Guidelines for Sampling and Analysis of PFAS," dated January 2020, Appendix C, "Sampling Protocols for PFAS in Monitoring Wells." This guidance document is provided in Appendix 6 of this SCWP. Additional information on project-specific PFAS sampling procedures and QA/QC procedures is provided in Appendix 4 – QCP.
2. Development water will be containerized in 55-gallon drums, characterized, and disposed of off-Site in accordance with applicable regulation (refer to Section 6.3).
3. Following development, wells will be allowed to recharge for a minimum of 1 week prior to sampling.
4. Wells will be sampled using modified low-flow techniques (i.e. peristaltic pump) with PFAS-free tubing or bailers. Water quality parameters, including turbidity, pH, temperature, specific conductivity, dissolved oxygen, oxidation reduction potential, and depth to water will be recorded at five (5) minute intervals. Samples will be collected when the parameters have stabilized for three (3) consecutive 5-minute intervals to within the specified ranges below:
    - Water level drawdown (<0.3')
    - Turbidity (+/- 10%, <50 NTU for metals)
    - pH (+/- 0.1)
    - Temperature (+/- 3%)
    - Specific conductivity (+/- 3%)
    - Dissolve Oxygen (+/- 10%)
    - Oxidation reduction potential (+/- 10 millivolts)
5. PFAS samples will be collected first to minimize the potential for cross-contamination. Prior to collection of any "full suite" samples, an equipment blank will be collected and analyzed for PFAS.
6. All samples will be sent under standard Chain of Custody procedures to a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory with a standard turnaround request (5 to 7 business days).
7. QA/QC samples will also be collected and analyzed (e.g., trip blank, duplicate sample, matrix spike/ matrix spike duplicate (MS/MSD)). The specific QA/QC program is detailed in Section 6.4. The soil samples will be delivered under chain of custody procedures to an ELAP-certified laboratory. The laboratory will provide a NYSDEC Analytical Services Protocol (ASP)

Category B Deliverables data package, EQUIS Electronic Data Deliverables (EDDs) and Data Usability Summary Reports (DUSRs) will be completed.

6.1.5 *Task 5: Reporting*

Upon completion of the field portion of the SC, a SCR will be prepared that summarizes the findings in accordance with Section 3.13 of NYSDEC Division of Environmental Remediation (DER)-10, "Technical Guidance for Site Investigation and Remediation," dated May 2010. This SCR will include a discussion of the work performed, site characterization investigation data summary, an electronic data summary (EDS), well development logs and as-built specifications, field notes, and figures showing monitoring well, surface water, seeps, and test pit sampling locations.

6.2 Health and Safety and Community Air Monitoring

A Community Air Monitoring Plan (CAMP) will be implemented whenever ground intrusive activities and soil disturbance activities take place on-Site. CAMP data will be provided weekly in reports to NYSDEC/NYSDOH. CAMP exceedances will be communicated separately to NYSDEC/NYSDOH (i.e. via phone call or email).

LaBella's Health and Safety Plan (HASP) for this project is included in Appendix 3. The NYSDOH Generic CAMP and Fugitive Dust and Particulate Monitoring will be utilized for this SC and is included in Appendix 1.

6.3 Housekeeping and Investigation Derived Waste

Good housekeeping practices will be followed to prevent leaving contaminated material on the ground surface (e.g., precautions will be taken to prevent impacts to the ground surface due to material spilled during soil sampling, etc.). Any material that does spill on to the ground surface will be promptly picked up and placed in an appropriate location and the ground surface will be cleaned.

Potable water is not available at the Site, and therefore decontamination water will need to be transported to the Site. Any water used for decontamination will be transported in an allowable PFAS-free container, as specified in Sections 6.1.1 through 6.1.3 in Appendix 4 – QCP. All decontamination water will be obtained from a municipal water source, the Monroe County Water Authority (MCWA). The most recent Third Unregulated Contaminant Monitoring Rule (UCMR3) analytical results available for the MCWA will be provided to NYSDEC prior to the start of work, per the requirements of NYSDEC's "Guidelines for Sampling and Analysis of PFAS."

Waste materials anticipated to be generated during the implementation of this SCWP include soil generated from soil borings and groundwater generated from development and sampling of the wells. These waste materials will be containerized in 55-gallon drums and stored at the Site for characterization and future disposal.

Additional information regarding Investigation Derived Waste is included in Section 10 of the QCP, included in Appendix 4.

6.4 Quality Assurance/Quality Control Plan

Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in Appendix 4. Laboratory QA/QC sampling will include analysis of one (1) duplicate sample for each matrix type (i.e., soil, air/vapor and groundwater) at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater. Additionally, one (1) MS/MSD will be collected and analyzed for each twenty samples collected for each parameter group, or one per shipment, whichever is greater. The MS/MSD will be analyzed for the same parameters as that of the field samples. One (1) trip blank will be analyzed per shipment of groundwater samples for VOC analysis. The samples will be delivered under Chain of Custody procedures to an ELAP-certified laboratory. The laboratory will provide a NYSDEC ASP Category B Deliverable data package for all samples. A DUSR will be completed for all ASP-B and ASP-B format laboratory data packages per DER-10. The laboratory will provide EQUIS EDDs for all samples.

In addition to the above, field sampling for PFAS will follow the appropriate procedures provided in NYSDEC's "Guidelines for Sampling and Analysis of PFAS" for soil, sediment and solids (Appendix B), groundwater (Appendix C), and surface water (Appendix D). These appendices are provided in Appendix 6 of this SCWP, and outline media-specific sampling procedures and allowable equipment to prevent sample cross-contamination. QA/QC samples (e.g. duplicates, MS/MSD) will be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only (i.e. groundwater and surface water), rinsate or equipment blanks will be collected. Equipment blanks will be collected at a frequency of one (1) per day or one (1) per twenty samples, whichever is more frequent. Additional information regarding media-specific PFAS sampling and QA/QC procedures can be found in the QCP in Appendix 4. NYSDEC's "Guidelines for Sampling and Analysis of PFAS" guidance document is provided in Appendix 6. Additional information on project-specific PFAS sampling procedures and QA/QC procedures is provided in Appendix 4 – QCP.

7.0 SC Schedule and Reporting – Deliverables

The information and laboratory analytical data obtained during the SC will be included in a SCR, completed in accordance with DER-10.

Implementation of the SCWP is anticipated to begin within 60 days after NYSDEC approval of this work plan and the standard three-day Dig Safely New York waiting period. The field work is anticipated to require approximately 45 days to complete subsequent to approval of the SCWP *(Note: this timeframe does not include laboratory analysis or data validation).* The SCR will be submitted within two (2) months of receipt of DUSRs. It should be noted that, based on timing, the SCR may not include all static water level data and groundwater flow modeling; this data will be submitted in a separate letter once completed.

The above schedule assumes that an addendum to the SCWP will not be required. If an SCWP addendum is required, it will be submitted as the need is identified and it will include a revised schedule. All data will also be submitted in the NYSDEC-approved EDD format. The data will be submitted on a continuous basis immediately after data validation occurs.

TABLES

Table 2 - Sampling Schedule

Task	Task Description	Analyses: Soil		Surface Water		Sediment		Groundwater	
		PFAS[1] ONLY	Full Suite[2]	PFAS[1] ONLY	Full Suite[2]	PFAS[1] ONLY	Full Suite[2]	PFAS[1] ONLY	Full Suite[2]
1	Test Pit Installation/Soil Sampling	4	2	-	-	-	-	-	-
2	Surface Water/Sediment Sampling	-	-	3	2	1	1	-	-
3	Surface Soil Sampling	4	2	-	-	-	-	-	-
4	Groundwater Monitoring Well Installation	3	-	-	-	-	-	5	3
	TOTAL	11	4	3	2	1	1	5	3

NOTES:

1 PFAS refers to analysis as described in Section 6.1, "Site Characterization Tasks" in the SCWP.

2 Full suite refers to list of analyses described in Section 6.1, "Site Characterization Tasks" in the SCWP.

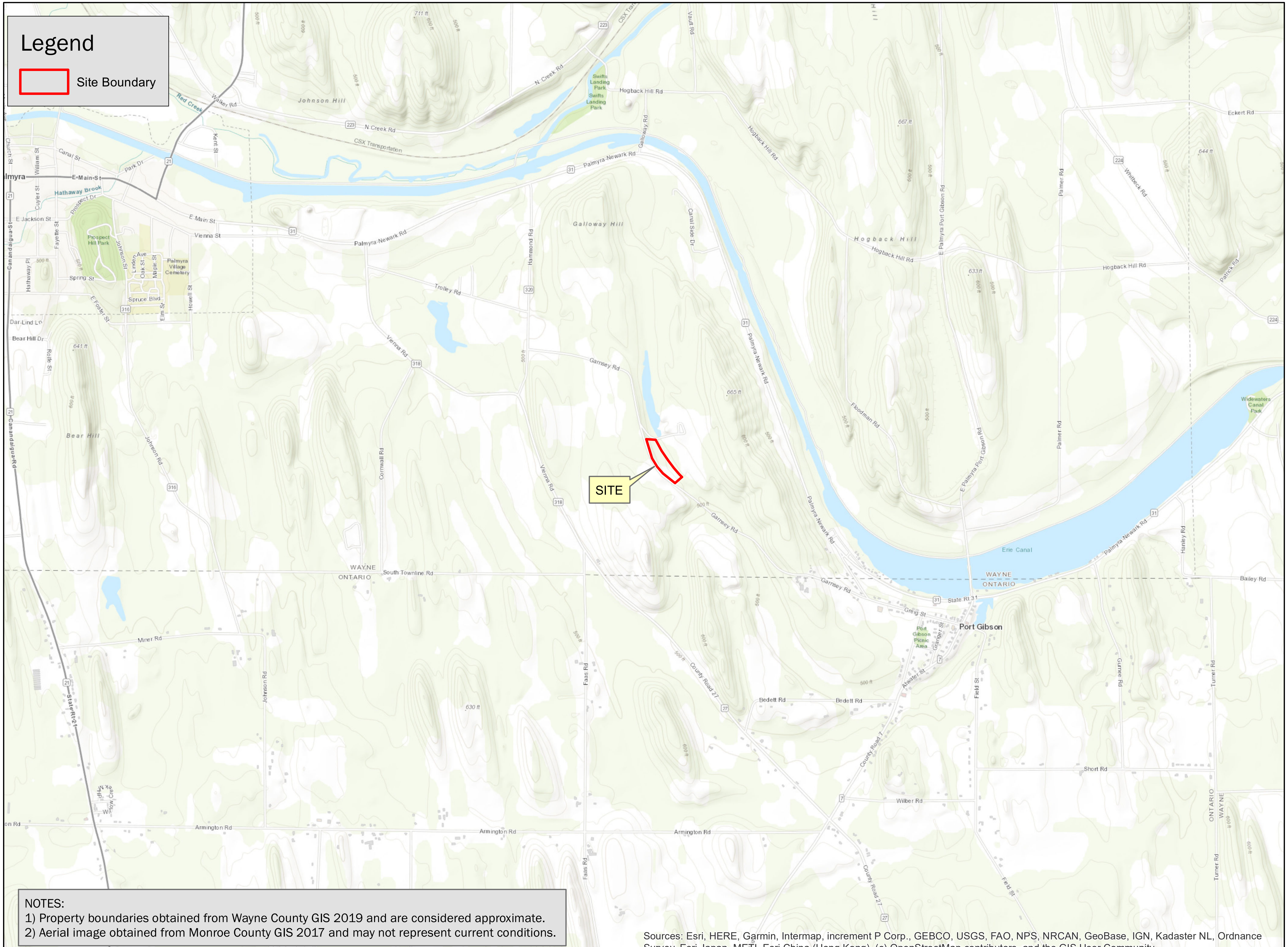
Table 3 - QA/QC Sampling Schedule

Task	Task Description	*Soil*		*Surface Water*			*Sediment*		*Groundwater*		
		Field Dup.	MS/MSD	Field Dup.	MS/MSD	Equip. Blank	Field Dup.	MS/MSD	Field Dup.	MS/MSD	Equip. Blank
1	Test Pit Installation/Soil Sampling	1	1	-	-	-	-	-	-	-	-
2	Surface Water/Sediment Sampling	-	-	1	1	1	1	1	-	-	-
3	Surface Soil Sampling	1	1	-	-	-	-	-	-	-	-
4	Groundwater Monitoring Well Installation	-	-	-	-	-	-	-	1	1	1

NOTES:

All QA/QC samples will be analyzed for full suite parameters as defined in Section 6.1 of the SCWP. QA/QC samples shall be collected at locations to be analyzed for full suite parameters.

FIGURES



NOTES:
1) Property boundaries obtained from Wayne County GIS 2019 and are considered approximate.
2) Aerial image obtained from Monroe County GIS 2017 and may not represent current conditions.

LaBella
Powered by partnership.

N
W E
S

0 1,000 2,000 Feet

1 inch = 2,000 feet

INTENDED TO PRINT AS: 11" X 17"

CLIENT:

TOWN OF PALMYRA

PROJECT:

SITE CHARACTERIZATION WORK PLAN OLD PALMYRA LANDFILL

DRAWING NAME:

SITE LOCATION MAP

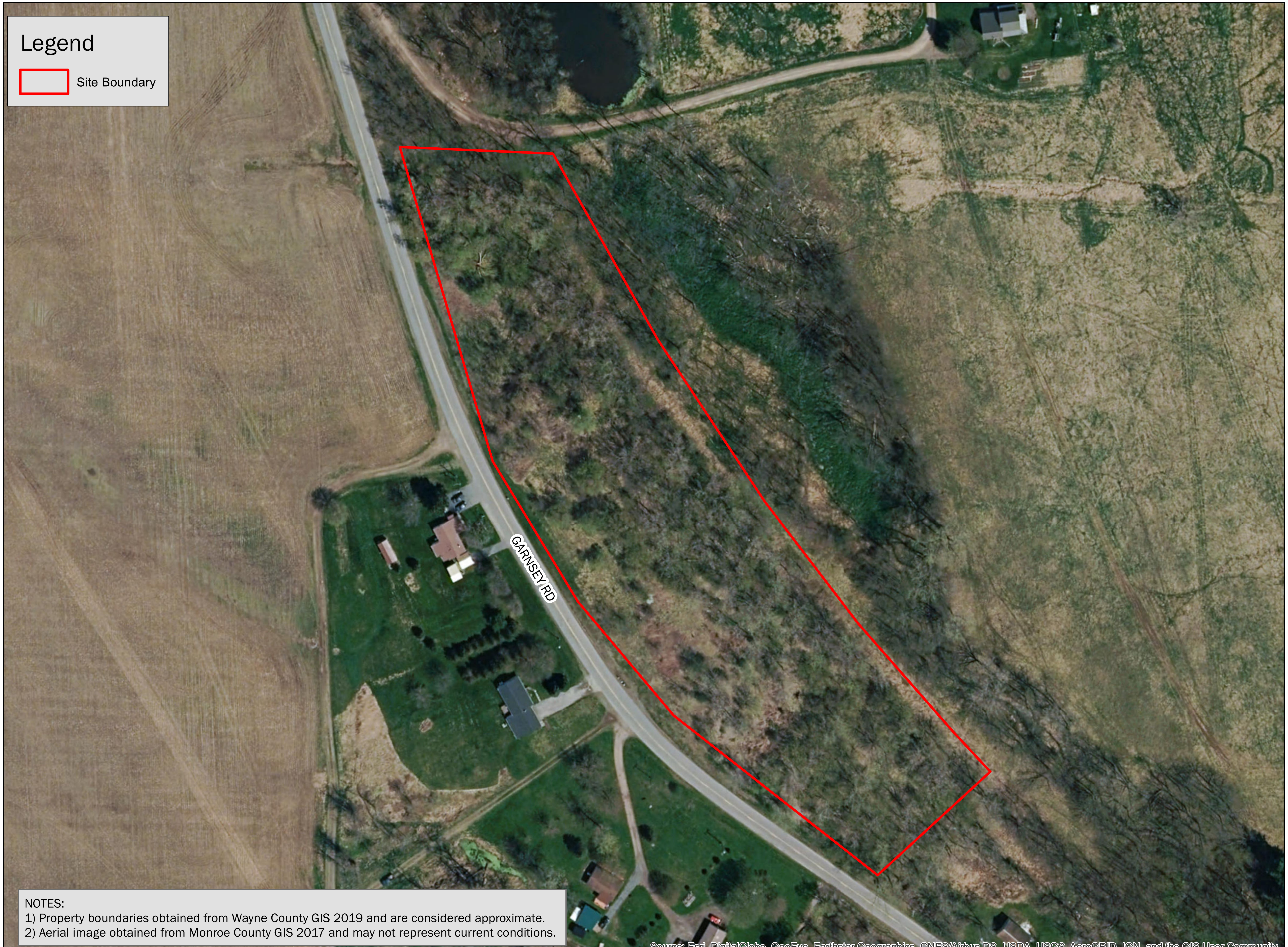
PROJECT #/DRAWING #/ DATE

2191764

FIGURE 1

2/26/2020

\\projects2\projectsNZ\Palmyra, Town of\2191764 - Old Garnsey Rd Landfill\Drawings\FIGURE 1 SITE LOCATION.mxd



NOTES:
1) Property boundaries obtained from Wayne County GIS 2019 and are considered approximate.
2) Aerial image obtained from Monroe County GIS 2017 and may not represent current conditions.

LaBella
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N E S W

0 50 100 Feet

1 inch = 120 feet

INTENDED TO PRINT AS: 11" X 17"

CLIENT:

TOWN OF PALMYRA

PROJECT:

SITE CHARACTERIZATION WORK PLAN OLD PALMYRA LANDFILL

DRAWING NAME:

SITE BOUNDARY MAP

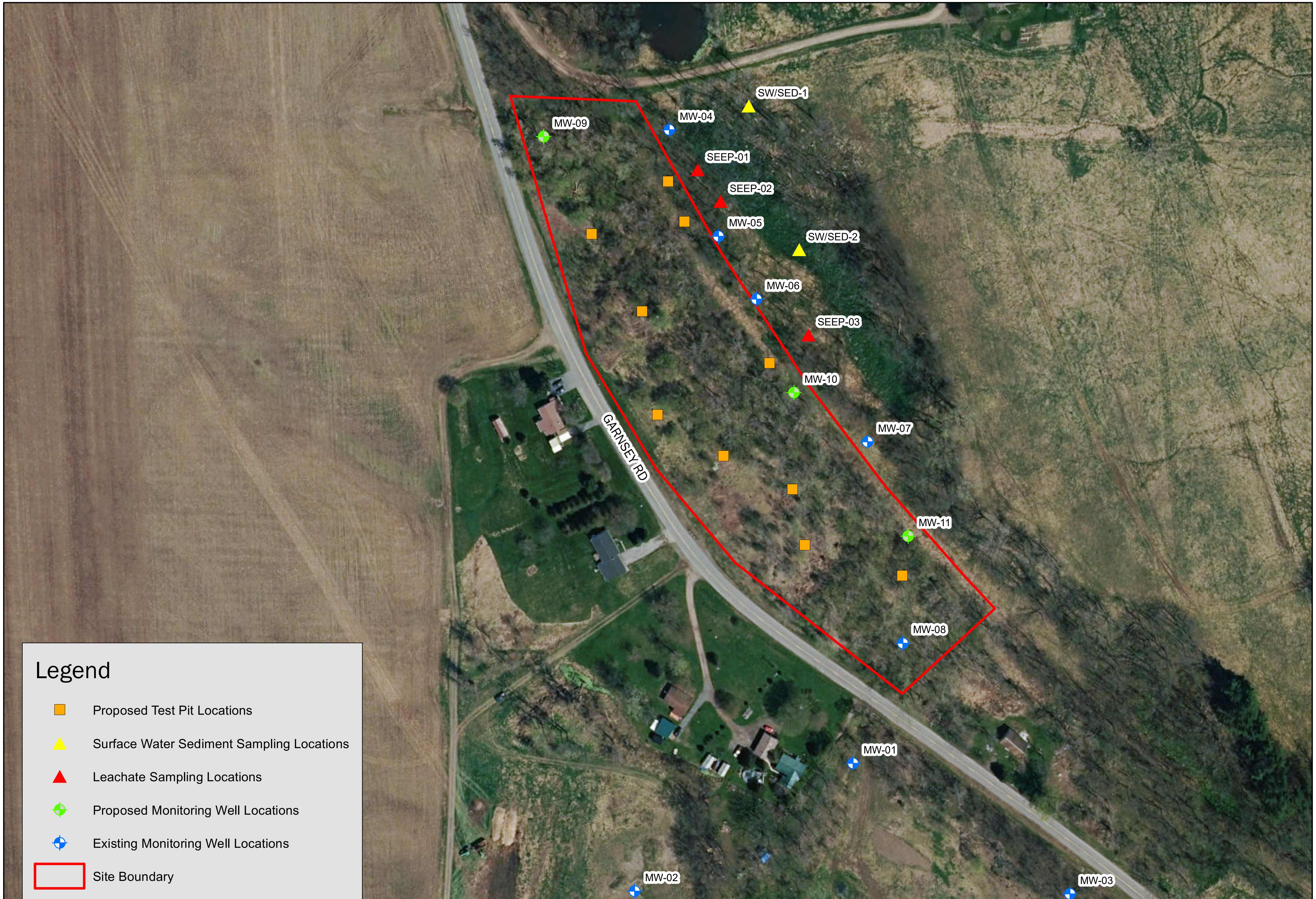
PROJECT #/DRAWING #/ DATE

2191764

FIGURE 2

2/26/2020

\\projects2\projectsNZ\Palmyra, Town of\2191764 - Old Garnsey Rd Landfill\Drawings\FIGURE 2 SITE BOUNDARY.mxd



NOTES:
1) Property boundaries obtained from Wayne County GIS 2019 and are considered approximate.
2) Aerial image obtained from Monroe County GIS 2017 and may not represent current conditions.

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0 50 100
Feet
1 inch = 150 feet
INTENDED TO PRINT AS: 11" X 17"

CLIENT:

TOWN OF PALMYRA

PROJECT:

SITE CHARACTERIZATION WORK PLAN OLD PALMYRA LANDFILL

DRAWING NAME:

PROPOSED INVESTIGATION LOCATIONS

PROJECT #/DRAWING #/ DATE

2191764

FIGURE 3A

2/26/2020

\\projects2\projectsNZ\Palmyra, Town of\2191764 - Old Garnsey Rd Landfill\Drawings\FIGURE 3A.mxd

LaBella
Powered by partnership.

N
W E
S

0 50 100
Feet
1 inch = 120 feet
INTENDED TO PRINT AS: 11" X 17"

CLIENT:

TOWN OF PALMYRA

PROJECT:

SITE CHARACTERIZATION WORK PLAN OLD PALMYRA LANDFILL

DRAWING NAME:

PROPOSED SOIL SAMPLE LOCATIONS

PROJECT #/DRAWING #/ DATE

2191764

FIGURE 3B

2/26/2020

J:\Palmyra, Town of\2191764 - Old Garnsey Rd Landfill\Drawings\FIGURE 3B.mxd

APPENDIX 1

Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

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

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

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

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

ERRATA SHEET for

DER-10, *Technical Guidance for Site Investigation and Remediation*
Issued on May 3, 2010

Citation and Page Number	Current Text	Corrected Text	Date
Table 1.5, Document 9 (SMPs): 'Certified by' column 'Certification' column Page 21	Certified by = NYSPE Certification = 1.5(b) 2	Certified by = QEP or NYSPE Certification = 1.5(b) 1 since SMP is considered to be a work plan	09/14/2015 09/14/2015
Section 4.1(f)(2)(i) Page 131	for residential or restricted residential use, is to be two feet;	for restricted residential use, is to be two feet;	11/07/2017
Table 1.5, Document 13 (Underground storage tank waiver) Page 21	pursuant to clause 5.5(c)3.v.(3)	pursuant to clause 5.5(d)2.	04/09/2019

DER-10 / Technical Guidance for Site Investigation and Remediation	
New York State Department of Environmental Conservation **DEC Program Policy**	
Issuing Authority: Val Washington	**Title:** Deputy Commissioner, Office of Remediation and Materials Management
Date Issued: May 3, 2010	**Latest Date Revised:**

I. Summary: This guidance provides an overview of the site investigation and remediation process for the New York State Department of Environmental Conservation (DEC) remedial programs administered by the Division of Environmental Remediation (DER). These include the Inactive Hazardous Waste Disposal Site Remedial Program, known as the State Superfund Program (SSF); Brownfield Cleanup Program (BCP); Environmental Restoration Program (ERP); and Voluntary Cleanup Program (VCP); and certain petroleum releases.

II. Policy: DER administers the SSF, BCP, ERP, VCP and Bulk Storage Programs and provides response to releases of petroleum. This guidance assists the user in developing and implementing investigation and remediation projects involving contaminated sites under these programs administered by DER. It is a separate document of the requirements for a remedial program set forth in statute and regulation, as well as in guidance. It reflects DER's experience and knowledge in developing and managing the various programs for the past 25 years.

III. Purpose and Background: This guidance provides the scope of activities needed to satisfy minimum requirements for the life-cycle of the site-specific remedial program under the SSF, BCP, ERP, and VCP, and for certain petroleum releases. It facilitates consistent, accurate, efficient and timely completion of remedial projects. It also contains the minimum technical activities DEC will generally accept for projects where DER oversight, approval or acceptance is sought or mandated by law.

DER will, however, determine the acceptable minimum technical activities for a particular site upon consideration of all the facts and circumstances of such site under the authority of applicable laws and regulations. No provision of this guidance document should be construed to limit DER's authority to require additional investigation and/or remediation based upon site-specific conditions. Sections 1.1 and 1.2 present the scope and applicability of this guidance document in more detail.

No provisions of this guidance, however, should be construed to alter the requirements of the Navigation Law or Environmental Conservation Law, or any regulation or order or permit having the force of law. This guidance does not replace or supersede protocols established for emergency spill response actions, emergency drum removal actions, and other such events requiring immediate responses and follow-up. In such time-critical situations, existing guidance established pursuant to applicable emergency response laws, regulations and policy, and directives of the on-scene DEC Spill Responder or Project Manager must be followed.

IV. Responsibility: Remedial Bureau C in DER is responsible for interpreting and maintaining this guidance document. The procedures are to be used by DER staff and regulated entities responsible for sites in the remedial programs.

V. Procedure: This guidance assists the user in developing and implementing investigation and remediation projects under the above described programs administered by DER. This guidance is attached as a separate document and included herein by reference. A summary of topics addressed by each chapter are provided below.

Chapter 1 provides general information, establishes the basic "rules-of-the-game" for utilizing the guidance, and includes issues which are common to many elements of a remedial program.

Chapter 2 describes the minimum quality assurance guidelines and criteria for sampling and laboratory analysis activities. The guidance provided in Chapter 2 applies to various sampling and analytical activities associated with projects or project phases outlined in subsequent chapters.

Chapters 3 through 6 present technical guidance addressing each of the investigative and remedial steps that should be undertaken at contaminated sites toward fulfillment of the remedial program goals and objectives, from identifying a site to its eventual long term management and close out. This follows an iterative process, which begins in Chapter 3 with an assessment of environmental conditions at the site based on the review of existing sources of information and preliminary field investigations (Site Characterization) and progresses through the detailed and focused site investigation (Remedial Investigation).

Chapter 4 addresses remedy selection, detailing the development of remedial alternatives, their evaluation and selection of the remedy.

Chapter 5 details design and construction activities.

Chapter 6 provides the description of the required site management and periodic review process, and includes guidance on site and project close out considerations.

VI. Related References:

- Environmental Conservation Law, Article 27 Titles 3, 5, 13 and 14.
- Article 12 of the Navigation Law, Section 178.
- 6 NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.
- 6 NYCRR Part 611, Environmental Priorities and Procedures in Petroleum Cleanup and Removal. November 5, 1984 (amended).
- Bulk Storage Programs:
  - Petroleum Bulk Storage Program (6 NYCRR Parts 612-614; February 1992)
  - Chemical Bulk Storage Program (6 NYCRR Parts 595-599; August 1994)
  - Major Oil Storage Facilities Program (6 NYCRR Part 610; 1985)

- Program Policy DER-23 *Citizen Participation Handbook for Remedial Programs*. NYS DEC. January 2010.

- Commissioner Policy CP-43 *Groundwater Monitoring Well Decommissioning*. NYSDEC. August 2009.

- Commissioner Policy on *Soil Cleanup Guidance*. NYS DEC.

- Analytical Services Protocol (ASP). (FTP Zip file folder with documents) NYS DEC.

- *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* . NYS Department of Health. October 2006.

- Preparation Aids for the Development of Category I Quality Assurance Project Plans. USEPA. EPA/600/8-91/003. February 1991.

- USEPA Contract Laboratory Program; Statement of Work for Organic Analysis; Multi-Media, Multi-Concentration. EPA/540/R/94/097. December 1994.

- Standards, Criteria and Guidance (SCGs) for Investigation and Remediation of Sites under Remedial Programs

APPENDIX 2

Anticipated Project Personnel Qualifications

Anticipated LaBella Project Personnel

LaBella Staff Member	Title	Phone Number
Greg Senecal	Environmental Division Director	585-295-6243
Daniel Noll, PE	Project Manager	585-295-6611
Jared Pristach, PE	Environmental Engineer	585-402-7004
Eric Detweiler	Geologist	585-278-8202

GREG SENECAL

Environmental Division Director

Greg is Director of Environmental Services and is a Certified Hazardous Materials Manager responsible for the direction of all environmental investigation projects undertaken by the firm. He has over 25 years of experience in designing, managing, and conducting numerous site assessments, remedial projects, Brownfield redevelopment projects, groundwater monitoring well installations, test pit excavations, underground petroleum storage tank removals, and spill cleanups.

CHMM

Certified Hazardous Materials Manager

EDUCATION

SUNY College of Environmental Science and Forestry: BS, Environmental Science

SUNY Cobleskill: AAS, Fisheries and Wildlife Technology

CERTIFICATIONS/ REGISTRATIONS

Certified Hazardous Waste Operations & Emergency Response (40-Hour OSHA Health & Safety Training 29)

Ithaca Chainworks: Brownfield Redevelopment Project - Ithaca, NY

Greg has designed all of the purchasers environmental due diligence efforts for this project. The Chainworks project involves the purchase and redevelopment of Ithaca's largest Industrial Complex. The project Site is a state superfund listed property that encompasses 98 acres and houses 900,000 of vacant industrial building space. Greg worked very closely with the purchaser and the purchasers environmental legal team to negotiate with the seller and the NYSDEC. The out come of these negotiations was an agreement to hold the purchaser harmless for the contamination that exists at the property. An agreement was designed and signed by the seller, that requires the seller to conduct all environmental clean up to meet restricted residential levels. Cleanup has been ongoing since the late 1990's and is expected to be complete in approximately twenty years.

Monoco Oil Brownfield Cleanup & Redevelopment - Pittsford, NY

Greg has been responsible for directing all environmental services associated with the NYSDEC Brownfield Cleanup Program for this project. This complex environmental project involves the cleanup and demolition of a 20-acre blighted vacant oil refinery. The redevelopment plan for the project includes redevelopment of an upscale waterfront apartment and town home complex along the Canal. Greg has conducted NYSDEC, NYSDOH, and local negotiations for many aspects of the project. Public participation and communication has been paramount to the project success.

Former Emerson Street Landfill: Redevelopment Programs - Rochester, NY

Greg is Client Manager for these studies which have been ongoing for the past 15 years. Greg functions a liaison between the City of Rochester and the owners of 66 buildings that have been constructed on the 260 acre landfill footprint.

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Tasks include:

- Development of environmental cost premiums for projects that are being completed on the landfill;
- Development of a fill management protocol for redevelopment projects;
- Direction of soil vapor intrusion studies as required by the NYSDEC for the 66 buildings that have been redeveloped on the landfill footprint;
- Formation of technical teams to design sub slab soil vapor mitigation systems for buildings and building additions that are being constructed on the landfill footprint;
- Directed environmental efforts for the expansion at a City of Rochester High School that is located on the landfill footprint.

Monroe County Environmental Testing Term Agreement Monroe County, NY

As Director of Environmental Services, Greg has been responsible for the successful completion of over 12 years of term agreements (with annual renewals) for hazardous materials inspection and abatement design with Monroe County. Greg's responsibilities typically include meeting with the County, understanding the needs of the environmental project and forming the best possible project team to meet the County's needs. Recent assignments include environmental evaluation of three Sites for the County Crime Lab, and the asbestos inspection, design, and abatement monitoring for a New Downtown Monroe Community College Campus at a former Kodak headquarters building.

City of Rochester: Brownfield Assistance Program Term Agreement (4 Consecutive Terms) - Rochester, NY

Greg serves as the Client Manager who directs all of the projects under the term. Projects range from Phase I Environmental Site Assessments to Site Characterizations, Remedial Cost Estimates, and Brownfield Cleanups. Greg works with the City and the individual property owner to design and implement investigative programs and evaluate clean up and redevelopment options.

690 St. Paul Street: NYSDEC Brownfield Cleanup Project - Rochester, NY

Greg is serving as the project director for this multi-faceted Brownfield investigation and cleanup project. Greg acts as the liaison between the building owners, the former owner (Bausch & Lomb), the Building tenant (City of Rochester School District), and the numerous regulatory agencies involved in the project. This project includes a large SVI investigation, design and installation of a SVI mitigation system, monthly performance monitoring of indoor, sub slab, and exterior air, and communication of the above results to the agencies, tenants, and various stakeholder groups this project also included several IRM's for the removal of orphan tanks and petroleum impacted soils. The RI is currently focusing on the identification and delineation of suspected TCE plumes on the property and under the building structures.

Buffalo Avenue Industrial Corridor Brownfield Opportunity Area: Pre-Nomination Study - Niagara Falls, NY

Greg served as the project director for this 1500 acre, 2500 industrial parcel Brownfield Opportunity Area Project. Greg coordinated the effort between LaBella's Planning and environmental division. He also oversaw the schedule and public outreach components of the project.

Vacuum Oil/South Genesee Brownfield Opportunity Area: Pre-Nomination Study - Rochester, NY

Director of the Project Team for the City of to prepare a pre-nomination study for the proposed Vacuum Oil-South Genesee River Corridor Brownfield Opportunity Area. LaBella developed mapping that allowed for the Brownfield Opportunity Area boundaries to be established in a logical manner at the 56 acre 1.2 mile long corridor along the Genesee River. LaBella conducted economic and demographic research for the project site and gathered zoning, occupancy, and environmental information for potential underutilized Brownfield properties within the BOA.

Oswego River Corridor BOA - Oswego County, NY

Environmental Division Director for this 1,300 acre BOA on the Lake Ontario and Oswego River waterfronts. The project will focus on opportunities to redevelop strategic sites on the waterfront, downtown and underutilized or contaminated brownfields.Town of Tonawanda: Tonawanda BOA - Tonawanda, NY

Foster Wheeler Plant: Site Characterization - Dansville, NY

Project Manager for this due diligence investigation, which consisted of a complete Phase I Environmental Site Assessment and Phase II Site Characterization.

Port of Rochester Redevelopment Project: Phase II Site Characterization - Rochester, NY

Project Manager for complete Phase II Site Characterization, which involved sub surface characterization of approximately 38 acres. Greg directed the environmental team who received a beneficial re-use determination to re use 80,000 cubic yards of iron foundry slag as on site fill.

Bureau of Water, Lighting, & Parking Meter Operations - Rochester, NY

Greg served as Client Manager to remediate the Water Bureau site to obtain regulatory closure or inactivation. The project scope includes the redevelopment of the current site for reuse as a new facility for the operations center.

CSXT Train Derailment & Hazardous Materials Spill - Rochester, NY

Project Manager responsible for review of all delineation reports, implementation of additional delineation studies, review of remedial work plans, and oversight of all facets of the execution of IRM as it related to achieving a cleanup that would limit long term liability for the City and allow for the planned redevelopment to occur.

Rochester Rhinos Stadium: Brownfield Redevelopment - Rochester, NY

Greg served as Project Manager of the NYSDEC Voluntary Cleanup of this prominent urban redevelopment site. The voluntary clean was based around a soils management plan approach that included the re-use of approximately sixty thousand yards of low level petroleum contaminated soils as on site fill under parking lots and in landscaped berm areas of the property.

Seneca Nation: USEPA Brownfield Cleanup Grant

Client Manager responsible for the preparation of a USEPA funded Brownfield Cleanup. The site consists of a vacant rail yard that is contaminated with diesel fuel and heavy metals. The cleanup involves removal and ex-situ bio-remediation of petroleum impacted soils and an environmental management approach that allows for the re-use of railroad ballast and shallow soil impacted with low levels of heavy metals and semi volatile organic compounds as fill under paved parking lots.

NYSDOT: Hazardous Waste Projects, Region 4, Region 5 - State of New York

Project Manager responsible for the development of a characterization workplan to satisfy City, NYSDEC, NYSDOH, MCEMC, and NYSDOT requirements, and implementation of a multiple phase work plan including: shallow soil sampling, test pitting, drilling, geo-probing, and groundwater monitoring well installation. Greg also served as the environmental liaison between LaBella Associates, the NYSDOT, the NYSDEC, and the City of Rochester. In addition, he provided direction of investigative and remedial work and evaluation of contamination levels and impacts. Greg was responsible for final report preparation for the City and the NYSDEC.

Automotive Service Center: Voluntary Cleanup Investigation - Rochester, NY

Project Manager responsible for the delineation of an area of impairment for the client, and the release of future environmental liability for the client from the NYSDEC.

Pennsylvania Act II Site Characterization: Soil and Groundwater Remediation - Coudersport, Pennsylvania

Greg was Project Manager for a Pennsylvania Department of Environmental Protection Act II Voluntary Cleanup project. The site consisted of approximately five acres of land, two vacant gas stations and an agricultural chemical retail store.

Former Trucking Maintenance Facility: Phase II Site Characterization and Remedial Measures - Bloomfield, NY

Project Manager for a multi-phased site characterization and remedial effort. Greg was responsible for the oversight of the spill closure, design of a sub slab venting system, removal of 800 tons of impaired soil, and negotiations with the NYSDEC.

DANIEL NOLL

Senior Remedial Design Engineer

Dan has more than 20 years of experience with environmental projects at industrial/manufacturing facilities and environmental investigation projects for a variety of clients including developers, financial institutions, industrial clients, and municipalities. Dan has managed numerous Phase II Environmental Site Assessments and remediation projects such as groundwater monitoring programs, soil vapor investigations, test pit investigations, geo-probe investigations, underground storage tank removals, soil removals, bio-cell remediations, and in-situ groundwater remediation. He also has experience with the design and installation oversight of mitigation systems. In addition, Dan has assisted industrial, municipal and agricultural clients with permitting and annual reporting for State Pollution Discharge Elimination System (SPDES) permits, Part 360 Land Application permits, Composting permits, and Petroleum Bulk Storage (PBS) registrations.

PE

Professional Engineer, NY and ME

EDUCATION

Clarkson University: BS, Chemical Engineering

CERTIFICATIONS/ REGISTRATIONS

OSHA 40-Hour Certified Hazardous Waste Site Worker Training

OSHA 8-Hour Certified Hazardous Waste Site Worker Refresher Training

NYS Department of Transportation: Hazardous Materials Assessment & Remediation Term - DOT Regions 3, 4, 5, & 6

Mr. Noll manages a NYSDOT Term Agreement for Hazardous Materials Assessment & Remediation for Regions 3, 4, 5, & 6. This agreement includes a variety of services to support the NYSDOT for all manner of construction projects and for property acquisition. The work includes Phase I & II Environmental Site Assessments to support property acquisitions and/or to pre-characterize soil and groundwater prior to construction in a NYSDOT corridor. Mr. Noll also has assisted NYSDOT with waste characterization of soil, spent paint, and wastewater. In addition, NYSDOT has utilized LaBella for community air monitoring during construction work at impacted properties and to complete radiological screening for areas where radioactive slag has been a concern.

Valeo North America: Former Valeo Facility - Rochester, NY

Dan managed Remedial Investigations of two areas of potential contamination at this former manufacturing facility. These assessments included evaluating bedrock groundwater for plating waste impacts (metals and chlorinated solvents). These evaluations were complicated by the fact that multiple industrial companies were in operation at the Site in the past and thus requiring LaBella to provide a focused assessment to only evaluate potential Valeo responsibilities.

PFAS Investigation at Former Landfill – Orleans County, NY

Mr. Noll managed a project to assess a former landfill in Orleans County NY for Per and Polyfluoroalkyl Substances (PFAS). Due to concerns with the landfill closure (1980s), the NYSDEC required sampling of nearby residential drinking water wells and an assessment of the soil and groundwater at the

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landfill. Mr. Noll coordinated an assessment of drinking water wells in proximity of the landfill. Municipal water serviced a majority of the area but four residences still utilized private wells. Mr. Noll coordinated sampling with the NYSDOH, NYSDEC, Orleans County DOH and the property owners. In addition, Mr. Noll managed soil and groundwater sampling within and around the landfill to assess for PFAS sources.

PFAS at Brownfield Sites – Various Locations, NY

The NYSDEC is currently undergoing a statewide assessment of Per and Polyfluoroalkyl Substances (PFAS) in groundwater. As part of that assessment NYSDEC has been requesting that active and former Brownfield sites be assessed for PFAS across the State of New York. This program resulted in numerous old and active remedial sites being further investigated. Mr. Noll was the project manager for over 15 Brownfield sites in NY where such testing was requested. Mr. Noll negotiated the details of the sampling and managed/coordinated the field activities and reporting. In addition to PFAS NYSDEC also required conducting emerging contaminant testing for 1,4-Dioxane.

Former Rock Quarry Water Sampling – Cortland, NY

Mr. Noll coordinated a project to characterize quarry water as part of a larger construction project. The former quarry filled with water after operations ceased. A large natural gas pipeline was being installed near the quarry and required ballast water for the pipeline installation. Mr. Noll coordinated the approvals for baseline sampling of the water through the Town of Cortland who owned the quarry. The sampling included contaminants of concern including Per and Polyfluoroalkyl Substances (PFAS). Mr. Noll negotiated the sampling requirements/scope and coordinated implementation with internally and with the natural gas company, Town and contractor. The sampling included baseline and post discharge of the ballast water to confirm there was no impact to the water since the Town was exploring possible future uses of the quarry.

Genesee Valley Real Estate: Former Bausch & Lomb Facility BCP Site - Rochester, NY

Dan is Project Manager for this Brownfield site that served as a manufacturing facility from the 1930s to the 1970s. The project includes a Remedial Investigation (RI) of a four-acre parcel with ten areas of concern identified based on historic information. The RI identified four areas requiring remedial actions and Interim Remedial Measures have been completed in three of the locations. The areas of remediation included petroleum impacted soil and groundwater with free floating petroleum product, and chlorinated solvent contamination including bedrock impacts at depth. A remedial alternatives analysis is being completed to determine a final remedy for the site.

Stern Family Limited Partnership: Former Manufacturing Facility BCP Site - Rochester, NY

Dan was the Project Engineer for this BCP Site, which underwent a Remedial Investigation, Interim Remedial Measures, and installation of a sub-slab depressurization system. Dan completed and stamped the Final Engineering Report required to obtain the Certificate of Completion for the property owner, allowing them to obtain their tax credits.

Springs Land Company: Carriage Cleaners BCP Site - Rochester, NY

As Project Manager, Dan completed a Brownfield Cleanup Program (BCP) Application & Work Plan to conduct a Remedial Investigation at a former dry cleaning facility. A soil, groundwater, and soil gas study was undertaken to develop remedial costs and assist with redeveloping the property. Subsequently, an Interim Remedial Measure was completed to remove the source area of impacts from the Site. Dan completed a remedial alternatives analysis for selecting a treatment approach for the residual groundwater plume. Dan also attended Town Board Meetings regarding this project.

American Siepmann Corporation: Former Manufacturing Facility BCP Site - Henrietta, NY

Dan was the Project Manager for this Brownfield Cleanup Program (BCP) Site and has overseen the installation of a groundwater monitoring well network and subsequent routine sampling as part of a Monitored Natural Attenuation (MNA) program for remediation of chlorinated groundwater impacts at the Site.

Buckingham Properties: Manufacturing Facility - Rochester, NY

Dan assisted a developer that purchased a former Bausch & Lomb manufacturing facility to obtain a SPDES Permit for Industrial Discharges. This project included assessing the new operations and discussion of the Site with NYSDEC to determine the appropriate permits for the facility, since multiple tenants with various operations were in operation at the Site.

JARED PRISTACH

Environmental Engineer

Project Manager and Environmental Engineer responsible for coordination and successful completion of environmental investigation and remediation projects. Currently manage numerous Phase II Environmental Site Assessments (ESAs). Project experience includes Phase I and Phase II ESAs, NYSDEC State Superfund projects (including remedial design and construction oversight), remedial systems operation and maintenance. green infrastructure design, civil engineering site design, and structural engineering design of recreational facilities.

PE

NYS-licensed Professional Engineer

EDUCATION

Manhattan College: Environmental Engineering, BS

University at Buffalo: Civil/ Environmental Engineering, MS

CERTIFICATION

40-hour OSHA HAZWOPER Certified

BSA RainCheck 2.0, Buffalo Sewer Authority, Buffalo, NY:

Project Engineer responsible for conducting in-field Retrofit Reconnaissance Inventory (RRI) and providing technical insight into each Combined Sewer Overflow (CSO) basin for final reporting. Mr. Pristach assessed over 350 individual private properties within six (6) CSO basins in the City of Buffalo to determine whether or not these properties were suitable for green infrastructure retrofitting. He was also responsible for proposing signature projects in each CSO based on his field findings, as well as developing green infrastructure profiles based on the land use of each CSO basin.

Highway Rehabilitation Project, East and West Road, Town of West Seneca, NY:

Project Engineer responsible for environmental review services on this locally-funded project to improve a 3.25-mile stretch of East and West Road between Orchard Park Road (NY Route 240) and Leydecker Road. Mr. Pristach prepared environmental text and appendices for the Design Approval document, various environmental screenings (wetlands, endangered species, coastal zone areas, floodplains, wild/scenic rivers and groundwater), and a Joint Application for Permit for NYSDEC and USACE.

PCB-Impacted Soil Remediation, Brooklyn Navy Yard, Brooklyn, NY:

Project Engineer responsible for preparing Contract Documents for bid and construction, including technical specifications and project drawings, for the remediation of PCB-impacted soils at the former Building 297/Substation H location at the Brooklyn Navy Yard site in Brooklyn, NY. Mr. Pristach developed the Contract Documents, coordinated bidding and contractor selection efforts, prepared an Engineer's Estimate for the proposed work, developed project documentation, and developed sampling requirements for the project. He also prepared the Construction Completion Report (CCR) for the project.

PCB-Impacted Concrete Remediation, Brooklyn Navy Yard, Brooklyn, NY:

Project Engineer responsible for preparing Contract Documents for bid and construction,

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including technical specifications and project drawings, for the remediation of a PCB-impacted concrete slab at the Building 77 site at the Brooklyn Navy Yard site in Brooklyn, NY. Mr. Pristach developed the Contract Documents, coordinated bidding and contractor selection efforts, prepared an Engineer's Estimate for the proposed work, developed project documentation, and developed sampling requirements for the project.

Highway Rehabilitation Project, Fisk Road, Town of Pendleton, NY:

Project Engineer responsible for environmental review services on this locally-administered, federally-funded project to improve a 2 mile stretch of Fisk Road between Transit Road (NY Route 78) and East Canal Road. Mr. Pristach prepared a Project Submittal Package for NYSDOT regarding potential project impacts to historic structures/ properties, prepared a Joint Application for NYSDEC and USACE. He also performed various environmental screenings (wetlands, endangered species, coastal zone areas, floodplains, wild/scenic rivers and groundwater). Mr. Pristach also prepared the environmental text and appendices for the Design Approval document to NYSDOT standards.

Erie County Department of Public Works (DPW) Safety Improvement Project at Sibley Road/Genesee Road/NY Route 240 Intersection, East Concord, NY:

Project Engineer responsible for environmental review services on this locally-administered, federally-funded project to improve the high-accident intersection of Sibley Rd/ Genesee Rd/NY Route 240 in Concord, NY. Mr. Pristach coordinated with SHPO regarding potential project impacts to historic structures/properties, prepared the SEQR short Environmental Assessment form and a Federal checklist and performed various environmental screenings (wetlands, endangered species, coastal zone areas, floodplains, wild/scenic rivers and groundwater). Mr. Pristach also prepared a Phase I Environmental Assessment to determine potential presence of hazardous materials in the project area.

Stormwater Pollution Prevention Plan Inspections, Portageville Bridge, Portageville, NY:

NYSDEC Certified Inspector responsible for performing monthly Stormwater Pollution Prevention Plan (SWPPP) inspections for construction activities related to replacement of the Portageville Bridge (a federally funded project). Inspections are performed to ensure compliance with the applicable New York State Department of Environmental Conservation (NYSDEC) State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities (GP-0-15-002) and the Site-specific SWPPP. Mr. Pristach prepared monthly audit reports summarizing the condition of existing erosion and sediment control measures and noting improvements that need to be made to concur with SWPPP.

Stormwater Pollution Prevention Plan and Green Infrastructure Design, Staten Island University Hospital, Staten Island, NY:

Project engineer responsible for developing a Stormwater Pollution Prevention Plan (SWPPP) and design of a large bioretention area to meet NYCDEP permitting requirements at the Staten Island University Hospital in Staten Island, NY. Mr. Pristach authored and helped to implement the SWPPP while construction activities were in progress at the site. He also developed a green infrastructure design of a large bioretention area that was incorporated into the final design for the project.

Bridge Replacement Project, Hosmer Road, Town of Somerset, NY:

Project engineer responsible for environmental review services on this locally-administered, federally-funded project to replace a functionally-obsolete bridge in Niagara County, NY. Mr. Pristach coordinated with NYSDOT, SHPO, NYSDEC, and USACE regarding potential project impacts to historic structures/properties and adjacent wetlands, prepared the SEQR short Environmental Assessment form and a Federal checklist and performed various environmental screening (wetlands, endangered species, coastal zone areas, floodplains, wild/scenic rivers, and groundwater).

Sanitary Sewer Commissioning, Spaulding Green Phase 3B, Clarence, NY:

Project Engineer responsible for field oversight of sanitary sewer testing and commissioning for the Spaulding Green Phase 3B development project in Clarence, NY. Mr. Pristach coordinated field efforts with the general contractor, oversaw deflection, air, and exfiltration testing, and authored testing and daily reports which were provided to Erie County.

Sanitary Sewer Installation Inspection, Spaulding Green Phase 6B, Clarence, NY:
Project Engineer responsible for field oversight and inspection of sanitary sewer installation for the Spaulding Green Phase 6B development project in Clarence, NY. Mr. Pristach coordinated field efforts with the general contractor, oversaw sanitary sewer and manhole installation, and authored daily reports which were provided to Erie County.

Maintenance and Protection of Traffic, Belscher Road Slide Remediation, Springville, NY:
Project engineer responsible for design of a maintenance and protection of traffic (MPT) plan and review of the Draft Design Report for a slide remediation project in Springville, NY. Mr. Pristach was responsible for developing a MPT route, signage, and traffic protection in accordance with NYSDOT specifications, as well as technical review of the Draft Design Report for Greenman-Pedersen, Inc.

Stormwater Pollution Prevention Plan, Staten Island University Hospital, Staten Island, NY:
Project engineer responsible for developing a Stormwater Pollution Prevention Plan (SWPPP) for the States Island University Hospital Overbuild project. Mr. Pristach developed a SWPPP for the project site, including selection and placement of appropriate erosion and sediment controls in accordance with the NYS "Blue Book" best management practices (BMPs), development of site SWPPP CAD drawings, and submission of the Notice of Intent (NOI) to NYSDEC. Mr. Pristach also coordinated with NYSDEC and the client to develop a plan that worked best for all involved parties.

Point Gratiot Park, Dunkirk, NY and Lake Erie Beach, Evans, NY - NYS Office of General Services (NYSOGS):
Mr. Pristach served as the primary design engineer for two green infrastructure projects conducted for NYSOGS. These projects included design of rain gardens and vegetated swales to intercept stormwater runoff at municipal parks to improve water quality and reduce beach erosion. Mr. Pristach generated design drawings, design specifications, planting plans, cost estimates, and design presentations given to the municipalities.

Allegany State Park, Salamanca, NY; Hamlin Beach State Park, Hamlin, NY; & Riddell State Park, Davenport, NY – NYS Office of Parks, Recreation and Historic Preservation (NYSOPRHP):
Mr. Pristach served as the primary design engineer for three recreational boardwalk and interpretive feature designs conducted for NYSOPRHP. These projects included the design of walking trails, structural design of elevated boardwalks, observation platforms and recreational boat launches, as well as invasive species control. Mr. Pristach generated design drawings, design specifications, construction cost estimates, and planting plans as part of these designs. Mr. Pristach also coordinated the structural design with a sub-consultant.

Lake Erie State Park, Portland, NY– NYS Office of Parks, Recreation and Historic Preservation (NYSOPRHP):
Mr. Pristach served as the primary design engineer for an engineered pond/ wetland feature conducted for NYSOPRHP. His work included dam design, planting selection, design of spillway features, and selection of a solar pump. Mr. Pristach generated design drawings, design specifications, construction cost estimates, and planting plans.

Golden Hill State Park, Barker, NY– NYS Office of Parks, Recreation and Historic Preservation (NYSOPRHP):
Mr. Pristach served as the primary design engineer for a lakeshore stabilization design conducted for NYSOPRHP. Mr. Pristach's responsibilities included design of a "green" riprap revetment and recreational walkway. Mr. Pristach generated design drawings, design specifications, construction cost estimates, and developed project-specific planting plans to implement the green revetment.

Town of Carroll Landfill Soil Cover Design, Carroll, NY - New York State Department of Environmental Conservation (NYSDEC):
This project involved a landfill consolidation design under the NYSDEC standby program. Mr. Pristach served as resident engineer and deputy project manager on the project for two years providing third party oversight of the contractor. His duties included review of submittals, approval of contractor applications for payment (CAPs), and infield engineering design assistance as needed due to changes in project conditions.

Blackmar Well Site Interim Remedial Measure (IRM), Cattaraugus, New York - New York State Department of Environmental Conservation (NYSDEC):
This project involved fast-paced design and implementation of an initial remedial measure (IRM) to treat methylene chloride contamination found in a drinking water supply well for the Village of Cattaraugus under the

NYSDEC standby program. Mr. Pristach provided construction oversight for the installation of a portable air stripper

BB&S Treated Lumber Site, Suffolk County, NY- New York State Department of Environmental Conservation (NYSDEC):

Mr. Pristach provided field oversight of groundwater sampling and construction activities during the November 2013 sampling round at this Superfund site, including coordination of sample collection with the Suffolk County Department of Health Services (SCDHS). He provided oversight of a groundwater sampling crew in the field, coordinating potable water sampling at several residences with SCDHS. He also oversaw a construction crew performing maintenance and removing residual contamination at the site. Mr. Pristach prepared the summary report for this sampling, as well as the 2013 periodic review report.

Middlesex Municipal Landfill, Middlesex, New Jersey – US Army Corps of Engineers (USACE):

Mr. Pristach was part of the team that developed a full-scale design for a radiological soil sorting pilot study at the Middlesex Municipal Landfill FUSRAP site for USACE. Mr. Pristach served as deputy project manager and project engineer and assisted in the subcontractor bidding process, development of work plans, and scoping of the pilot study.

Van der Horst Superfund Site, Olean, NY - New York State Department of Environmental Conservation (NYSDEC):

Mr. Pristach measured groundwater levels and tested for chromium contamination as part of continuing operation and maintenance (O&M) on the Van der Horst #2 Superfund site in Olean, NY in Cattaraugus County. The Site had operated as a chromium plating facility from the early 1940s until 1987. He also prepared a long-term O&M recommendation report for NYSDEC.

ERIC DETWEILER

Geologist

Eric has more than 20 years of experience as a Geologist and Project Engineer. His areas of specialization include suite assessments, remedial investigation/site characterization, site remediation and regulatory compliance. Eric has worked on numerous remediation projects for federal, state, municipal and private clients.

EDUCATION

St. Lawrence University: B.S. Geology

CERTIFICATIONS/ ORGANIZATIONS

OSHA 40 Hour Health & Safety Training for Hazardous Waste Site Operations & Refresher Training

DOH 2832 Asbestos Building Inspector

RMD XRF Manufacturers Training

New York State Council of Professional Geologists

Environmental Site Assessments

Perform ASTM and specialized Phase I and II environmental site assessments for banks, law firms, oil companies, manufacturing companies, private individuals, NYSDEC, NYSDOT, and the NYS Thruway Authority. Phase II assessments have included intrusive and nonintrusive methods. Non-intrusive project experience has ranged from ground penetrating radar surveys to conductivity and magnetometer studies.

Subsurface Investigation

Conduct subsurface investigations for a variety of private and public clients. Projects involve contractor oversight duties, work plan development, on-site drilling excavation supervision, sample classification, sampling coordination, and preparation of reports. Additional responsibilities include aquifer testing, monitoring, and preparing site status reports for NYSDEC and other regulatory entities.

Environmental Remediation

Coordinate and conduct remediation projects. Technologies include vapor extraction, air injection, groundwater pump and treat, air stripping/sparging, various free product recovery methods, and bioremediation. Responsibilities include design and field implementation of systems for industry and NYSDEC.

Wetland Delineation and Natural Resource Studies

Experience has included wetland boundary delineation, species identification and soil characterization. Hydrologic and hydrogeological studies have involved research and field methods. Related natural resource work has included farmland assessments, water quality studies, threatened and endangered species identification and general ecological valuations.

Asbestos Related Projects

Serve as Building Inspector, Project Monitor and Air Technician for various asbestos projects. Responsibilities include inspection and sampling of building materials, monitoring of all asbestos abatement activities to ensure compliance with applicable regulations and conducting air sampling on asbestos abatement projects.

Brownfield and Hazardous Waste

Phase II investigations and remedial projects under the Inactive Hazardous Waste

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Disposal Site (IHWDS), Voluntary Cleanup (VCP), Brownfield Cleanup (BCP), Petroleum Spills and Environmental Restoration Programs (ERP). These projects have involved comprehensive subsurface and structural investigations for all types of hazardous substances and in many cases designing and implementing agency required cleanup programs.

City of Rochester: Facilities Inspections—Rochester, NY

Mr. Detweiler was the asbestos Building Inspector on this long-term assignment. He inspected all city owned recreation centers, fire halls and water supply reservoirs for asbestos containing materials as the basis for a large-scale Asbestos Management Plan. Activities included collecting measurements and building material samples, inspection of building conditions, quantifying materials, coordination with City of Rochester personnel, and report writing.

Former Adirondack Steel: Remedial Investigation/ Feasibility Study—Colonie, NY

Mr. Detweiler performed surveying services for a Remedial Investigation I Feasibility Study at the 101-acre former Adirondack Steel site. Survey included establishing the property boundaries on several parcels and mapping the test points. He also established right-of-ways for the adjoining NYS highway and railroad.

NYSDEC: Former Frink America Property, Voluntary Cleanup Work Plan—Clayton, NY

Mr. Detweiler was the Field Team Leader who oversaw installation of test pits and borings used to delineate the extent of subsurface contamination. Collected samples for waste profiles to confirm the waste was non-hazardous and to determine appropriate disposal options. He oversaw monitoring well installations. A RI/FS report was completed. He oversaw all investigation and remedial activities, including Aquifer testing, soil vapor sampling and the removal and disposal of 19,000 tons of contaminated soil. He also completed the Final Engineering Report.

USAF: Newport B-1605—Herkimer County, NY

Mr. Detweiler conducted Phase I and II Environmental Baseline Survey for the Rome Research Site. Manual soil sampling at drainage outfalls and geoprobing around Building 1605 at the Newport Research Facility was performed. The geoprobe work was intended to delineate subsurface petroleum contamination associated with two past spills of fuel oil from underground storage tanks which have since been removed.

MACTEC: Preferred Electric Motors site—Rochester, NY

Mr. Detweiler provided assistance with Remedial Investigation/ Feasibility Study (RI/FS) at NYSDEC Inactive Hazardous Waste Site, Preferred Electric Motors site located in Rochester, NY. Tasks included preparation of a site-specific Health and Safety Plan, boundary and well survey, geophysical (magnetic and GPR) surveys, Geoprobe sampling, sediment/soiVwater sampling, soiVgas sampling, indoor air/ subslab sampling, and utility stakeout.

Monroe County: Regional Traffic Operations Center—Rochester, NY

Mr. Detweiler was the Project Geologist for the facility located at the Greater Rochester International Airport. As on-site geologist, tasks consisted of the monitoring of cleanup activities, installation of a SVE system, UST removals, the collection of samples, air monitoring, as well as oversight of the construction of a remedial bio-cell. Mr. Detweiler was the Chief Health and Safety Officer at the site during construction.

OKAR Equipment/Wilkins RV, Inc.: Voluntary Cleanup Program Investigation, Former ChurchrvilleFord Site—Churchville, NY

Mr. Detweiler conducted an environmental subsurface investigation to identify the nature and extent of contamination. He updated the Work Plan and the field work included groundwater investigation, residential well survey, a topographic survey, installation of three new wells, sampling and testing of all site wells, aquifer testing, sediment/ soil sampling, groundwater modeling and development of a cleanup plan. A remedial alternatives report was written and an interim remedial measure involving underground injection of a chemical oxidizer was conducted.

NYSDOT: Region 6,1-86; Surveying Services—Allegany County, NY

Mr. Detweiler performed surveying services on 1-86 in Allegany County as a subconsultant to Ravi Engineering under a term agreement with NYSDOT Region 6. The work entailed locating and mapping drill boring holes on 1-86.

Rochester Gas & Electric: Environmental Division Assistance—Rochester, NY

Mr. Detweiler provided multidisciplinary assistance to local utility company's environmental department on a long-term assignment. Responsibilities included generation of reports, including air emission statements and Phase I and II investigation reports, internal and external project coordination, and project oversight of investigation and remediation projects.

NYS Superfund: Davis-Howland Oil Company Remediation Site—Rochester, NY

Mr. Detweiler served as Project Engineer on this NYS Superfund project. Responsibilities included continuous monitoring of all field activities during installation of large-scale Air Sparging/SVE and groundwater treatment System, ensuring contractor compliance with project specifications, surveying as-built elevations, collecting all as-built information, creating site sketches, maintaining photo log, documentation of daily site activities and O&M of system including catalytic oxidation(CatOx) treatment and air stripper. He also conducted a soil vapor survey on properties south of the former Davis Howland Oil Company site in Rochester, NY. He also conducted interior soil vapor intrusion sampling in residences surrounding the site and provided follow-up sampling a year later.

Conkling & Calabrese, LLC: N. Main St.—Fairport, NY

Mr. Detweiler prepared a Remediation Work Plan, installed a SVE system and provided oversight of the operation and maintenance of SVE system. Once soil concentrations reached acceptable NYSDEC levels, the system was decommissioned.

Ontario County: Grimes Glen Phase I & II ESA—Naples, NY

Mr. Detweiler conducted a subsurface investigation of an existing landfill. The investigation included test pitting, installation of groundwater monitoring wells and soil and groundwater sampling. A report documenting all the field and laboratory findings was prepared for Ontario County and NYSDEC. He also provided oversight during the waste removal.

Harris & Rainey Parcel—Pittsford, NY

Mr. Detweiler performed all the field activities for a Phase II Environmental Site Investigation. Surface soil samples surrounding the abandoned drum were tested to determine the absence or presence of volatile organic chemical vapors. Test pits were completed in the C&D landfill area. Bulk samples for suspect asbestos containing materials ere collected from test pits in the landfill area.

Monoco Oil Company: Phase I ESA—Pittsford, NY

Mr. Detweiler conducted full Phase I and limited Phase II site investigation for this Superfund Site. He performed all record reviews, interviews, database searches, site inspections, and oversight of the excavation of test pits.

Alstom Transportation: Asbestos Building Survey—Hornell, NY: 2002

Project Engineer: Mr. Detweiler performed asbestos sampling and inspection at two sites for Alstom Transportation in Hornell, NY.

Belvedere Townhouses: Construction Survey—Webster, NY: 2004

Project Engineer: Mr. Detweiler performed on-site and off-site topographic surveys and stakeout which were necessary to determine the status of the Phase II earthwork and grading, and to design off-site stormwater management facility on adjacent Town land. He also performed stakeouts of new townhouses and stakeout of "clearing limits" and stormwater pond for the next section of townhouses to be developed.

City of Rochester: Bus Facility Subsurface Investigation—Rochester, NY: 2004

Mr. Detweiler conducted a subsurface investigation of PBS facilities in Service Building area of RGRTA's Main Street bus facility. It was necessary to characterize soil type, the horizontal and vertical extent of soil and groundwater contamination, and the type and chemical characteristics of the spill. Activities were scheduled in close coordination with RTS personnel in order to prevent unnecessary interference with routine activities such as bus maintenance and placement.

Candlewood Park Subdivision,: Construction Survey—Webster, NY

Mr. Detweiler performed on-site survey tasks, including boundary and topographical surveys, utility stake-outs, house stake-outs, as-builts and stormwater features for Candlewood Park subdivision planning on a 70 acre parcel.

Churchville Pump Station: GPS Survey—Churchville, NY: 2003

Project Engineer: Mr. Detweiler provided profile, alignment survey and utility mapping for approximately nine miles of forcemain for the Churchville Pump Station, from the Mill Seat

Landfill to the Union Square area. The work was needed by the Monroe County Department of Environmental Services.

Churchville Pump Station: GPS Survey—Churchville, NY: 2005

Project Engineer: Mr. Detweiler provided topographic land survey in Churchville, NY near Routes 490 and 36 for the Churchville sewage design.

Clematis Lane Subdivision—Penfield, NY: 2002

Project Engineer: Mr. Detweiler performed a Phase I and Phase II site assessment including asbestos sampling, excavation of test pits, radon testing, soil screening and perc testing for the Clematis Lane subdivision property. There was potential for hazardous waste from bulk storage petroleum tanks and asbestos in the former green house areas.

Cornell University: Cornell Experimental Agricultural Station—Geneva, NY: 1994

Project Geologist: Mr. Detweiler was the Site Supervisor/ Project Geologist, responsible for pesticide storage building sampling, oversight and health and safety duties during building demolition, treatment system and leach field removal as well as, monitoring well installations and final report submittal.

Covington Estates: Wetland Delineation/Land Survey—Canandaigua, NY: 2004-05

Project Engineer: Mr. Detweiler performed wetland delineation services for 26 acres for Covington Estates, a single family development in Canandaigua, NY. He provided boundary and topography survey services

Crowne Pointe Subdivision: Penfield, NY: 2004

Project Engineer: Mr. Detweiler performed field survey of the 66 acres and existing structures including a certified boundary with topographical and natural features, existing elevations, establishing horizontal and vertical control for the site, tied into the Monroe County Monument System, collected field measurements of utilities to be installed (sewers, drainage, pavements, etc.), perimeter property locations and grades to establish drainage patterns along the property lines, as necessary and/or required by the Town of Penfield. He also performed test pits, and stakeout of sewer easements, and federal wetland delineation.

NYSDOT Region 6: Culvert & Wall Repair or Replacement—Various Counties, NY: 2005

Project Engineer: Mr. Detweiler provided land surveying services for wall and culvert repair or replacement in various counties in NYSDOT Region 6. This project involved the rehabilitation and replacement 14 highway drainage culverts and provided right-of-way (ROW) mapping. Services included research of NYSDOT ROW mapping and County tax maps, surveying and mapping, and ROW mapping.

Davis-Howland Oil Company: Remediation Site—Rochester, NY: 2001-2005

Project Engineer: Mr. Detweiler served as Project Engineer on this NYS Superfund project. Responsibilities included continuous monitoring of all field activities during installation of large-scale Air Sparging/SVE and groundwater treatment System, ensuring contractor compliance with project specifications, surveying as-built elevations, collecting all as-built information, creating site sketches, maintaining photo log, documentation of daily site activities and O&M of system including catalytic oxidation (CatOx) treatment and air stripper. He also conducted a soil vapor survey on properties south of the former Davis Howland Oil Company site in Rochester, NY. He also conducted interior soil vapor intrusion sampling in residences surrounding the site and provided follow-up sampling a year later.

Doug Kent: Land Surveyor—East Bloomfield, NY: 1999-2000

Land Surveyor: Mr. Detweiler was a Land Surveyor Assistant. Responsibilities included peration of Total Station, operation of survey rod, setting of residential and commercial property corners, small and large scale property traverses, topographical surveys, and boundary surveys.

City of Rochester: Durand Beach Water Quality Survey—Rochester, NY: 2006

Project Engineer: Mr. Detweiler assisted with the stream inspection and stream water sampling to identify potential sources of bacterial contamination. Additional sampling of water from Lake Ontario was conducted

Eastman Kodak Company: Building Demolition Program—Rochester, NY: 1994

Project Geologist: Mr. Detweiler was the Project Geologist; responsibilities included health & safety oversight, OVA monitoring, drilling of test borings, soil classification, split spoon sampling, pre-demolition building material sampling and sample preparation.

Elder lee Inc.: Wetland Delineation—Oak Corners, NY: 2005

Project Engineer: Mr. Detweiler provided wetland delineation services on 92 acres at the existing Elderlee pipe plant facility in Oak Comers, NY. The property includes an open-water pond and several creeks. The boundary was determined with sample points and located boundary with boundary points flags with GPS.

SUNY Geneseo: Erie and Ontario Residence Halls—Geneseo, NY: 2003

Project Engineer: Mr. Detweiler performed asbestos sampling and inspection at both Erie and Ontario Residence Halls. A room-by-room survey was completed with collection of samples.

Fairport School District: Asbestos Assessment —Fairport, NY

Mr. Detweiler provided asbestos assessment and assisted in asbestos building inspections of four schools in the Fairport Central School District.

Ecology and Environment: Former Adirondack Steel—Colonie, NY: 2006

Land Surveyor Mr. Detweiler performed surveying services for a Remedial Investigation I Feasibility Study at the lOl-acre former Adirondack Steel site. Survey included establishing the property lines on several parcels of the property and mapping the test points. He also assisted in establishing right-of-ways for the adjoining NYS highway and railroad.

NYSDEC Voluntary

Cleanup Work Plan: Former Frink America property—Clayton, NY: 2004-05

Field Team Leader: Mr. Detweiler was the Field Team Leader who oversaw the test pits and borings used to delineate the horizontal extent of migration. During the borings, samples were taken for waste profiles to confirm the waste was non-hazardous. He took samples of the onsite cinders and black ash to determine appropriate disposal options. He installed three monitoring wells and eight test pits were dug. A report (RI/FS) identifying the vertical/horizontal extent of contaminant migration and evaluating appropriate remedial alternatives were completed. He oversaw all demolition and contractor activities. The project also included Aquifer testing, soil vapor sampling and the removal and disposal of 19,000 tons of contaminated soil. The Site was granted unrestricted use site classification following remediation.

Former Karenlee Drive Wastewater Treatment Plant:

Voluntary Cleanup Program—Henrietta, NY: 2004

Project Engineer: Mr. Detweiler provided oversight of the installation of seven monitoring wells, the collection of subsurface soil samples during the well installation, the collection of water samples from the installed wells and the collection of surface soil samples. He also provided coordination between NYSDEC and Town of Hemietta for this former waste water treatment plant.

Fort Drum Military Base: Unexploded Ordnance Range Clearance—Fort Drum, NY: 1994

Land Surveyor: Mr. Detweiler was a member of the Range Survey Support Team; responsibilities included initial project setup, coordination activities, on-site GPS survey assistance, Range 42 (40 mm grenade range), UXO clearance activities, ordinance identification/demolition, and scrap metal/ordinance collection and removal.

Farmington Mobile Home Park, Inc.: Fuel Oil Spill Response Oversight—Farmington, NY: 2007

Project Engineer: Mr. Detweiler provided coordination and oversight of fuel oil spill response at a residence in Farmington, NY. Services provided include correspondence with NYSDEC, the owner, Ontario County Health Department, excavation services and analytical laboratories. Soil, drinking water, and ground water analysis was performed. Mr. Detweiler provided oversight and documented and facilitated the spill closure process.

Gates-Chili School District: Wetland Delineation—Gates, NY: 2005

Project Engineer: Mr. Detweiler performed wetland delineation services for the Gates Chili Central School District. Wetland delineation on approximately ten acres of federal jurisdictional wetlands was performed for the proposed new school bus storage facility at the Neil Armstrong School at 3273 Lyell Road.

Genesee/Wyoming Counties: Flood Mitigation Studies, G-FLRPC—Genesee/Wyoming County, NY: 2003

Project Engineer: Mr. Detweiler evaluated known flood hazard areas and stream bank erosion areas, identified critical facilities and structures for ten communities in Tonawanda Creek and Oatka Creek watersheds. He also met with representatives from the municipalities to discuss historical flooding issues and future flood control plans.

Harris & Rainey Parcel: Phase II Environmental Site Investigation—Pittsford, NY: 2005

Project Engineer: Mr. Detweiler performed all the field activities for a Phase II Environmental Site Investigation. Surface oil samples surrounding the abandoned drum were tested to determine the absence or presence of volatile organic chemical vapors. Test pits were completed in the C&D landfill area. The samples were analyzed for volatile organics, semi-volatile organics, RCRA metals and PCBs to determine if it falls below the USEP A hazardous waste limits. The bulk samples for suspect asbestos containing materials were collected from the test pit excavation of the landfill area.

SUNY Plattsburgh, Hawkins Hall: Asbestos Building Inspection—Plattsburgh, NY: 2005

Project Engineer: Mr. Detweiler performed an asbestos survey and sampling of the attic of Hawkins Hall at SUNY Plattsburgh. Due to the illegal activities of an asbestos abatement contractor in 1997, the attic was contaminated with asbestos. NYS Office of General Services and SUNY Plattsburgh needed to determine the extent of contamination and determine the best course of action to decontaminate the attic space.

Hidden Valley Electronics Site: Soil Vapor Extraction System—Vestal, NY: 2005

Project Engineer: Mr. Detweiler installed a sub-slab ventilation/ soil vapor extraction (SVE) system at the referenced site to draw contaminated soil vapor from beneath the slab-on-grade floor of the main site building. Draw points were installed through the floor of the interior of the occupied building. There were four extraction wells and each consisted of a five-foot screened interval and was constructed of either steel or PVC depending on the on soil conditions and other factors. During installation of the vacuum wells, a groundwater sample was obtained using the Geoprobe “PRT System”. Four monitoring wells and four temporary vacuum monitoring points were installed to verify radial vacuum influence. The SVE system was installed at rear of building with vent piping connected to interior draw points. Floor penetrations were checked with a Dwyer Inc. manometer.

Hornell Industrial Development Corp.: Hornellsville South Yards Area ARC Survey—Steuben County, NY: 2005

Mr. Detweiler performed land surveying services for the Hornell Industrial Development Corporation for the South Yards ARC (Appalachia Regional Commission) project located in the City of Hornell and Town of Hornellsville. The project involved the design of a 740 LF extension of sanitary sewer and 340 LF water main extension as well as 3700’ of road reconstruction/ resurfacing and drainage ditch.

Ecology and Environment: Hudson River PCBs Superfund Site Cultural Resource Study/ Land Survey—Fort Edward to Albany, NY: 2003

Mr. Detweiler provided land surveying services on the Hudson River PCBs Superfund Site from Fort Edward to Albany, NY. He surveyed and mapped the sampling locations and site features for seven sites along the Hudson River. Prepared site-specific health and safety plans, provided baseline control for the archeological resource sampling survey conducted at each site, set stream gauges at seven locations. Additional control points were established on each site to monitor floodplain limits. The work was performed for the US Army Corps of Engineers.

Ithaca Journal Facility: Building Renovation Survey—Ithaca New York: 2002

Project Engineer: Mr. Detweiler provided asbestos project monitoring services and prepared report for a newspaper production facility in Central New York State.

Mark IV Enterprises: Jefferson Estates Subdivision, Construction Stakeout—Henrietta, NY: 2002

Mr. Detweiler performed land surveying services for Jefferson Estates, Section 3, in Henrietta, NY. Stakeout services included establishing horizontal and vertical control and construction stakeout. Included lot stakeout for individual house construction, utilities stakeout, topographic stakeout.

Village of Penn Yan: Lake Street, Commercial Ave., Florence Ave., and Walnut Street Water main Replacement Project—Penn Yan, NY: 2003

Mr. Detweiler provided surveying services for several water main replacements and upgrade projects in the Village ofPenn Yan.

Ecology and Environment: Leastman Landfill Phase II ESA—Murray, NY: 2000

Project Geologist: Mr. Detweiler served as Project Geologist/ Land Surveyor while performing preliminary site assessment of inactive landfill. He assisted Ecology & Environment with oversight of excavation of test trenches, installation of overburden and bedrock monitoring wells and soil and water sampling. He also served as land surveyor in location of all monitoring wells and test trenches.

MACTEC Engineering and Consulting: Ludlow Landfill Site Assistance—Paris, NY: 2006

Project Engineer: Mr. Detweiler provided field support with a landfill inspection at the NYSDEC site, Ludlow Landfill in Paris, New York in Oneida County. Mr. Detweiler was involved in low-flow groundwater sampling and landfill cap inspection.

Village of Penn Yan: Main Street—Penn Yan, NY: 2003

Land Surveyor Mr. Detweiler provided survey and mapping services for the Village of Penn Yan. The survey provided planimetric and topographic information. Utility information was added to the mapping and invert elevations of storm and sanitary sewers at manholes and catch basins were collected where accessible.

Wegmans: Indoor Air Quality, Mold and Bacteria Investigation—Rochester, NY: 2006

Project Engineer: Mr. Detweiler performed sampling for indoor air and bacteria testing at the Wegman's meat processing site in Monroe County, NY.

Midland Asphalt Materials: Pre-demolition Asbestos Building Survey—Lyons, NY: 2004

Project Engineer: Mr. Detweiler completed an asbestos pre-demolition survey for Midland Asphalt Materials in Lyons, NY. The project included inspection, sampling, laboratory analysis and preparation of a technical memorandum outlining asbestos containing materials and quantities.

Monoco Oil Company: Phase I and Limited Phase II— Pittsford, NY: 2000

Project Engineer: Mr. Detweiler conducted full Phase I and limited Phase II site investigation for this Superfund Site. He performed all record reviews, interviews, database searches, site inspections, and oversight of the excavation of test pits.

Monroe Community College Building 9: Asbestos Design & CA—Rochester, NY: 2007

Project Engineer: Mr. Detweiler performed an asbestos assessment with inspection and sampling for the demolition of Building 9.

Monroe Community College: Phase II Master Plan—Rochester, NY: 2002-2003

Project Engineer: Mr. Detweiler provided oversight of full shift on site project monitoring and assisted with asbestos sampling.

Monroe County Health & Social Services Building: Building Renovation Project—Henrietta, NY: 2004

Project Engineer: Mr. Detweiler conducted an asbestos site investigation, building inspection and emergency sampling at Monroe County Health and Social Services Building in Rochester, NY.

Ecology and Environment, Inc.: Moreau Dredge Spoil Disposal, Moreau, NY: 2006

Land Surveyor Mr. Detweiler performed surveying services at the Moreau Dredge Spoil site, a 16-acre NYSDEC site. Surveying included horizontal data for seven drilling boreholes, ten test pits, 25 surface soil sampling locations, ten surface water/ sediment sampling locations; both horizontal and vertical data for three onsite monitoring wells; and establishment of horizontal location of key site features such as roadways, former building foundations, railroad tracks, and other above ground appurtenances. Site base map and detailed field notes were provided to the client. Archeological Survey; Cutting line, lathe every 100.

Mumford Fire Hall: Tank Removal Project—Mumford, NY: 2006

Project Engineer: Mr. Detweiler was involved in project coordination, sample collection, excavation oversight, and analytical findings for this emergency tank and soils removal project.

Conkling and Calabrese, LLC: N. Main St., Fairport. NY: 2005

Project Engineer: Mr. Detweiler prepared a Remediation Work Plan, installed a SVE system and provided oversight of the operation and maintenance of SVE system. Once soil concentrations reached acceptable NYSDEC levels, the system was decommissioned. Wells, SGMP, Indoor Air.

USAF: Newport B-1605—Herkimer County, NY: 2002-2003

Project Engineer: Mr. Detweiler conducted Phase I and II Environmental Baseline Survey for the Rome Research Site. Manual soil sampling at drainage outfalls and geoprobing around Building 1605 at the Newport

Research Facility was intended to delineate subsurface petroleum contamination.

Village of Penn Yan: New Village Hall—Penn Yan, NY: 2003

Project Engineer: Mr. Detweiler performed asbestos predemolition building survey and sampling and provided historical review for SEQR application to cover the acquisition of the Penn Yan Tennis Club property, construction of the new Village Hall, and renovations to the existing Fire Hall and Police Station buildings.

NYSDEC: NYSDEC LeHigh Valley Railroad Spill Site—Rochester, NY: 1997-1998

Project Geologist: Mr. Detweiler was the Project Geologist/Health & Safety Officer, responsible for the installation of open bedrock extraction wells, vapor extraction pilot studies, Geoprobe and conventional drill rig and rock coring activities. As the project coordinator, he was also responsible for soil and rock classification and logging, bedrock and soil sampling, test boring locations and map generation. The project was a pilot study for bedrock vapor extraction. Packer Testing.

Ravi Engineering: NYSDOT Region 6,1-86—Allegany County, NY: 2006

Mr. Detweiler performed land surveying services on 1-86 in Allegany County as a subconsultant to Ravi Engineering under a term agreement with NYSDOT Region 6. The work entailed locating and mapping drill boring holes on 1-86.

OGS: Oil Removal at Finger Lakes DDSO, Newark, NY: 2005

Project Engineer: Mr. Detweiler provided oversight of oil removal, performed a subsurface investigation of existing soil and groundwater conditions in the area surrounding the USTs and Power House building. The subsurface investigation included 13 soil probe locations and installation of one temporary groundwater monitoring well. He also evaluated the soil around the tanks after all removal was completed.

City of Rochester: Orchard-Whitney Brownfield Investigation—Rochester, NY: 2006-Present

Project Engineer: Mr. Detweiler was the Project Geologist, provided environmental services for the Orchard-Whitney Brownfield site for the City of Rochester under the NYSDEC Environmental Restoration Program. Mr. Detweiler has conducted a Hazardous Materials Assessment within the former building structures, provided contractor oversight during hazardous materials removal, delineated contamination from former plating operations, conducted Community Air Monitoring, aquifer testing, installation of groundwater monitoring wells and oversight of test excavations. He also investigated and evaluated the removal of nine USTs. Remediated plating area.

Other Phase I ESAs

- 2008: Phase I ESA Update, Hammondsport Senior Housing, Hammondsport
- 2008: 1153 & 1157 Ridge Road, Phase I ESA, Webster, NY
- 2007: Campbell & Jay Street, Phase I ESAs, City of Rochester, NY
- 2007: 526-546 S. Clinton Avenue Phase I ESA, Rochester, NY
- 2007: 270 Lake Avenue Phase I ESA, Rochester, NY
- 2007: 1 Willowbank Place Phase I ESA, Rochester, NY
- 2006: Phase II ESA, 192 & 204 Chestnut Ridge, Chili, NY
- 2006: Grimes Glen, Phase I & II ESA, Naples, NY
- 2004: RRS, former Griffiss AFB, Phase I EBS, Rome, NY
- 2003: Sugar Creek/Truck Stop, Phase I & II ESA, Rochester, NY
- 2003: RRS, Newport B-1605, Phase I and II EBS, Newport, Herkimer County, NY
- 2003: Phase I ESA, Roseland Parcels, Canandaigua, NY
- 2003: Former Gypsum Supply, Phase I ESA, Henrietta, NY
- 2002: Power Pig, Phase I & II ESA, Sugar Creek Store, Rochester, NY
- 2002: Phase I ESA, Marion, NY
- 2000: Henrietta, Proposed DPW Facility, Phase I & II ESA, Town of Henrietta, NY
- Perinton Town Offices: Turk Hill Traffic Signal—Fairport, NY: 2004
- Mr. Detweiler performed land survey services on Turk Hill Road for the new Town Hall driveway traffic signal system for the Town of Perinton.

MACTEC Engineering & Consulting: Preferred Electric Motors site—Rochester, NY: 2006

Project Engineer: Mr. Detweiler provided assistance with Remedial Investigation/Feasibility Study (RI/FS) at NYSDEC Inactive Hazardous Waste Site, Preferred

Electric Motors site located in Rochester, NY. Tasks included preparation of a site-specific Health and Safety Plan, boundary and well survey, geophysical (magnetic and GPR) surveys, Geoprobe sampling, sediment/ soil/water sampling, soil/ gas sampling, indoor air/ SVI sampling, and utility stakeout.

USAF: RRS/IFOCV Former Griffiss AFB—Rome, NY: 2000-2003

Project Engineer: Mr. Detweiler conducted a Phase I Envirorunental Baseline Survey at a total of 12 buildings and seven parcels of land totaling approximately 67 acres at Griffiss Business and Technology Park, the former Griffiss Air Force Base, in Rome, NY. The scope of work included detailed investigations, conducted in accordance with applicable USAF and ASTM protocols, of existing site envirorunental conditions; property inspection with photoionization detector to test for volatile organic vapors; radon testing and lead based paint assessment in all buildings; and interviews with RRS personnel regarding past and current envirorunental conditions.

USAF: RRS/IFOCV Former Griffiss Air Force Base, Three Mile Creek—Rome, NY: 2003

Project Engineer: Mr. Detweiler performed land surveying Services, including cross-sections of Three Mile Creek and surrounding area on the former Griffiss Air Force Base. He also modified the Health and Safety Plan. This project was for the U.S. Army Corp of Engineers-Kansas City.

USAF: RRS/IFOCV, Continued Development of Air Quality—Compliance, NY: 2002

Project Engineer: Mr. Detweiler assisted in the preparation of annual Air Emissions Statement using APIMS computer program/ database for the continued development of the air quality program for the U.S. Air Force/ Rome Research Site. The facilities included the Griffiss Business and Technology Park, Stockbridge, and Newport (both Tanner Hill and Irish Hill). Work included field verification of emissions processes and equipment, as well as, interviewing responsible personnel.

Monroe County: Regional Traffic Operations Center—Rochester, NY: 2000

Project Geologist: Mr. Detweiler was the Project Geologist for the facility located at the Greater Rochester International Airport. As on-site geologist, tasks consisted of the monitoring of cleanup activities, installation of a SVE system, UST removals, the collection of samples, air monitoring, as well as oversight of the construction of a remedial bio-cell. Mr. Detweiler was the Chief Health and Safety Officer at the site during construction.

City of Rochester: Renaissance Square—Rochester, NY: 2005

Project Engineer: Mr. Detweiler conducted asbestos sampling and environmental assessment below the parking garage for the Renaissance Square Project in downtown Rochester

Developer Client: River Road 100 acres—Tonawanda, NY: 2005

Project Engineer: Mr. Detweiler provided oversight of drilling activities of twenty soil borings which were required to establish subsurface conditions and evaluate the geotechnical characteristics of site soils.

Rochester Gas & Electric: Environmental Assistant—Rochester, NY: 2001

Project Engineer: Mr. Detweiler provided multidisciplinary assistance to local utility company's environmental department on a long-term assignment. Responsibilities included generation of reports, including air emission statements and Phase I and II investigation reports, internal and external project coordination, and project oversight of investigation and remediation projects.

Rochester School for the Deaf: Embankment Survey—Rochester, NY: 2004

Land Surveyor Mr. Detweiler provided surveying services for the Rochester School for the Deaf in Rochester, NY for retaining wall/embankment monitoring. A baseline for measurements on a shale river gorge/embankment to determine slope stability was established. Eric assisted with the verification of the baseline location and checked the offset measurements to determine if the shale and/or the slope had moved.

NYSDOT: Route 17 Conversion to 1-86, Windsor to Hale Eddy—Broome & Delaware Counties, NY: 2003-2004

Project Engineer: Mr. Detweiler performed environmental studies of hazardous waste, wetlands, asbestos and water.

NYSDOT: Route 252 (Jefferson Road)—Henrietta, Brighton and Chili, Monroe County, NY: 2000

Project Engineer: Mr. Detweiler identified wetlands, hazardous waste, and completed soil borings for hazardous waste assessment for the reconstruction of 5.5 miles ofNYS Route 252.

NYSDOT: Route 1-490 from the Erie Canal to the Genesee River and Bridges—Rochester, NY: 12/01,2/03-3/03

Project Engineer: Mr. Detweiler provided oversight during soil boring program for Troup-Howell Bridge replacement, I-490 reconstruction. Oversaw GeoProbe boring installations, sampled soil analyzed, oversaw geophysical survey. He also provided drilling (geoprobing) oversight for earlier phases of boring installations along I-490 (at Valeo, near Inner Loop). All boring activities were developed in an attempt to identify potentially hazardous/contaminated soils prior to construction.

URS: Smith-Corona Site Vapor Intrusion Study— Cortlandville, NY: 2006

Project Engineer: Mr. Detweiler performed soil vapor intrusion sampling as part of this project to conduct site assistance to help complete a vapor intrusion study associated with the Smith-Corona NYSDEC IHWS located in Cortlandville, NY.

URS: Stuart/Olver-Holtz Building Demolition—Henrietta, NY: 2005

Project Engineer: Mr. Detweiler was the Site Quality Control Officer and provided inspection services for the demolition of a former metal finishing facility (Stuart/Olver-Holtz), which was an Inactive Hazardous Waste Site. Mr. Detweiler was on site for all demolition and activities.

Ecology and Environment: Sweden-Chapman Landfill ESA—Sweden, NY: 2002

Project Geologist: Mr. Detweiler was the Field Geologist; provided drilling oversight, well development, sampling and testing, and general field assistance. Well installations involved penetrating the synthetic cover. SUNY Brockport: McLean Hall Renovation—Brockport, NY: 2002 Project Engineer: Mr. Detweiler provided air and project monitoring services, inspection services and submittal review for this asbestos abatement project. On-sitemonitoring services included daily abatement inspection of work areas. Reviewed and approved all submittals, shop drawings, schedules and samples from the asbestos abatement contractor.

Town of Henrietta Department of Public Works: DPW Garage Spill Remediation—Henrietta, NY: 2000

Project Engineer: Mr. Detweiler provided project oversight and coordination of the installation and operation of SVE System. Activities included SVE system design, well installation oversight,SVE system installation, and sample collection.

Townsend Oil Bulk Storage Facility — Hopewell, NY

Land Surveyor: Mr. Detweiler performed land surveying services including utility and drainage stakeout for the site design of a 15-acre parcel of the Hopewell bulk storage facility for Townsend Oil.

Ultrafab: Site Improvements Project—Farmington, NY: 2004-05

Land Surveyor Mr. Detweiler provided surveying and stakeout services for on-site improvements for the warehouse expansion, parking lot and stormwater management facility at Ultrafab, Inc. in Farmington, NY.

Ultralife Batteries: Phase II ESA—Newark, NY: 2001

Project Geologist: Mr. Detweiler was the Project Geologist/ Coordinator for Phase II investigation. Activities included oversight of soil boring program, soil classification and sampling, monitoring well installation and development, slug testing and interpretation, water sampling and generation of investigation report.

USACE Rapid Response Project: Northeastern Industrial Park—Albany, NY: 1998

Project Engineer: Mr. Detweiler was responsible for all mobilization activities, test pit installations, soil classifications, soil sampling, as well as the coordination and oversight of transportation and disposal activities and submittal of the final report.

USACE Rapid Response PCB Decontamination Project: USAF Plant #85—Columbus, Ohio: 1996-1997

Project Geologist: Mr. Detweiler was the Project Geologist/ Sampling Program Coordinator; responsibilities included development of sampling plans, project coordination, extensive PCB wipe sampling, sample preparation and shipment, photo documentation, analytical coordination, waste water treatment, sample documentation, and map generation.

USACE Rapid Response Selma Pressure Treatment Superfund Site: Remedial Investigation—Selma, CA: 1994

Project Geologist: Mr. Detweiler was a Project Geologist; responsibilities included oversight of CME85 mud-rotary drilling, continuous soil classification of test borings, well installations groundwater sampling, field analysis, subsurface interpretation and correlation of groundwater aquifers. He also conducted pump testing of monitoring wells.

USACE Rapid Response Project: Seneca Army Depot—Romulus, NY: 1994-Mid 1995

Field Technician: Mr. Detweiler was Field Technician, responsible for sampling activities including soil, surface water, groundwater and air. He also conducted continuous real-time air monitoring, recorded daily meteorological data, and performed general maintenance, calibration, and repairs on all instruments. Additional responsibilities included the operation of a wastewater treatment system and submittal of final project report.

USX Bendix Site: Landfill Monitoring and Inspection—Elmira, NY: 1996-1997

QA/QC Officer Mr. Detweiler was the Interim QA/QC Officer; responsibilities included soil tracking, ensuring compliance with work plan specifications, general organization of all daily logs/operations, and oversight of all site activities. He also coordinated and performed annual groundwater sampling and land fill cap inspection.

OKAR Equipment: NYSDEC VCP Investigation Former Churchville Ford Site—Churchville, NY: 2006-2013

Project Engineer: Mr. Detweiler conducted subsurface investigation to identify the nature and extent of contamination. Field work included groundwater investigation, residential well survey, a topographic survey, installation of monitoring wells, sampling and testing of site wells, aquifer testing and analysis, sediment/soil sampling, and development of a remedial work plan. A remedial investigation report was written and provided oversight of in-situ chem ox injection as an IRM.

NYSDOH: Wadsworth Center Griffin Labs Freezer Repository—Slingerlands, NY: 2003-2004

Land Surveyor Mr. Detweiler assisted with a topographic survey for a 7,500 sq. ft. building (Freezer Repository) to be constructed at the Wadsworth Center's Griffin Laboratories in Slingerlands, NY.

Water District Extension — Town of Chili, NY

Land Surveyor: Mr. Detweiler performed topographic drainage surveys in 2000 and 2003 for the project that included the creation of two extensions to the existing Chili Water District and the engineering design of the new water mains with the extensions.

Wendy's-Tim Horton's: Construction Stakeout—Canandaigua, NY: 2004

Land Surveyor: Mr. Detweiler performed a survey stakeout for a new combined Wendy's and Tim Horton's restaurant in Canandaigua, NY.

Western New York Children's Psychiatric Center,: Asbestos Lead Management Plan—West Seneca, NY: 2001

Project Engineer: Mr. Detweiler performed asbestos and lead inspection to assist in the development of an Asbestos and Lead Management Plan.

APPENDIX 3

Site Health and Safety Plan

Site Health and Safety Plan

Location:

Old Palmyra Landfill
Garnsey Road
Palmyra, New York 14522

Prepared For:

Town of Palmyra
1180 Canandaigua Road
Palmyra, New York 14522

LaBella Project No. 2191764

March 2020

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SITE HEALTH AND SAFETY PLAN

Project Title:	Site Characterization Work Plan – Old Palmyra Landfill
Project Number:	2191764
Project Location (Site):	Garnsey Road, Palmyra, NY
Environmental Director:	To Be Determined
Project Manager:	To Be Determined
Site Safety Supervisor:	To Be Determined
Site Contact:	Mr. Ken Miller
Safety Director:	To Be Determined
Proposed Date(s) of Field Activities:	To Be Determined
Site Conditions:	6.8± acres; Site is currently undeveloped land.
Site Environmental Information Provided By:	❑ *Hydrogeologic Investigation at the Palmyra Landfill Site*, completed by Parsons, May 2018 ❑ *Records Search Report*, completed by LaBella, November 2019
Air Monitoring Provided By:	To Be Determined
Site Control Provided By:	Contractor(s)

EMERGENCY CONTACTS

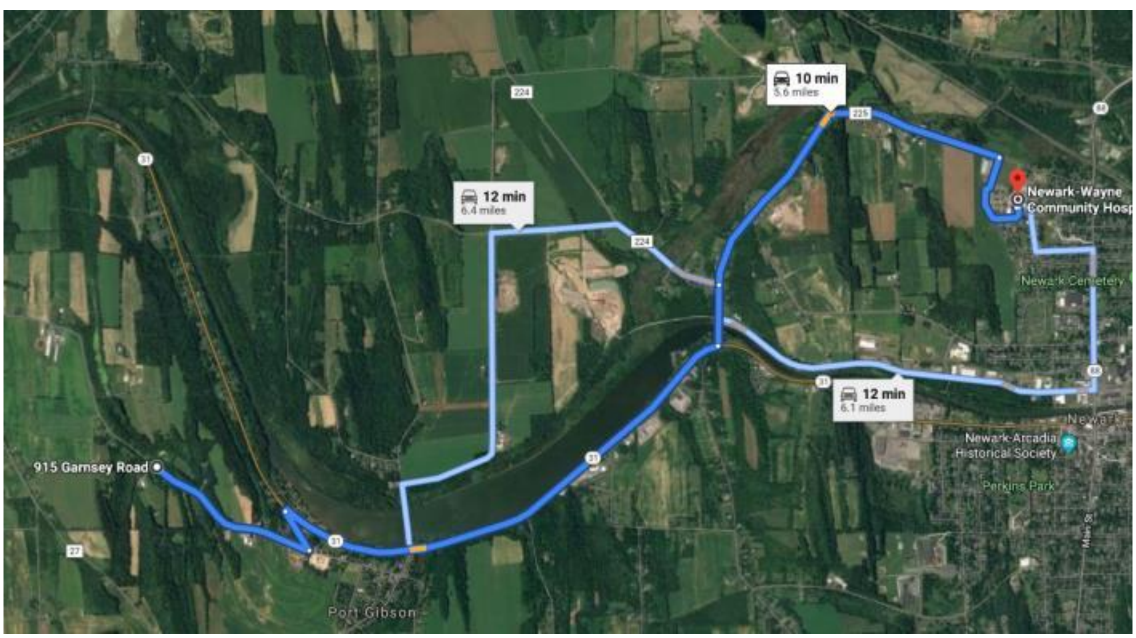
	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Newark-Wayne Community Hospital	315-332-2022
Poison Control Center:	Finger Lakes Poison Control	716-275-5151
Police (local, state):	Palmyra Police Department	911
Fire Department:	Village of Palmyra Fire Department	911
Site Contact:	Mr. Ken Miller	315-597-2324
Agency Contact:	NYSDEC – Ms. Brittany O'Brien	518-402-9676
Environmental Director:	To Be Determined	To Be Determined
Project Manager:	To Be Determined	To Be Determined
Site Safety Supervisor:	To Be Determined	To Be Determined
Safety Director	To Be Determined	To Be Determined

MAP AND DIRECTIONS TO THE MEDICAL FACILITY - NEWARK-WAYNE COMMUNITY HOSPITAL

Total Est. Time: 10 minutes **Total Est. Distance:** 5.6 miles

1:	Start out going SOUTHEAST on GARNSEY RD toward GREIG ST/OLD RTE 31	0.8 miles
2:	Turn SHARP LEFT onto GREIG ST/OLD RTE 31	0.2 miles
3:	Turn SHARP RIGHT onto NY-31 E	2.2 miles
4:	Turn LEFT onto WHITBECK RD	0.3 miles
5:	Continue onto STEBBINS RD	0.9 miles
6:	Turn RIGHT onto TELLIER RD	0.8 miles
7:	Turn RIGHT onto SUNSET DR	0.4 miles
8:	Turn LEFT onto DRIVING PARK AVE	46 feet

End at **1200 Driving Park Ave**
Newark, NY 14513



1.0 Introduction

The purpose of this Health and Safety Plan (HASP) is to provide guidelines for responding to potential health and safety issues that may be encountered during the Site Characterization (SC) at the Old Palmyra Landfill, Garnsey Road in the Town of Palmyra, Wayne County, New York (Site). This HASP only reflects the policies of LaBella Associates D.P.C. The requirements of this HASP are applicable to all approved LaBella personnel at the work site. This document's project specifications, and the Community Air Monitoring Plan (CAMP) are to be consulted for guidance in preventing and quickly abating any threat to human safety or the environment. The provisions of this HASP do not replace or supersede any regulatory requirements of the USEPA, NYSDEC, OSHA, or other regulatory bodies.

2.0 Responsibilities

This HASP presents guidelines to minimize the risk of injury to project personnel, and to provide rapid response in the event of injury. The HASP is applicable only to activities of approved LaBella personnel and their authorized visitors. The Project Manager shall implement the provisions of this HASP for the duration of the project. It is the responsibility of LaBella employees to follow the requirements of this HASP, and all applicable company safety procedures.

3.0 Activities Covered

The activities covered under this HASP are limited to the following:

- Management of environmental investigation and remediation activities
- Environmental Monitoring
- Collection of samples
- Management of excavated soil and fill

4.0 Work Area Access and Site Control

The contractor(s) will have primary responsibility for work area access and site control.

5.0 Potential Health and Safety Hazards

This section lists some potential health and safety hazards that project personnel may encounter at the project site and some actions to be implemented by approved personnel to control and reduce the associated risk to health and safety. This is not intended to be a complete listing of any and all potential health and safety hazards. New or different hazards may be encountered as site environmental and site work conditions change. The suggested actions to be taken under this plan are not to be substituted for good judgment on the part of project personnel. At all times, the Site Safety Officer has responsibility for site safety and their instructions must be followed. A tailgate meeting should be conducted at the beginning of each work day to review potential health and safety hazards at the Site.

5.1 *Hazards Due to Heavy Machinery*

Potential Hazard:
Heavy machinery including trucks, drilling rigs, trailers, excavators, etc. will be in operation at the site. The presence of such equipment presents the danger of being struck or crushed. Use caution when working near heavy machinery.

Protective Action:
Make sure that operators are aware of your activities, and heed operator's instructions and warnings. Wear bright colored clothing and walk safe distances from heavy equipment. A hard hat, safety glasses and steel toe shoes are required. Site workers shall be aware of work zones where machinery is in operation. When a spotter is not used, anyone entering the work zone of machinery shall make eye contact with the machine operators and signal their intentions of entering and exiting the work zone.

5.2 *Excavation Hazards*

Potential Hazard:
Excavations and trenches can collapse, causing injury or death. Edges of excavations can be unstable and collapse. Toxic and asphyxiant gases can accumulate in confined spaces and trenches. Excavations that require working within the excavation will require air monitoring in the breathing zone (refer to Section 9.0).

Excavations left open create a fall hazard which can cause injury or death.

Protective Action:
Personnel must receive approval from the Project Manager to enter an excavation for any reason. Subsequently, approved personnel are to receive authorization for entry from the Site Safety Officer. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped. Additional personal protective equipment may be required based on the air monitoring.

Personnel should exercise caution near all excavations at the site as it is expected that excavation sidewalls will be unstable. Do not proceed closer than 3 feet to an unsupported or non-sloped excavation side wall.

Fencing and/or barriers accompanied by "no trespassing" signs should be placed around all excavations when left open for any period of time when work is not being conducted.

5.3 *Cuts, Punctures and Other Injuries*

Potential Hazard:
In any excavation and construction work site there is the potential for the presence of sharp or jagged edges on rock, metal materials, and other sharp objects. Serious cuts and punctures can result in loss of blood and infection.

Protective Action:
The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. The Site Safety Officer is responsible for arranging the transportation of authorized on-site personnel to medical facilities when First Aid treatment in not sufficient. Do not move

seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager. Serious injuries are to be reported immediately to the Site Safety Office.

5.4 Injury Due to Exposure of Chemical Hazards

Potential Hazards:
Contaminants identified in testing locations at the Site include various petroleum-related volatile organic compounds (VOCs) and chlorinated-volatile organic compounds (CVOCs). Volatile organic vapors, chlorinated solvents or other chemicals may be encountered during subsurface activities at the project work site. Inhalation of high concentrations of volatile organic vapors can cause headache, stupor, drowsiness, confusion and other health effects. Skin contact can cause irritation, chemical burn, or dermatitis.

Protective Action:
The presence of organic vapors may be detected by their odor and by monitoring instrumentation. Approved employees will not work in environments where hazardous concentrations of organic vapors are present. Air monitoring (refer to Section 9.0) of the work area will be performed at least every 60 minutes or more often using a Photoionization Detector (PID). Personnel are to leave the work area whenever PID measurements of ambient air exceed 25 ppm consistently for a 5 minute period. In the event that sustained total volatile organic compound (VOC) readings of 25 ppm are encountered personnel should upgrade personal protective equipment to Level C (refer to Section 8.0) and an Exclusion Zone should be established around the work area to limit and monitor access to this area (refer to Section 6.0).

5.5 Injury Due to Exposure of Asbestos-Containing Material (ACM)

Potential Hazards:
Contaminants identified by historical records for the Site include asbestos-containing material (ACM) disposed of at the Site. The types of asbestos disposed of at the Site are unknown, but it is assumed that there may be areas where friable asbestos was disposed of. Inhalation of friable asbestos fibers can lead to asbestosis, lung cancer, and mesothelioma.

Protective Action:
The presence of ACM may be detected by visual methods by an asbestos project monitor (APM). The APM will possess valid certifications and a company license issued by the New York State Department of Labor (NYSDOL). During all intrusive work, air monitoring (refer to Section 9.0) of the work area will be performed. Personnel should perform the work in such a manner that dust is not generated during intrusive work. An APM will be on-Site at all times to monitor all intrusive work for the presence of ACM. If ACM is encountered during intrusive work, the APM will stop all work, any ACM will be placed back into the excavation without generating dust, and work procedures will be re-evaluated.

5.6 Injuries due to extreme hot or cold weather conditions

Potential Hazards:
Extreme hot weather conditions can cause heat exhaustion, heat stress and heat stroke or extreme cold weather conditions can cause hypothermia.

Protective Action:

Precaution measures should be taken such as dress appropriately for the weather conditions and drink plenty of fluid. If personnel should suffer from any of the above conditions, proper techniques should be taken to cool down or heat up the body and taken to the nearest hospital if needed.

6.0 Work Zones

In the event that conditions warrant establishing various work zones (i.e., based on hazards - Section 5.0), the following work zones should be established:

Exclusion Zone (EZ):
The EZ will be established in the immediate vicinity and adjacent downwind direction of site activities that elevate breathing zone VOC concentrations to unacceptable levels based on field screening. These site activities include contaminated soil excavation and soil sampling activities. If access to the site is required to accommodate non-project related personnel then an EZ will be established by constructing a barrier around the work area (yellow caution tape and/or construction fencing). The EZ barrier shall encompass the work area and any equipment staging/soil staging areas necessary to perform the associated work. The contractor(s) will be responsible for establishing the EZ and limiting access to approved personnel. Depending on the condition for establishing the EZ, access to the EZ may require adequate PPE (e.g., Level C).

Contaminant Reduction Zone (CRZ):
The CRZ will be the area where personnel entering the EZ will don proper PPE prior to entering the EZ and the area where PPE may be removed. The CRZ will also be the area where decontamination of equipment and personnel will be conducted as necessary.

7.0 Decontamination Procedures

Upon leaving the work area, approved personnel shall decontaminate footwear as needed. Under normal work conditions, detailed personal decontamination procedures will not be necessary. Work clothing may become contaminated in the event of an unexpected splash or spill or contact with a contaminated substance. Minor splashes on clothing and footwear can be rinsed with clean water. Heavily contaminated clothing should be removed if it cannot be rinsed with water. Personnel assigned to this project should be prepared with a change of clothing whenever on site.

Personnel will use the contractor’s disposal container for disposal of PPE.

8.0 Personal Protective Equipment

Generally, site conditions at this work site require level of protection of Level D or modified Level D; however, air monitoring will be conducted to determine if up-grading to Level C PPE is required (refer to Section 9.0). Descriptions of the typical safety equipment associated with Level D and Level C are provided below:

Level D:
Hard hat, safety glasses, rubber nitrile sampling gloves, steel toe construction grade boots, etc.

Level C:
Level D PPE and full or ½-face respirator and tyvek suit (if necessary). [*Note: Organic vapor cartridges are to be changed after each 8-hours of use or more frequently.*]

9.0 Air Monitoring

According to 29 CFR 1910.120(h), air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection required for personnel working onsite. Air monitoring will consist at a minimum of the procedure listed below. Air monitoring instruments will be calibrated and maintained in accordance with the manufacturer's specifications.

The Air Monitor will utilize a photoionization detector (PID) to screen the ambient air in the work areas (drilling, excavation, soil staging, and soil grading areas) for total Volatile Organic Compounds (VOCs) and a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. Work area ambient air will generally be monitored in the work area and downwind of the work area. Air monitoring of the work areas and downwind of the work areas will be performed at least every 60 minutes using a PID and the DustTrak meter.

If sustained PID readings of greater than 25 ppm are recorded in the breathing zone, either personnel are to leave the work area until satisfactory readings are obtained or approved personnel may re-enter the work areas wearing at a minimum a ½ face respirator with organic vapor cartridges for an 8-hour duration (i.e., upgrade to Level C PPE). Organic vapor cartridges are to be changed after each 8-hour use or more frequently, if necessary. If PID readings are sustained, in the work area, at levels above 50 ppm for a 5 minute average, work will be stopped immediately until safe levels of VOCs are encountered or additional PPE will be required (i.e., Level B).

If downwind PID measurements reach or exceed 25 ppm consistently for a 5 minute period downwind of the work area, PID readings will be taken within the buildings (if occupied) on Site to ensure that the vapors are not penetrating any occupied building and effecting the personnel working within. If the PID measurements reach or exceed 25 ppm within the nearby buildings, the personnel should be evacuated via a route in which they would not encounter the work area. The building should then be ventilated until the PID measurements within the building are at or below background levels. It should be noted that the site buildings are currently vacant.

10.0 Emergency Action Plan

In the event of an emergency, employees are to turn off and shut down all powered equipment and leave the work areas immediately. Employees are to walk or drive out of the Site as quickly as possible, wait at the assigned 'safe area' and follow the instructions of the Site Safety Officer.

Employees are not authorized or trained to provide rescue and medical efforts. Rescue and medical efforts will be provided by local authorities.

11.0 Medical Surveillance

Medical surveillance will be provided to all employees who are injured due to overexposure from an emergency incident involving hazardous substances at this site.

12.0 Employee Training

Personnel who are not familiar with this site plan will receive training on its entire content and organization before working at the Site.

Individuals involved with the remedial investigation must be 40-hour OSHA HAZWOPER trained with current 8-hour refresher certification.

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Table 1
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL (ppm)(b)	LEL (%)(e)	UEL (%)(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69
Anthracene	.2	.2	NA	NA	NA	NA	Faint aromatic	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	.096	10.07
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07
Ethyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100	100	NA	1.0	6.7	2,000	Ether	2.3	8.76
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol	400	200	500	2.0	12.7	2,000	Rubbing alcohol	3	10.10
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	50	NA	12	23	5,000	Chloroform-like	10.2	11.35
Naphthalene	10, Skin	10	NA	0.9	5.9	250	Moth Balls	0.3	8.12
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphoric Acid	1	1	3	NA	NA	10,000	NA	NA	NA
Polychlorinated Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium Hydroxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane	NA	NA	NA	NA	NA	NA	Sweet	NA	NA
Toluene	100	100	NA	0.9	9.5	2,000	Sweet	2.1	8.82
Trichloroethylene	100	50	NA	8	12.5	1,000	Chloroform	1.36	9.45
1,2,4-Trimethylbenzene	NA	25	NA	0.9	6.4	NA	Distinct	2.4	NA
1,3,5-Trimethylbenzene	NA	25	NA	NA	NA	NA	Distinct	2.4	NA
Vinyl Chloride	1	1	NA	NA	NA	NA	NA	NA	NA
Xylenes (o,m,p)	100	100	NA	1	7	1,000	Sweet	1.1	8.56
Metals									
Arsenic	0.01	0.2	NA	NA	NA	100, Ca	NA	NA	NA
Cadmium	0.2	0.5	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1	0.5	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.15	NA	NA	NA	700	NA	NA	NA
Mercury	0.05	0.05	NA	NA	NA	28	NA	NA	NA
Selenium	0.2	0.02	NA	NA	NA	Unknown	NA	NA	NA

(a) Skin = Skin Absorption
(b) OSHA-PEL Permissible Exposure Limit (flame weighted average, 8-hour): NIOSH Guide, June 1990
(c) ACGIH – 8 hour time weighted average from Threshold Limit Values and Biological Exposure Indices for 2003.
(d) Metal compounds in mg/m3
(e) Lower Exposure Limit (%)
(f) Upper Exposure Limit (%)
(g) Immediately Dangerous to Life or Health Level: NIOSH Guide, June 1990.

Notes:
1. All values are given in parts per million (PPM) unless otherwise indicated.
2. Ca = Possible Human Carcinogen, no IDLH information.

APPENDIX 4

Quality Control Program

LaBella
Powered by partnership.

Quality Control Program (QCP)

Site Location:

Old Palmyra Landfill
Garnsey Road
Palmyra, New York 14522

April 2020

300 State Street, Suite 201 | Rochester, NY 14614 | p 585-454-6110 | f 585-454-3066
www.labellapc.com

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1.0 Introduction

LaBella's Quality Control Program (QCP) is an integral part of its approach to environmental investigations. By maintaining a rigorous QC program, our firm is able to provide accurate and reliable data. This QCP should be followed during implementation of environmental investigation and remediation projects and should serve as a basis for quality control methods to be implemented during field programs. Project-specific requirements may apply.

The QC program contains procedures which allow for the proper collection and evaluation of data and documents that QC procedures have been followed during field investigations. The QC program presents the methodology and measurement procedures used in collecting quality field data. This methodology includes the proper use of equipment, documentation of sample collection, and sample handling procedures.

Procedures used in the firm's QC program are compatible with federal, state, and local regulations, as well as, appropriate professional and technical standards.

This QC program includes the following:

- QC Objectives and Checks
- Field Equipment, Handling, and Calibration
- Sampling and Logging Techniques
- Sample Handling, Packaging, and Shipping
- Laboratory Requirements and Deliverables

It should be noted that project-specific work plans (e.g., Remedial Investigation Work Plans) may have project specific details that will differ from the procedures in this QC program. In such cases, the project-specific work plan should be followed (subsequent to regulatory approval).

The characteristics of major importance for the assessment of generated data are accuracy, precision, completeness, representativeness, and comparability. Application of these characteristics to specific projects is addressed later in this document. The characteristics are defined below.

1.1 Accuracy

Accuracy is the degree of agreement of a measurement or average of measurements with an accepted reference or "true" value and is a measure of bias in the system.

1.2 Precision

Precision is the degree of mutual agreement among individual measurements of a given parameter.

1.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

1.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition

Careful choice and use of appropriate methods in the field will ensure that samples are representative. This is relatively easy with water or air samples since these components are homogeneously dispersed. In soil and sediment, contaminants are unlikely to be evenly distributed, and thus it is important for the sampler and analyst to exercise good judgment when removing a sample.

1.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another. The data sets may be inter- or intra- laboratory.

2.0 Measurement of Data Quality

2.1 Accuracy

Accuracy of a particular analysis is measured by assessing its performance with "known" samples. These "knowns" take the form of EPA standard reference materials, or laboratory prepared solutions of target analytes spiked into a pure water or sample matrix. In the case of gas chromatography (GC) or GC/MS (mass spectrometry) analyses, solutions of surrogate compounds are used. These solutions can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination.

In each case the recovery of the analyte is measured as a percentage, correcting for analytes known to be present in the original sample if necessary, as in the case of a matrix spike analysis. For EPA supplied known solutions, this recovery is compared to the published data that accompany the solution.

For the firm's prepared solutions, the recovery is compared to EPA-developed data or the firm's historical data as available. For surrogate compounds, recoveries are compared to EPA CLP acceptable recovery tables.

If recoveries do not meet required criteria, then the analytical data for the batch (or, in the case of surrogate compounds, for the individual sample) are considered potentially inaccurate. The analyst or his supervisor must initiate an investigation of the cause of the problem and take corrective action. This can include recalibration of the instrument, reanalysis of the QC sample, reanalysis of the samples in the batch, or flagging the data as suspect if the problems cannot be resolved. For highly contaminated samples, recovery of the matrix spike may depend on sample homogeneity. As a rule, analyses are not corrected for recovery of matrix spike or surrogate compounds.

2.2 Precision

Precision of a particular analysis is measured by assessing its performance with duplicate or replicate samples. Duplicate samples are pairs of samples taken in the field and transported to the laboratory as distinct samples. Their identity as duplicates is typically not known to the laboratory. For most purposes, precision is determined by the analysis of replicate pairs (i.e., two samples prepared at the laboratory from one original sample). Often in replicate analysis the sample chosen for replication does not contain target analytes so that quantitation of precision is impossible. For EPA CLP analyses, replicate pairs of spiked samples, known as matrix spike/matrix spike duplicate samples, are used for precision studies. This has the advantage that two real positive values for a target analyte can be compared.

Precision is calculated in terms of Relative Percent Difference (RPD).

- Where X_1 and X_2 represent the individual values found for the target analyte in the two replicate analyses or in the matrix spike/matrix spike duplicate analyses.
- RPDs must be compared to the method RPD for the analysis. The analyst or his supervisor must investigate the cause of RPDs outside stated acceptance limits. This may include a visual inspection of the sample for non-homogeneity, analysis of check samples, etc. Follow-up action may include sample reanalysis or flagging of the data as suspect if problems cannot be resolved.
- During the data review and validation process, field duplicate RPDs are assessed as a measure of the total variability of both field sampling and laboratory analysis.

2.3 Completeness

Completeness for each parameter is calculated as follows:

- The firm's target value for completeness for all parameters is 100%. A completeness value of 95% will be considered acceptable. Incomplete results will be reported to the site managers. In planning the field sample collection, the site manager will plan to collect field duplicates from identified critical areas. This procedure should assure 100% completeness for these areas.

2.4 Representativeness

The characteristic of representativeness is not quantifiable. Subjective factors to be taken into account are as follows:

- The degree of homogeneity of a site;
- The degree of homogeneity of a sample taken from one point in a site; and

- The available information on which a sampling plan is based.

To maximize representativeness of results, sampling techniques and sample locations will be carefully chosen so that they provide laboratory samples representative of the site and the specific area. Within the laboratory, precautions are taken to extract from the sample bottle an aliquot representative of the whole sample. This includes premixing the sample and discarding pebbles from soil samples.

2.5 Comparability

Comparability of laboratory tests is ensured by utilizing only New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)- certified laboratories. This certification is the basis for demonstrating proficiency in testing requirements. Using ELAP certified laboratories will result in consistency amongst analytical data within a specific project and across projects.

3.0 Quality Control Targets

Target values for detection limit, percent spike recovery and percent "true" value of known check standards, and RPD of duplicates/replicates are included in the QCP, Analytical Procedures. Note that tabulated values are not always attainable. Instances may arise where high sample concentrations, non-homogeneity of samples, or matrix interferences preclude achievement of target detection limits or other quality control criteria. In such instances, the firm will report reasons for deviations from these detection limits or noncompliance with quality control criteria.

4.0 Soil Boring Advancement & Monitoring Well Installation Procedures

Soil and groundwater sampling shall be conducted in accordance with NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation dated May 3, 2010 and any Site-specific work plans.

Prior to drilling, all drill sites will be cleared with appropriate utility companies to avoid potential accidents relating to underground utilities. Utility drawings will be reviewed, if available.

4.1 Drilling Equipment and Techniques

<u>Direct Push Geoprobe Advanced Borings:</u>

Soil borings and monitoring wells will be advanced with a Geoprobe direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The Geoprobe utilizes a four to five-foot macrocore sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four or five-foot sections, and can be easily cut from the polyethylene sleeves for observation and sampling. The macrocore sampler will be decontaminated between boring locations using an alconox and water solution.

Prior to initiating drilling activities, the Macrocores, drive rods, and pertinent equipment, will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.

Test borings will be advanced with 2-inch (or larger) inside diameter (ID) direct push Macrocore through overburden soils. Drilling fluids, other than potable water will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

During the drilling, a properly calibrated photoionization detector (PID) will be used to screen soil cores retrieved from the Macrocores.

Direct Push Geoprobe advanced groundwater-monitoring wells typically utilize minimum 1.25-inch threaded flush joint PVC pipe with 0.010-in. slotted screen or pre-packed well screens. PVC piping used for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe.. All materials used to construct the wells will be NSF/ASTM approved. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well. Stainless steel wells or pre-packed PVC wells may be used if specified in the work plan and approved by the NYSDEC.

Hollow-Stem Auger Advanced Borings:

The drilling and installation of soil borings and monitoring wells will be performed using a rotary drill rig which will have sufficient capacity to perform 4 1/4-inch inside diameter (ID) hollow-stem auger drilling in the overburden, retrieve Macrocore or split-spoon samples, and perform necessary rock coring using NX, NQ, HQ or core barrel size as specified in the project-specific work plan. The borehole may be reamed up to 5 1/2-inch diameter prior to monitoring well installation as cased hole in the bedrock, or may be left as open bedrock hole, with regulatory concurrence. Equipment sizes and diameters may vary based on project-specific criteria. Any investigative derived waste generated during the advancement of soil borings and monitoring well installations will be containerized and characterized for proper disposal.

Prior to initiating drilling activities, the augers, rods, Macrocore, split spoons, and other pertinent equipment will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Steam cleaning activities will be performed in a designated on-site decontamination area. During and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.
Test borings will be advanced with 4 1/4-inch (ID) hollow stem augers through overburden, and cored with a NX, NQ, HQ or core barrel size as specified in the project-specific work plan sized diamond core barrels in competent rock, driven by truck-, track-, or trailer-mounted drilling

equipment. Alternative methods of drilling or equipment may be allowed or requested for project-specific criteria, but must be approved by the NYSDEC. Drilling fluids, other than water from a NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

During the drilling, a (PID) will be used to screen soils retrieved from the split spoons or Macrocores. In the event that headspace field screening is required to determine the presence of VOCs in soil samples, the following procedure will be utilized:

- Soils from core will be inserted into an airtight glass jar and/or disposable polyethylene bag, and the container will be sealed immediately
- After sealing the container, the soils will be shaken or kneaded for 10-15 seconds to release volatiles into the headspace of the sealed container
- The PID inlet will be inserted into the headspace of the airtight container to screen soil samples for VOCs

During the drilling, visual screening will be utilized to identify any Non-Aqueous Phase Liquid (NAPL) in the soil cores.

Where bedrock wells are required, test borings shall be advanced into rock with NX, NQ, HR (or similar) coring tools. Only water from an approved source shall be used in rock coring. The consultant shall monitor and record the petrology, core recovery, fractures, rate of advance, and water lost or produced in each test boring. The Rock Quality Determination (RQD) value shall be calculated for each 5-foot core. Each core shall be screened with a PID upon extraction. All core samples shall be retained and stored by the consultant in an approved wooden core box for a period of not less than one year.

The method selected may be percussion or rotary drilling. The method and equipment selected must be capable of penetrating the bedrock at each well location to a depth required by the work plan.

Bedrock well installation will involve construction of a rock socket in the weathered bedrock. The socket will be drilled into the top of rock (typically 1-ft. to 5-ft. into the top of rock) at each bedrock well location to allow a permanent steel casing to be grouted securely in place prior to completion of the well. The purpose for this is to provide a seal at the overburden/bedrock interface and into the upper bedrock surface, to prevent the entrance of overburden water into the bedrock. After the grout and casing have set up for a minimum of 12 hours, the remaining bedrock can be NX (or similar) cored through the steel casing to a depth determined by the project-specific work plan.

Bedrock wells will either be open coreholes in the rock or consist of threaded, flush-joint PVC piping. Construction will vary depending on the project and as such, specific construction of the wells will be detailed in the project-specific work plan. Bedrock wells which do utilized PVC piping for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe. All materials used to construct the wells will be NSF/ASTM approved.

Screen and riser sections shall be joined by flush-threaded coupling to form watertight unions that retain 100% of the strength of the casing. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well.

4.1.1 Artificial Sand Pack

When utilized, granular backfill will be chemically and texturally clean, inert, siliceous, and of appropriate grain size for the screen slot size and the host environment The sand pack will be installed using a tremie pipe, when possible (i.e., a tremie pipe may not fit into smaller, 2-in. diameter boreholes). When utilized, the well screen and casing will be installed, and the sand pack placed around the screen and casing to a depth extending at least 2-ft.. A pre-packed well screen may be used if pre-approved by the NYSDEC.

An artificial sand pack will not be utilized in bedrock wells without screens (i.e., open borehole wells).

4.1.2 Bentonite Seal

A minimum 2-ft. thick seal will be placed directly on top of the sand pack, and care will be taken to avoid bridging. In the event that Site geology does not allow for a 2-ft. seal (e.g., only 1-ft. of space remains between the top of the sand pack and ground surface), the remaining space in the annulus will be filled with bentonite.

4.1.3 Grout Mixture

Upon completion of the bentonite seal, the well may be grouted with a non-shrinking cement grout (e.g., Volclay^R) mix to be placed from the top of the bentonite seal to the ground surface. The cement grout shall consist of a mixture of Portland cement (ASTM C 150) and water, in the proportion of not more than 7 gallons of clean water per bag of cement (1 cubic foot or 94 pounds). Additionally, 3% by weight of bentonite powder may be added.

4.1.4 Surface Protection

At all times during the progress of the work, precautions shall be used to prevent tampering with or the entrance of foreign material into the well. Upon completion of the well, a suitable cap shall be installed to prevent material from entering the well. Where permanent wells are to be installed, the well riser shall be protected by a flush mounted road box set into a concrete pad or locking well cap for stick-up wells. A concrete pad, sloped away from the well, shall be constructed around the flush mount road box or stick-up casing at ground level.

Any well that is to be temporarily removed from service or left incomplete due to delay in construction shall be capped with a watertight cap.

4.2 Surveying

Coordinates and elevations will be established for each monitoring well and sampling location. Elevations to the closest 0.01 foot shall be used for the survey. These elevations shall be referenced to a regional, local, or project-specific datum. The location, identification, coordinates, and elevations of the wells will be plotted on maps with a scale large enough to show their location with reference to other structures at each site.

4.3 Well Development

After completion of the well, but not sooner than 24 hours after grouting is completed, development will be accomplished using pumping, bailing, or surge blocking. No dispersing agents, acids, disinfectants, or other additives will be used during development or introduced into the well at any other time. During development, water will be removed throughout the entire water column by periodically lowering and raising the pump intake (or bailer stopping point).

Development water will be either properly contained and treated as waste until the results of chemical analysis of samples are obtained or discharged on Site as determined by the Site-specific work plans and/or consultation with the NYSDEC representatives on Site.

The development process will continue until removal of a minimum of 110% of the water lost during drilling, three well volumes; whichever is greater, or as specified in the work plan. In the event that limited recharge does not allow for the recovery of all drilling water lost in the well or three (3) well volumes, the well will be allowed to stabilize to conditions deemed representative of groundwater conditions. Stabilization periods will vary by project but will be confirmed with the NYSDEC prior to sampling.

4.4 PFAS Soil Sampling Procedure

Soil samples for PFAS analysis will be collected using PFAS-Free equipment. Samples will be collected in bottleware provided by the laboratory. Because PFAS are found in numerous everyday items, the following special precautions will be taken during sampling activities:

- No use of Teflon®-containing materials (e.g., Teflon® tubing, bailers, tape, sample jar lid liners, plumbing paste).
- No use of low density polyethylene (LDPE)-containing materials.
- No Tyvek® clothing will be worn by samplers.
- Clothes treated with stain-resistant or rain-resistant coatings (e.g., Gortex®) will be not be worn by samplers.
- All clothing worn by sampling personnel must have been laundered multiple times.
- No fast food wrappers, disposable cups or microwave popcorn will be within the vicinity of the wells/ samples.
- There will be no use of chemical (blue) ice packs, aluminum foil, or Sharpies® within the vicinity of the wells/ samples.
- No use of sunscreen, insect repellants, cosmetic, lotions or moisturizers will be allowed by sampling personnel the day of sampling.
- If any of the above items are handled by the field personnel prior to sampling activities, field personnel will wash their hands thoroughly with soap and water prior to any sampling activities.
- Powder-free nitrile gloves will be worn during all sample collection activities.

Quality assurance/ quality control (QA/QC) samples for PFAS sampling will include one (1) field duplicate, one (1) matrix spike / matrix spike duplicates (MS/MSD) and one (1) equipment blank. The procedures and rationale for collecting these samples are described below.

- **Field duplicate** – Sample will be used to assess the variability in concentrations of samples from the same well due to the combined effects of sample processing in the field and laboratory as well as chemical analysis.

- **Matrix spike/matrix spike duplicate** – Sample will be used to provide information about the effect of the sample matrix on the design and measurement methodology used by the laboratory.

- **Equipment blank** – Sample will be collected to help identify possible contamination from sampling equipment (i.e., shovel, soil core, etc.).

PFAS samples will be submitted to Alpha Analytical Laboratories, which is an Environmental Laboratory Accreditation Program (ELAP) certified laboratory, for analysis of the full PFAS target analyte list (21 compounds listed in the NYSDEC Guidance) via modified USEPA Method 537 with a method detection limit not to exceed 1 ug/kg. Note, the laboratory utilized will be ELAP certified for PFOA and PFOS in drinking water by EPA method 537 or ISO 25101 as ELAP does not currently offer certification for PFAS compounds in matrices other than finished drinking water.

5.0 Geologic Logging and Sampling

At each investigative location, borings will be advanced through overburden using either a drill rig and hollow-stem auger or direct push technology (split spoons or Macrocore). Soils will be evaluated for visual and olfactory evidence of impairment (i.e., staining, odors, and elevated PID readings) by a qualified individual. Sampling devices will be decontaminated according to procedures outlined in the Decontamination section of this document. When utilized, split-spoon samplers will be driven into the soil using a minimum 140-pound safety hammer and allowed to free-fall 30-inches, in accordance with ASTM-D 1586-84 specifications. The number of blows required to drive the sampler each 6-inches of penetration will be recorded. When required, samples will be stored in the appropriate bottleware (refer to Section 10) until analysis or deemed unnecessary.

In the event that maximum design depth of investigation is reached and hydrogeologic conditions are not suitable for well installation, the maximum drilling depth may be revised.

Boulders and bedrock encountered during well installation may be cored by standard diamond-core drilling methods using an NX, NQ, HQ size core barrel or other if specified in the project-specific work plan. All rock cores recovered will be logged by a qualified individual, and stored in labeled wooden core boxes. The cores will be stored by the firm until the project is completed or for at least one year. Drilling logs will be prepared by a qualified individual who will be present during drilling operations. One copy of each field boring and well construction log and groundwater data, will typically be submitted as part of the investigation summary report (e.g., Remedial Investigation Report). The RQD value shall be calculated for each 5-foot section. Information provided in the logs shall include, but not be limited to, the following:

- Date(s), test hole identification, and project identification;
- Name of individual developing the log;
- Name of driller and assistant(s);
- Drill, make and model, auger size;
- Identification of alternative drilling methods used and justification thereof (e.g., rotary drilling with a specific bit type to remove material from within the hollow stem augers);
- Standard penetration test (ASTM D-1586) blow counts;
- Field diagram of each monitoring well installed with the depth to bottom of well/ screen, top of screen, length of riser, depth of steel casing, depths of sand pack, bentonite seal, grout, type of well completion etc.;
- Depth of each change of stratum;
- Identification of the material of which each stratum is composed, according to the USCS system or standard rock nomenclature, as appropriate;
- Depth interval from which each sample was taken, sample identification, and sample time;
- Depth at which hole diameters (bit sizes) change;
- Depth at which groundwater is encountered;
- Drilling fluid and quantity of water lost during drilling;
- Depth or location of any loss of tools or equipment;
- Depths of any fractures, joints, faults, cavities, or weathered zones

6.0 Groundwater Sampling Procedures

The groundwater in all new monitoring wells will be allowed to stabilize for at least 1week following development prior to sampling. Water levels will be measured to within 0.01 feet prior to purging and sampling. Sampling of each well will typically be accomplished in one of two ways; active or passive.

Active Sampling:

Active sampling includes bailing or pumping. Purging will be completed prior to active sampling if specified in the project-specific work plan. During purging, the following will be recorded in field books or groundwater sampling logs:

- date
- purge start time
- weather conditions
- presence of NAPL, if any, and approximate thickness
- pump rate
- pH
- dissolved oxygen

- temperature
- conductivity
- redox
- turbidity
- depth of well
- depth to water
- depth to pump intake
- purge end time
- volume of water purged

During low flow sampling, the water quality parameters including pH, conductivity, temperature, dissolved oxygen, redox, water level drawdown, and turbidity will be recorded at five (5) minute intervals. Samples will be collected after the parameters have stabilized for three (3) consecutive 5-minute intervals to within the specified ranges below:

- Water level drawdown (<0.3')
- Turbidity (+/- 10%, < 50-NTU for Metals Samples)
- pH (+/-0.1)
- Temperature (+/- 3%)
- Specific conductivity (+/- 3%)
- Dissolved Oxygen (+/- 10%)
- Oxidation reduction potential (+/- 10 millivolts)

<u>Passive Sampling:</u>

Groundwater samples will be collected via passive methods (i.e., no-purge) according to the following procedures and in the volumes specified in Table 10-1:

Samples will be collected via passive diffusion bag (PDB) samplers. PDB samplers are made of low-density polyethylene plastic tubing (typically 4 mil), filled with laboratory grade (ASTM Type II) deionized water and sealed at both ends.

- Pre-filled PDBs will not be stored for longer than 30 days and will be kept stored at room temperature in a sealed plastic bag until ready to use.
- PDBs filled in the field will be used immediately and not stored for future use.
- PDB samplers will only be used to collect groundwater samples which will be analyzed for VOCs.
- Mesh covers will be utilized for open rock holes as to not puncture the PDB and will be secured to the bag using zip-ties.
- PDB samplers will be deployed by hanging in the well at the depth(s) specified in the project-specific work plan. The depth at which the PDB is deployed will be recorded on the groundwater sampling form. The PDB samplers will be deployed at least 14 days prior to sampling;
- When transferring water from the PDB to sample containers, care will be taken to avoid agitating the sample, since agitation promotes the loss of volatile constituents;

- Gloves will be changed between collection of each PDB and tools used to open the PDB will be decontaminated with an alconox and potable water solution between each PDB;
- Any volume not used will be treated as investigation derived waste;
- Any observable physical characteristics of the groundwater (e.g., color, sheen, odor, turbidity) at the time of sampling will be recorded; and
- Weather conditions (i.e., air temperature, sky condition, recent heavy rainfall, drought conditions) at the time of sampling will be recorded.

6.1 PFAS Groundwater Sampling Procedure

Samples for PFAS will be collected using PFAS-Free equipment, specifically a dedicated disposable high density polyethylene (HDPE) or PVC bailers, and/or low-flow sampling equipment with PFAS-Free components. Samples will be collected in bottleware provided by the laboratory. Because PFAS are found in numerous everyday items, the following special precautions will be taken during sampling activities:

- No use of Teflon®-containing materials (e.g. Teflon® tubing, bailers, tape, sample jar lid liners, plumbing paste);
- No use of low density polyethylene (LDPE)-containing materials;
- No Tyvek® clothing will be worn by samplers;
- Clothes treated with stain-resistant or rain-resistant coatings (e.g., Gortex®) will not be worn by samplers;
- All clothing worn by sampling personnel must have been laundered multiple times;
- No fast food wrappers, disposable cups or microwave popcorn will be within the vicinity of the wells/samples;
- There will be no use of chemical (blue) ice packs, aluminum foil, or Sharpies® within the vicinity of the wells/samples;
- No use of sunscreen, insect repellants, cosmetics, lotions or moisturizers will be allowed by sampling personnel the day of sampling;
- If any of the above items are handled by the field personnel prior to sampling activities, field personnel will wash their hands thoroughly with soap and water prior to any sampling activities; and
- Powder-free nitrile gloves will be worn during all sample collection activities.

NYSDEC’s Technical Guidance for Site Investigation and Remediation (DER-10) specifies technical guidance applicable to DER’s remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices” specific to sampling for PFAS. These “best management practices” are presented below as media-specific sampling procedures, which will be adhered to as part of this project. Field sampling for PFAS performed under DER remedial programs will follow the appropriate procedures outlined for soils, sediments or other solids (Appendix B of NYSDEC’s “Guidelines for Sampling and Analysis of PFAS”, January 2020), non-potable groundwater (Appendix C of NYSDEC’s “Guidelines for Sampling and Analysis of PFAS”, January 2020), and surface water (Appendix D of NYSDEC’s “Guidelines for Sampling and Analysis of PFAS”, January 2020).

6.1.1 Sampling Protocols for PFAS in Soils, Sediments and Solids

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by NYSDEC's Division of Environmental Remediation. No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions:

- Stainless steel spoon
- Stainless steel bowl
- Steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two-step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water use for equipment decontamination will be verified in advance to be PFAS-free through laboratory analysis or certification. NYSDEC's PFAS sampling guidance document specifies that previous results of "non-detect" for PFAS from the UCMR3 water supply testing program are acceptable as verification.

Sampling Techniques

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

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

Shipping

Immediately place samples in a cooler maintained at 4 ± 2° Celsius using ice only. Cold packs are not acceptable and will not be used to maintain a stable cooler temperature.

Personal Protection Equipment (PPE)

For this sampling event, Level D PPE is anticipated to be appropriate. The sampler will wear nitrile gloves while conducting field work and handling sample containers. Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials will be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well-washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen. PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in field notes.

6.1.2 Sampling Protocols for PFAS in Monitoring Wells

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by NYSDEC's Division of Environmental Remediation. No sampling equipment components or sample containers will come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer. A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions:

- Stainless steel inertia pump with HDPE tubing
- Peristaltic pump equipped with HDPE tubing and silicone tubing
- Stainless steel bailer with stainless steel ball

- Bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

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

Sampling Techniques

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

Shipping

Immediately place samples in a cooler maintained at 4 ± 2° Celsius using ice only. Cold packs are not acceptable and will not be used to maintain a stable cooler temperature.

Personal Protection Equipment (PPE)

For this sampling event, Level D PPE is anticipated to be appropriate. The sampler will wear nitrile gloves while conducting field work and handling sample containers. Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials will be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well-washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen. PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in field notes.

6.1.3 Sampling Protocols for PFAS in Surface Water

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by NYSDEC's Division of Environmental Remediation. No sampling equipment components or sample containers will come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions:

- Stainless steel cup

Equipment Decontamination

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

Sampling Techniques

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

Personal Protection Equipment (PPE)

For this sampling event, Level D PPE is anticipated to be appropriate. The sampler will wear nitrile gloves while conducting field work and handling sample containers. Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials will be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well-washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen. PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in field notes.

Quality assurance/ quality control (QA/QC) samples for PFAS sampling will include field duplicates, matrix spike / matrix spike duplicates (MS/MSD) and equipment blanks. The procedures and rationale for collecting these samples are described below.

- **Field duplicate** – Sample will be used to assess the variability in concentrations of samples from the same well due to the combined effects of sample processing in the field and laboratory as well as chemical analysis. Field duplicates will be collected at a rate of one (1) field duplicate per sample batch, with a minimum frequency of one (1) duplicate per twenty (20) samples. The duplicate shall consist of an additional sample at a given location.

- **Matrix spike/matrix spike duplicate (MS/MSD)** – Sample will be used to provide information about the effect of the sample matrix on the design and measurement methodology used by the laboratory. MS/MSD samples will be collected at a rate of one (1) MS/MSD per sample batch, with a minimum frequency of one (1) MS/MSD per twenty samples. The MS/MSD shall consist of an additional two (2) samples at a given location and identified on the COC.

- **Equipment blank** – Sample will be collected to help identify possible contamination from sampling equipment (i.e., bailer). One equipment blank will be collected by pouring laboratory certified analyte-free deionized water over a bailer into the sample container. Equipment blank samples will be collected at a rate of one (1) sample per matrix per day that sampling is conducted, with a minimum frequency of one (1) equipment blank sample per twenty (20) samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory-provided PFAS-free water and passing the water over or through the sampling device and into laboratory-provided sample containers.

PFAS samples will be submitted to an Environmental Laboratory Accreditation Program (ELAP) certified laboratory for analysis of the full PFAS target analyte list (21 compounds listed in the NYSDEC Guidance) via modified USEPA Method 537 with a method detection limit not to exceed 2 ng/L in water or 0.5 µg/kg in soil/sediment/solids. Note, the laboratory utilized will be ELAP certified for PFOA and PFOS in drinking water by EPA method 537 or ISO 25101 as ELAP does not currently offer certification for PFAS compounds in matrices other than finished drinking water.

7.0 Soil Vapor Intrusion Sampling Procedures

Soil vapor intrusion (SVI) sampling is to be conducted in accordance with the *NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent updates. Tracer gas testing is to be conducted for sub-slab sampling points to ensure concentrations of the tracer gas are not detected in the sub-slab at greater than 10% of the concentration detected in the atmosphere. An outdoor air sample is to be collected at an upwind direction as a control. A building inventory should be completed to document building construction information and identify products that may be contributing to the levels in indoor air.

8.0 Field Documentation

8.1 Daily Logs/ Field Notebook

Daily logs are necessary to provide sufficient data and observations to enable participants to reconstruct events that occurred during the project and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. Daily logs may be kept in a project-specific notebook labelled with the project name/ number and contact information.

The daily log is the responsibility of the field personnel and will include:

- Name of person making entry;
- Start and end time of work;
- Names of team members on-site;
- Changes in required levels of personnel protection:
  - Level of protection originally used;
  - Changes in protection, if required; and
  - Reasons for changes.
- Air monitoring locations, start and end times, and equipment identification numbers;
- Summary of tasks completed;
- Summary of samples collected including location, matrix, etc.;
- Field observations and remarks;
- Weather conditions, wind direction, etc.;
- Any deviations from the work plan;
- Initials/ signature of person recording the information.

As with any data logbooks, no pages will be removed for any reason. If corrections are necessary, these must be made by drawing a single line through the original entry (so that the original entry can still be read) and writing the corrected entry alongside. The correction must be initialed and dated. Corrected errors may require a footnote explaining the correction.

Sample documents, forms, or field notebooks are not to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document. If an error is made on a document assigned to one individual, that individual may make corrections simply by crossing a line through the error and entering the corrected information. The incorrect information should not be obliterated. Any subsequent error discovered on a document should be corrected by the person who made the entry. All corrections must be initialed and dated.

8.2 Photographs

Photographs will be taken to document the work. Documentation of a photograph is crucial to its validity as a representation of an existing situation. Photographs should be documented with date, location, and description of the photograph.

9.0 Investigation Derived Waste

Purpose:

The purposes of these guidelines are to ensure the proper holding, storage, transportation, and disposal of materials that may contain hazardous wastes. Investigation-derived waste (IDW) included the following:

- Drill cuttings, drilling mud solids;
- Water produced during drilling;
- Well development and purge waters, unused PDB waters;
- Decontamination waters and associated solids;

IDW will be managed in substantial accordance with DER-10 and all applicable local, State and Federal regulations.

Procedure:

1. Contain all investigation-derived wastes in Department of Transportation (DOT)-approved 55-gallon drums, roll-off boxes, or other containers suitable for the wastes.
2. Place different media in separate drums (i.e., do not combine solids and liquids).
3. To the extent practicable, separate solids from drilling muds, decontamination waters, and similar liquids. Place solids within separate containers.
4. Transfer all waste containers to a staging area. Access to this area will be controlled. Waste containers must be transferred to the staging area as soon as practicable after the generating activity is complete.
5. Label all containers with regard to contents, origin, and date of generation. Use indelible ink for all labeling.
6. Collect samples for waste characterization purposes, use boring/well sample analytical data for characterization.
7. For wastes determined to be hazardous in character, be aware on accumulation time limitations. Coordinate the disposal of these wastes with the Owner and NYSDEC.
8. Dispose of investigation-derived wastes as follows;
    - Soil, water, and other environmental media for which analysis does not detect organic constituents, and for which inorganic constituents are at levels consistent with background, may be spread on-site (pending NYSDEC approval)

- or otherwise treated as a non-waste material.
- Soils, water, and other environmental media in which organic compounds are detected or metals are present above background will be disposed as industrial waste or hazardous waste, as appropriate. Alternate disposition must be consistent with applicable State and Federal laws.
- Personal protective equipment, disposable bailers, and similar equipment may be disposed as municipal waste, unless waste characterization results mandate disposal as industrial wastes

9. If waste is determined to be listed hazardous waste, it must be handled as hazardous waste as described above, unless a contained-in determination is accepted by the NYSDEC.

10.0 Decontamination Procedures

Sampling methods and equipment have been chosen to minimize decontamination requirements and to prevent the possibility of cross-contamination. Decontamination of equipment will be performed between discrete sampling locations. Equipment used to collect samples between composite sample locations will not require decontamination between collection of samples. All drilling equipment will be decontaminated after the completion of each drilling location. Special attention will be given to the drilling assembly and augers.

Split spoons and other non-disposable equipment will be decontaminated between each sampling location. The sampler will be cleaned prior to each use, by one of the following procedures:

- Initially cleaned of all foreign matter;
- Sanitized with a steam cleaner;

OR

- Initially cleaned of all foreign matter;
- Scrubbed with brushes in alconox solution;
- Triple rinsed; and
- Allowed to air dry.

Other sampling equipment including but not limited to low-flow sampling pumps, surface soil sampling trowel, water level meters, etc. will be decontaminated between sample location using an alconox solution. Consumables including gloves, tubing, bailers, string, etc. will be dedicated to one sample location and will not be reused.

11.0 Sample Containers

The containers required for sampling activities are pre-washed and ordered directly from a laboratory, which has the containers prepared in accordance with USEPA bottle washing procedures. The following tables detail sample volumes, containers, preservation and holding time for typical analytes.

Table 11-1
Groundwater Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	40-ml glass vial with Teflon-backed septum	Two (2); fill completely, no headspace	Cool to 4° C (ice in cooler), Hydrochloric acid to pH <2	14 days
Semi-volatile Organic Compounds (SVOCs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Polychlorinated biphenyls (PCBs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Metals	250-ml HDPE	One (1); fill completely	Cool to 4° C (ice in cooler) Nitric acid to pH <2	180 days (28 for mercury)
Cyanide	1,000-mL HDPE		Cool to 4° C (ice in cooler) Nitric acid to pH <2	14 days
1,4-Dioxane	40-ml glass vial with Teflon-backed septum	Three (3); fill completely, no headspace	Cool to 4° C (ice in cooler), Hydrochloric acid to pH <2	14 days
PFAS	250-mL HDPE, no Teflon	Two (2); fill completely	Cool to 4° C (ice in cooler), Trizma	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

TABLE 11-2
Soil Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days
VOCs via EPA 5035	40 mL vials with sodium bisulfate, methanol, and/or DI water	Three (3), 5 grams each	Cool to 4° C (ice in cooler)	2 days*
SVOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
PCBs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14/40 days
Metals	4-oz. glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	180 days (28 for mercury)
Cyanide	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days
1,4-Dioxane	40 mL vials with sodium bisulfate, methanol, and/or DI water	Three (3), 5 grams each	Cool to 4° C (ice in cooler)	2 days*
PFAS	8-oz HDPE, no Teflon	One (1); fill as completely as possible	Cool to 4° C (ice in cooler)	28 days

Note:
**Or freeze within holding time.*
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

Table 11-3
Air Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	1 – Liter Summa® Canister	One (1) 1-Liter 1.4- Liter for MS/MSD	N/A	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

12.0 Sample Custody and Shipment

12.1 Sample Identification

All containers of samples collected from the project will be identified using the following format on a label or tag fixed to the sample container:

AA-BB-CC-DD-EE

AA: This set of initials indicates an abbreviation for the Site from which the sample was collected.
BB This set of initials represents the type of sample (e.g., SB for soil boring and MW for monitoring well)
CC: These initials identify the unique sample location number.
DD: These initials identify the sample start depth (if soil sample)
EE These initials identify the sample end depth (if soil sample)

Each sample will be labeled, chemically preserved (if required) and sealed immediately after collection. To minimize handling of sample containers, labels will be filled out prior to sample collection when possible. The sample label will be filled out using waterproof ink and will be firmly affixed to the sample containers. The sample label will give the following information:

- Date and time of collection
- Sample identification
- Analysis required
- Project name/number
- Preservation

Sample tags attached to or affixed around the sample container must be used to properly identify all samples collected in the field. The sample tags are to be placed on the bottles so as not to obscure any QC lot numbers on the bottles; sample information must be printed in a legible manner using waterproof ink. Field identification must be sufficient to enable cross-reference with the logbook. For chain-of-custody purposes, all QC samples are subject to exactly the same custodial procedures and documentation as "real" samples.

12.2 Chain of Custody

This section describes standard operating procedures for sample identification and chain-of-custody to be utilized for all field activities. The purpose of these procedures is to ensure that the quality of the samples is maintained during their collection, transportation, and storage through analysis. All chain-of-custody requirements comply with standard operating procedures indicated in USEPA sample handling protocol.

Sample identification documents must be carefully prepared so that sample identification and chain-of-custody can be maintained and sample disposition controlled. Sample identification documents include:

- Field notebooks;
- Sample label; and
- Chain-of-custody records.

The primary objective of the chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is in custody if it is:

- In someone's physical possession;
- In someone's view;
- Locked up; or
- Kept in a secured area that is restricted to authorized personnel.

As few persons as possible should handle samples. Sample bottles will be obtained pre-cleaned from the laboratory. Sample containers should only be opened immediately prior to sample collection. The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under chain-of-custody rules. The sample collector will record sample data in the field notebook and/or field logs.

The chain-of-custody record must be fully completed in duplicate, using black carbon paper where possible, by the field technician who has been designated by the project manager as responsible for sample shipment to the appropriate laboratory for analysis. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations, etc.), the person completing the chain-of-custody record should note these constraints on the chain of custody.

12.3 Transfer of Custody and Shipment

The coolers in which the samples are packed must be accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on the chain-of-custody record. This record documents sample custody transfer.

Shipping containers must be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information are entered on the chain-of-custody.

All shipments must be accompanied by the chain-of-custody record identifying their contents. The original record accompanies the shipment. The other copies are distributed appropriately to the site manager.

12.4 Custody Seals

Custody seals are preprinted adhesive-backed seals. Sample shipping containers (coolers, cardboard boxes, etc., as appropriate) are sealed in as many places as necessary to ensure security. Seals must be signed and dated before shipment. On receipt at the laboratory, the custodian must check (and certify, by completing the package receipt log and LABMIS entries) that seals on boxes and bottles are intact. Strapping tape should be placed over the seals to ensure that seals are not accidentally broken during shipment.

13.5 Sample Packaging

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample packaging requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers.
- The label should not cover any bottle preparation QC lot numbers.
- All sample bottles are placed in a plastic bag and/or individual bubble wrap sleeves to minimize the potential for cross-contamination and breaking.
- Shipping coolers must be partially filled with packing materials and ice when required, to prevent the bottles from moving during shipment.
- The sample bottles must be placed in the cooler in such a way as to ensure that they do not directly come in contact with other samples. Ice will be added to the cooler to ensure that the samples reach the laboratory at temperatures no greater than 4°C.
- Any remaining space in the cooler should be filled with inert packing material. Under no circumstances should material such as sawdust, sand, etc., be used.
- A chain of custody record must be placed in a plastic bag inside the cooler. Custody seals must be affixed to the sample cooler.

13.6 Sample Shipment

Shipping containers are to be custody-sealed for shipment as appropriate. The container custody seal will consist of tape wrapped around the package and custody seals affixed in such a way that access to the container can be gained only by cutting the filament tape and breaking the seal. Chain of custody seals shall be placed on the container, signed, and dated prior to taping the container to ensure the chain of custody seals will not be destroyed during shipment. In addition, the coolers must also be labeled and placarded in accordance with DOT regulations if shipping medium and high hazard samples.

Field personnel will make arrangements for transportation of samples to the lab. The lab must be notified as early as possible regarding samples intended for Saturday delivery. The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling, and shipping hazardous materials are promulgated by the United States DOT in the Code of Federal Regulation, 49 CFR 171 through 177. All samples will be delivered to the laboratory and analyzed within the holding times specified by the analytical method for that particular analyte.

All chain-of-custody requirements must comply with standard operating procedures in the USEPA sample handling protocol.

13.7 Laboratory Custody Procedures

A designated sample custodian accepts custody of the shipped samples and verifies that the sample identification number matches that on the chain-of-custody record and traffic reports, if required. Pertinent information as to shipment, pickup, and courier is entered on the chain of custody or attached forms.

13.0 Deliverables

This section will describe laboratory requirement and procedures to be followed for laboratory analysis. Samples collected in New York State will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory. When required, analyses will be conducted in accordance with the most current NYSDEC Analytical Services Protocol (ASP). For example, ASP Category B reports will be completed by the laboratory for samples representing the final delineation of the Remedial Investigation, confirmation samples, samples to determine closure of a system, and correlation samples taken using field testing technologies analyzed by an ELAP-certified laboratory to determine correlation to field results. Data Usability Summary Reports will be completed by a third party for samples requiring ASP Category B format reports. Electronic data deliverables (EDDs) will also be generated by the laboratory in EQUIS format for samples requiring ASP Category B format reports.

NYSDEC DER-10 DUSR requirements are as follows:

a) Background. The Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data with the primary objective to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

    1. The development of the DUSR must be carried out by an experienced environmental scientists, such as the project Quality Assurance Officer, who is fully capable of conducting a full data validation. The DUSR is developed from:

        i. A DEC ASP Category B Data Deliverable; or

ii. The *USEPA Contract Laboratory Program National Functional Data Validation Standard Operating Procedures for Data Evaluation and Validation.*

2. The DUSR and the data deliverables package will be reviewed by DER staff. If full third party data validation is found to be necessary (e.g. pending litigation) this can be carried out at a later data on the same data package used for the development of the DUSR.

b) Personnel Requirements. The person preparing the DUSR must be pre-approved by DER. The person must submit their qualifications to DER documenting experience in analysis and data validation. Data validator qualifications are available on DEC's website identified in the table of contents.

c) Preparation of a DUSR. The DUSR is developed by reviewing and evaluating the analytical data package. In order for the DUSR to be acceptable, during the course of this review the following questions applicable to the analysis being reviewed must be answered in the affirmative.

1. Is the data package complete as defined under the requirements for the most current DEC ASP Category B or USEPA CLP data deliverables?
2. Have all holding times been met?
3. Do all the QC data; blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?
4. Have all of the data been generated using established and agreed upon analytical protocols?
5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?
6. Have the correct data qualifiers been used and are they consistent with the most current DEC ASP?
7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

d) Documenting the validation process in the DUSR. Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters, including data deficiencies, analytical protocol deviations and quality control problems are identified and their effect on the data is discussed.

14.0 Equipment Calibration

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations as well as criteria set forth in the applicable analytical methodology references. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Section 11 lists the major instruments to be used for sampling and analysis. In addition, brief descriptions of calibration procedures for major field and laboratory instruments follow.

15.1 Photovac/MiniRae Photoionization Detector (PID)

Standard operating procedures for the PID require that routine maintenance and calibration be performed every six months. Field calibration will be performed on a daily basis. The packages used for calibration are non-toxic analyzed gas mixtures available in pressurized containers. All calibration procedures will follow the manufacturer recommendations.

15.2 Conductance, Temperature, and pH Tester

Temperature and conductance instruments are factory calibrated. Temperature accuracy can be checked against an NBS certified thermometer prior to field use if necessary. Conductance accuracy may be checked with a solution of known conductance and recalibration can be instituted, if necessary.

15.3 0_2/Explosimeter

The specific meter used at the time of work shall be calibrated in accordance with manufacturer recommendations. The model 260 O_2/ Explosimeter is described below.

The primary maintenance item of the Model 260 is the rechargeable 2.4 volt (V) nickel cadmium battery. The battery is recharged by removing the screw cap covering receptacle and connecting one end of the charging cable to the instrument and the other end to a 115V AC outlet.

The battery can also be recharged using a 12V DC source. An accessory battery charging cable is available, one end of which plugs into the Model 260 while the other end is fitted with an automobile cigarette lighter plug.

Recommended charging time is 16 hours.

Before the calibration of the combustible gas indicator can be checked, the Model 260 must be in operating condition. Calibration check-adjustment is made as follows:

1. Attach the flow control to the recommended calibration gas tank.
2. Connect the adapter-hose to the flow control.
3. Open flow control valve.
4. Connect the adapter-hose fitting to the inlet of the instrument; after about 15 seconds the LEL meter pointer should be stable and within the range specified on the calibration sheet accompanying the calibration equipment. If the meter pointer is not in the correct range, stop the flow; remove the right hand side cover. Turn on the flow and adjust the "S" control with a small screwdriver to obtain a reading as specified on the calibration sheet.
5. Disconnect the adapter-hose fitting from the instrument.
6. Close the flow control valve.

7. Remove the adapter-hose from the flow control.
8. Remove the flow control from the calibration gas tank.
9. Replace the side cover on the Model 260.

CAUTION: Calibration gas tank contents are under pressure. Use no oil, grease, or flammable solvents on the flow control or the calibration gas tank. Do not store calibration gas tank near heat or fire or in rooms used for habitation. Do not throw in fire, incinerate, or puncture. Keep out of reach of children. It is illegal and hazardous to refill this tank. Do not attach the calibration gas tank to any other apparatus than described above. Do not attach any gas tank other than MSA calibration tanks to the regulator.

15.4 Nephelometer (Turbidity Meter)

LaMotte 2020WE Turbidity Meter is calibrated before each use. The default units are set to NTU and the default calibration curve is formazin. A 0 NTU Standard (Code 1480) is included with the meter. To calibrate, rinse a clean tube three times with the blank. Fill the tube to the fill line with the blank. Insert the tube into the chamber, close the lid, and select “scan blank”.

TABLE 14-4
List of Major Instruments
for Sampling and Analysis

- MSA 360 0_2 /Explosimeter
- Geotech Geopump II AC/DC Peristaltic Pump
- QED MP50 Controller and QED Sample Pro MicroPurge Bladder Pimp
- Horiba U-53 Multi-Parameter Water Quality Meter
- LaMotte 2020WE Turbidity Meter
- EM-31 Geomics Electromagnetic Induction Device
- Mini Rae Photoionization Detectors (3,000, ppbRAE, etc.)

15.0 Internal Quality Control Checks

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of field equipment. Field-based QC will comprise at least 10% of each data set generated and will consist of standards, replicates, spikes, and blanks. Field duplicates and field blanks will be analyzed by the laboratory as samples and will not necessarily be identified to the laboratory as duplicates or blanks. For each matrix, field duplicates will be provided at a rate of one per 10 samples collected or one per shipment, whichever is greater. Field blanks which may consist of trip, routine field, and/or rinsate blanks will be provided at a rate of one per 20 samples collected for each media, or one per shipment, whichever is greater. Frequency of QC data may vary from project to project; refer to the project-specific work plan for QC requirements.

Calculations will be performed for recoveries and standard deviations along with review of retention times, response factors, chromatograms, calibration, tuning, and all other QC information generated. All QC data, including split samples, will be documented in the site logbook and/or appropriate field logs. QC records will be retained and results reported with sample data.

16.1 Field Blanks

Various types of blanks are used to check the cleanliness of field handling methods. The following types of blanks may be used: the trip blank, the routine field blank, and the field equipment blank. They are analyzed in the laboratory as samples, and their purpose is to assess the sampling and transport procedures as possible sources of sample contamination. Field staff may add blanks if field circumstances are such that they consider normal procedures are not sufficient to prevent or control sample contamination, or at the direction of the project manager. Rigorous documentation of all blanks in the site logbooks is mandatory.

- **Routine Field Blanks** or bottle blanks are blank samples prepared in the field to access ambient field conditions. They will be prepared by filling empty sample containers with deionized water and any necessary preservatives. They will be handled like a sample and shipped to the laboratory for analysis.
- **Trip Blanks** are similar to routine field blanks with the exception that they are <u>not</u> exposed to field conditions. Their analytical results give the overall level of contamination from everything except ambient field conditions. For the RI/FS, one trip blank will be collected with every shipment of water samples for VOC analysis. Each trip blank will be prepared by filling a 40-ml vial with deionized water prior to the sampling trip, transported to the site, handled like a sample, and returned to the laboratory for analysis without being opened in the field. Trip blanks may be provided by the laboratory, shipped with the bottleware, and kept with the sampling containers until analysis.
- **Field Equipment Blanks** are blank samples (sometimes called transfer blanks or rinsate blanks) designed to demonstrate that sampling equipment has been properly prepared and cleaned before field use, and that cleaning procedures between samples are sufficient to minimize cross contamination. If a sampling team is familiar with a particular site, they may be able to predict which areas or samples are likely to have the highest concentration of contaminants. Unless other constraints apply, these samples should be taken last to avoid excessive contamination of sampling equipment.

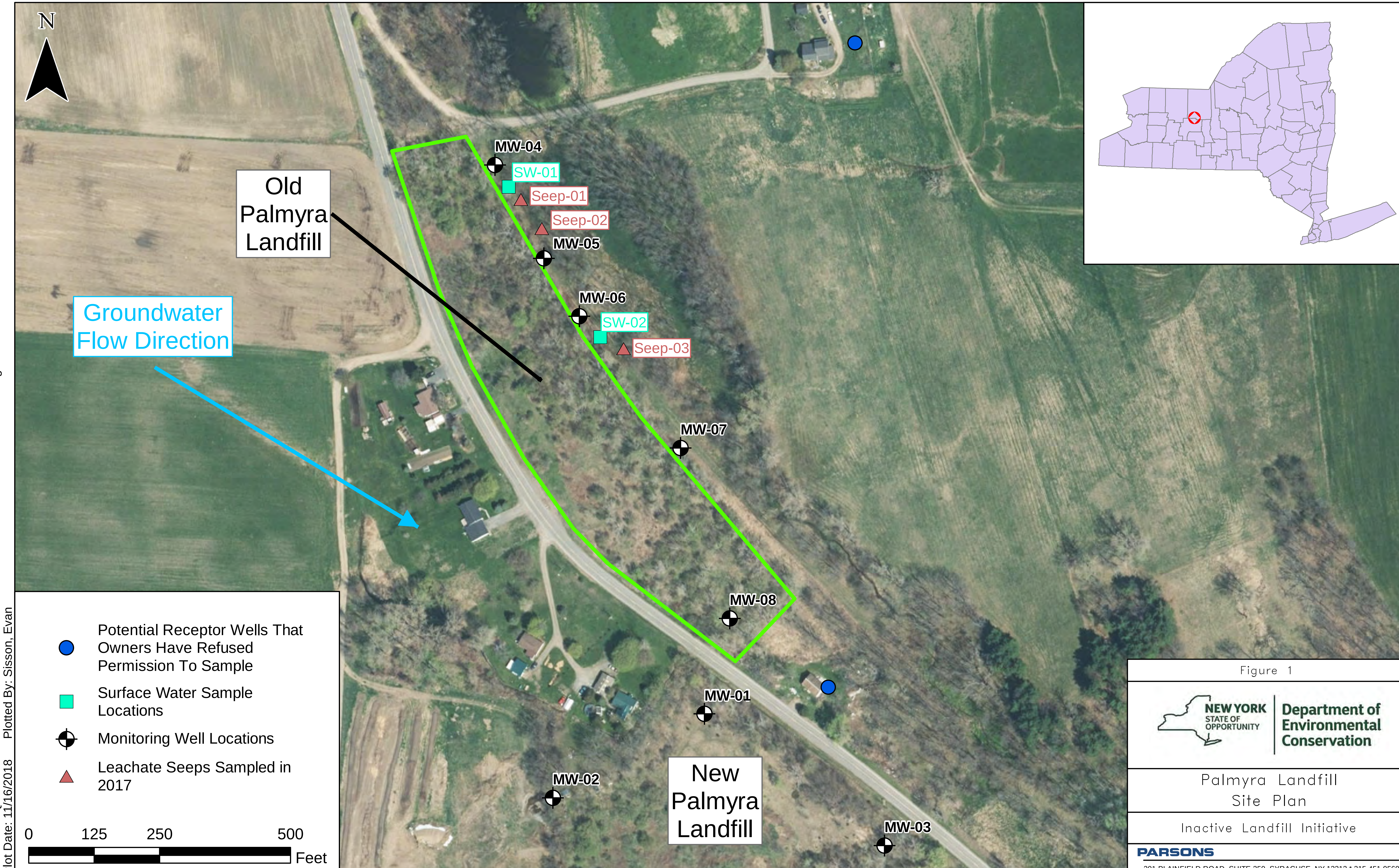
16.2 Duplicates

Duplicate samples are collected to check the consistency of sampling and analysis procedures. The following types of duplicates may be collected.

- **Blind duplicate** samples consist of a set of two samples collected independently at a sampling location during a single sampling event. Blind duplicates are designed to assess the consistency of the overall sampling and analytical system. Blind duplicate samples should not be distinguishable by the person performing the analysis.
- **Matrix Spike and Matrix Spike Duplicates (MS/MSDs)** consist of a set of three samples collected independently at a sampling location during a single sampling event. These samples are for laboratory quality control checks.

APPENDIX 5

Historical Data Tables and Figures



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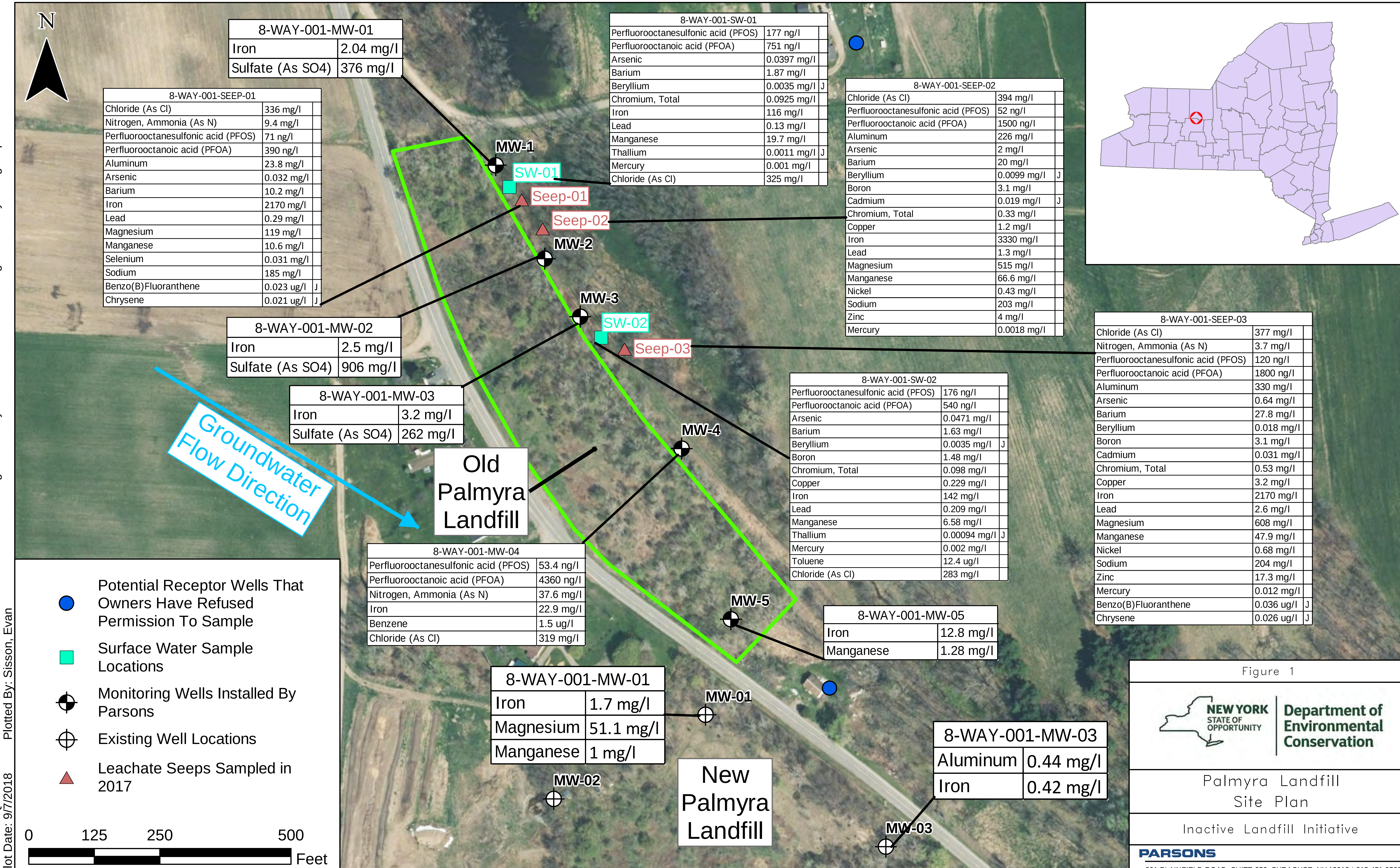
Plot Date: 11/16/2018 Plotted By: Sisson, Evan



8-WAY-001-MW-01	
Iron	2.04 mg/l
Sulfate (As SO4)	376 mg/l

8-WAY-001-SEEP-01		
Chloride (As Cl)	336 mg/l	
Nitrogen, Ammonia (As N)	9.4 mg/l	
Perfluorooctanesulfonic acid (PFOS)	71 ng/l	
Perfluorooctanoic acid (PFOA)	390 ng/l	
Aluminum	23.8 mg/l	
Arsenic	0.032 mg/l	
Barium	10.2 mg/l	
Iron	2170 mg/l	
Lead	0.29 mg/l	
Magnesium	119 mg/l	
Manganese	10.6 mg/l	
Selenium	0.031 mg/l	
Sodium	185 mg/l	
Benzo(B)Fluoranthene	0.023 ug/l	J
Chrysene	0.021 ug/l	J

8-WAY-001-SW-01		
Perfluorooctanesulfonic acid (PFOS)	177 ng/l	
Perfluorooctanoic acid (PFOA)	751 ng/l	
Arsenic	0.0397 mg/l	
Barium	1.87 mg/l	
Beryllium	0.0035 mg/l	J
Chromium, Total	0.0925 mg/l	
Iron	116 mg/l	
Lead	0.13 mg/l	
Manganese	19.7 mg/l	
Thallium	0.0011 mg/l	J
Mercury	0.001 mg/l	
Chloride (As Cl)	325 mg/l	

8-WAY-001-SEEP-02		
Chloride (As Cl)	394 mg/l	
Perfluorooctanesulfonic acid (PFOS)	52 ng/l	
Perfluorooctanoic acid (PFOA)	1500 ng/l	
Aluminum	226 mg/l	
Arsenic	2 mg/l	
Barium	20 mg/l	
Beryllium	0.0099 mg/l	J
Boron	3.1 mg/l	
Cadmium	0.019 mg/l	J
Chromium, Total	0.33 mg/l	
Copper	1.2 mg/l	
Iron	3330 mg/l	
Lead	1.3 mg/l	
Magnesium	515 mg/l	
Manganese	66.6 mg/l	
Nickel	0.43 mg/l	
Sodium	203 mg/l	
Zinc	4 mg/l	
Mercury	0.0018 mg/l	

8-WAY-001-MW-02	
Iron	2.5 mg/l
Sulfate (As SO4)	906 mg/l

8-WAY-001-MW-03	
Iron	3.2 mg/l
Sulfate (As SO4)	262 mg/l

8-WAY-001-SEEP-03		
Chloride (As Cl)	377 mg/l	
Nitrogen, Ammonia (As N)	3.7 mg/l	
Perfluorooctanesulfonic acid (PFOS)	120 ng/l	
Perfluorooctanoic acid (PFOA)	1800 ng/l	
Aluminum	330 mg/l	
Arsenic	0.64 mg/l	
Barium	27.8 mg/l	
Beryllium	0.018 mg/l	
Boron	3.1 mg/l	
Cadmium	0.031 mg/l	
Chromium, Total	0.53 mg/l	
Copper	3.2 mg/l	
Iron	2170 mg/l	
Lead	2.6 mg/l	
Magnesium	608 mg/l	
Manganese	47.9 mg/l	
Nickel	0.68 mg/l	
Sodium	204 mg/l	
Zinc	17.3 mg/l	
Mercury	0.012 mg/l	
Benzo(B)Fluoranthene	0.036 ug/l	J
Chrysene	0.026 ug/l	J

8-WAY-001-SW-02		
Perfluorooctanesulfonic acid (PFOS)	176 ng/l	
Perfluorooctanoic acid (PFOA)	540 ng/l	
Arsenic	0.0471 mg/l	
Barium	1.63 mg/l	
Beryllium	0.0035 mg/l	J
Boron	1.48 mg/l	
Chromium, Total	0.098 mg/l	
Copper	0.229 mg/l	
Iron	142 mg/l	
Lead	0.209 mg/l	
Manganese	6.58 mg/l	
Thallium	0.00094 mg/l	J
Mercury	0.002 mg/l	
Toluene	12.4 ug/l	
Chloride (As Cl)	283 mg/l	

8-WAY-001-MW-04	
Perfluorooctanesulfonic acid (PFOS)	53.4 ng/l
Perfluorooctanoic acid (PFOA)	4360 ng/l
Nitrogen, Ammonia (As N)	37.6 mg/l
Iron	22.9 mg/l
Benzene	1.5 ug/l
Chloride (As Cl)	319 mg/l

8-WAY-001-MW-05	
Iron	12.8 mg/l
Manganese	1.28 mg/l

8-WAY-001-MW-01	
Iron	1.7 mg/l
Magnesium	51.1 mg/l
Manganese	1 mg/l

8-WAY-001-MW-03	
Aluminum	0.44 mg/l
Iron	0.42 mg/l

Figure 1

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Palmyra Landfill Site Plan

Inactive Landfill Initiative

PARSONS

301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

File Name: Q:\GIS\NYSDEC\450619-WA#33-Inactive Landfill Initiative\Region 8\Palmyra Landfill\NYSDEC ILI Region 8 Palmyra Tag Map.mxd
Plot Date: 9/7/2018 Plotted By: Sisson, Evan

NYSDEC- Inactive Landfill Initiative
Validated Data

				Location Description										
				Location ID	8-WAY-001-MW-01		8-WAY-001-MW-02		8-WAY-001-MW-03		8-WAY-001-SEEP-01		8-WAY-001-SEEP-02	
				Sample ID	8-WAY-001-001-02		8-WAY-001-001-01		8-WAY-001-001-03		8-WAY-001-002-01		8-WAY-001-002-02	
				Matrix	WG		WG		WG		WS		WS	
				Lab Sample ID	480-128629-2		480-128629-1		480-128629-3		480-128714-1		480-128714-2	
				Sample Date	12/7/2017		12/7/2017		12/7/2017		12/19/2017		12/19/2017	
				Sample Type Code	N		N		N		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit										
A2320B	Alkalinity, Total (As CaCO3)	mg/l			485		344	J	386		764		949	
E300.0	Bromide	mg/l	2		0.4	U	0.4	U	0.4	U	1	U	2	U
E300.0	Chloride (As Cl)	mg/l	250		5.6		0.63	J	0.83	J	336		394	
E300.0	Sulfate (As SO4)	mg/l	250		75		6.1		6.8		10	U	163	
E350.1	Nitrogen, Ammonia (As N)	mg/l	2		0.02	U	0.02	U	0.02	U	9.4			
E410.4	COD - Chemical Oxygen Demand	mg/l			10	U	10	U	10	U	2880			
E537-LL	2-(N-methyl perfluorooctanesulfonamido) acetic acid	ng/l			20	U	19	U	19	U	24	U	25	U
E537-LL	N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine	ng/l			20	U	19	U	19	U	20	J	4.1	J
E537-LL	Perfluorobutanesulfonic acid (PFBS)	ng/l			1	J	0.67	J	0.68	J	0.99	J	3.1	
E537-LL	Perfluorodecanoic acid (PFDA)	ng/l			2	U	1.9	U	1.9	U	0.46	J	1.3	J
E537-LL	Perfluorododecanoic acid (PFDoA)	ng/l			2	U	1.9	U	1.9	U	2.4	U	2.5	U
E537-LL	Perfluoroheptanoic acid (PFHpA)	ng/l			1.7	J	0.78	J	1.9	U	11		35	
E537-LL	Perfluorohexanesulfonic acid (PFHxS)	ng/l			0.96	J	1.9	U	1.9	U	5.9		10	
E537-LL	Perfluorohexanoic acid (PFHxA)	ng/l			1.5	J	0.96	J	1.9	U	8.4		25	
E537-LL	Perfluorononanoic acid (PFNA)	ng/l			2	U	0.33	J	1.9	U	0.84	J	1.7	J
E537-LL	Perfluorooctanesulfonic acid (PFOS)	ng/l		20	3.2		0.67	J	1.9	U	71		52	
E537-LL	Perfluorooctanoic acid (PFOA)	ng/l		20	13		1.6	J	1.9	U	390		1500	
E537-LL	Perfluorotetradecanoic acid (PFTA)	ng/l			2	U	1.9	U	1.9	U	2.4	U	2.5	U
E537-LL	Perfluorotridecanoic Acid (PFTriA)	ng/l			2	U	1.9	U	1.9	U	2.4	U	2.5	U
E537-LL	Perfluoroundecanoic Acid (PFUnA)	ng/l			2	U	1.9	U	1.9	U	2.4	U	2.5	U
SM 2340 C	Hardness (As CaCO3)	mg/l			500		328		364		1050			
SM2540C	Total Dissolved Solids	mg/l			581		388		398		1290		1630	
SW6010C	Aluminum	mg/l	0.1		0.07	J	0.2	U	0.44		23.8			
SW6010C	Antimony	mg/l	0.003		0.02	U	0.02	U	0.02	U	0.1	U		
SW6010C	Arsenic	mg/l	0.025		0.015	U	0.015	U	0.015	U	0.032			
SW6010C	Barium	mg/l	1		0.18		0.06		0.071		10.2			
SW6010C	Beryllium	mg/l	0.003		0.002	U	0.002	U	0.002	U	0.0015	J		
SW6010C	Boron	mg/l	1		0.047		0.015	J	0.0072	J	0.76			
SW6010C	Cadmium	mg/l	0.005		0.002	U	0.002	U	0.002	U	0.01	U		
SW6010C	Calcium	mg/l			125		91.8		94.5		834			
SW6010C	Chromium, Total	mg/l	0.05		0.004	U	0.004	U	0.004	U	0.05			
SW6010C	Cobalt	mg/l			0.06		0.004	U	0.004	U	0.0041	J		
SW6010C	Copper	mg/l	0.2		0.01	U	0.01	U	0.01	U	0.093			
SW6010C	Iron	mg/l	0.3		1.7		0.05	U	0.42		2170			
SW6010C	Lead	mg/l	0.025		0.01	U	0.01	U	0.01	U	0.29			
SW6010C	Magnesium	mg/l	35		51.1		22.3		29.7		119			
SW6010C	Manganese	mg/l	0.3		1		0.0036		0.011		10.6			
SW6010C	Nickel	mg/l	0.1		0.0022	J	0.01	U	0.01	U	0.059			
SW6010C	Potassium	mg/l			1.7		3.4		0.94		26			
SW6010C	Selenium	mg/l	0.01		0.025	U	0.025	U	0.025	U	0.031			
SW6010C	Silver	mg/l	0.05		0.006	U	0.006	U	0.006	U	0.03	U		
SW6010C	Sodium	mg/l	20		6.3		1.2		2.2		185			
SW6010C	Thallium	mg/l	0.0005		0.02	U	0.02	U	0.02	U	0.1	U		
SW6010C	Vanadium	mg/l			0.005	U	0.005	U	0.005	U	0.1			
SW6010C	Zinc	mg/l	2		0.0036	J	0.01	U	0.0025	J	1.3			

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				Location Description										
				Location ID	8-WAY-001-MW-01		8-WAY-001-MW-02		8-WAY-001-MW-03		8-WAY-001-SEEP-01		8-WAY-001-SEEP-02	
				Sample ID	8-WAY-001-001-02		8-WAY-001-001-01		8-WAY-001-001-03		8-WAY-001-002-01		8-WAY-001-002-02	
				Matrix	WG		WG		WG		WS		WS	
				Lab Sample ID	480-128629-2		480-128629-1		480-128629-3		480-128714-1		480-128714-2	
				Sample Date	12/7/2017		12/7/2017		12/7/2017		12/19/2017		12/19/2017	
				Sample Type Code	N		N		N		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit										
SW7470A	Mercury	mg/l	0.0007		0.0002	U	0.0002	U	0.0002	U	0.001	U		
SW8260C	1,1,1,2-Tetrachloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	1,1,1-Trichloroethane (TCA)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	1,1,2-Trichloroethane	ug/l	1		1	U	1	U	1	U	1	U	1	U
SW8260C	1,1-Dichloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	1,1-Dichloroethene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	1,2,3-Trichloropropane	ug/l	0.04		1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dibromo-3-Chloropropane	ug/l	0.04		1	U	1	U	1	U	10	UJ	10	UJ
SW8260C	1,2-Dibromoethane (Ethylene Dibromide)	ug/l	0.0006		1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dichlorobenzene	ug/l	3		1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dichloroethane	ug/l	0.6		1	U	1	U	1	U	1	U	1	U
SW8260C	1,2-Dichloropropane	ug/l	1		1	U	1	U	1	U	1	U	1	U
SW8260C	1,4-Dichlorobenzene	ug/l	3		1	U	1	U	1	U	1	U	1	U
SW8260C	2-Hexanone	ug/l	50		5	U	5	U	5	U	10	U	10	U
SW8260C	Acetone	ug/l	50		10	U	10	U	10	U	37		17	J
SW8260C	Acrylonitrile	ug/l	5		5	U	5	U	5	U	10	U	10	U
SW8260C	Benzene	ug/l	1		1	U	1	U	1	U	1	U	1	U
SW8260C	Bromochloromethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Bromodichloromethane	ug/l	50		1	U	1	U	1	U	1	U	1	U
SW8260C	Bromoform	ug/l	50		1	U	1	U	1	U	1	U	1	U
SW8260C	Bromomethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Carbon Disulfide	ug/l	60		1	U	1	U	1	U	1	U	1	U
SW8260C	Carbon Tetrachloride	ug/l	5		1	U	1	U	1	U	1	UJ	1	UJ
SW8260C	Chlorobenzene	ug/l	5		1	U	1	U	1	U	0.41	J	1	U
SW8260C	Chloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Chloroform	ug/l	7		1	U	1	U	1	U	1	U	1	U
SW8260C	Chloromethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Cis-1,2-Dichloroethylene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Cis-1,3-Dichloropropene	ug/l	0.4		1	U	1	U	1	U	1	U	1	U
SW8260C	Dibromochloromethane	ug/l	50		1	U	1	U	1	U	1	U	1	U
SW8260C	Dibromomethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Ethylbenzene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Iodomethane (Methyl Iodide)	ug/l	5		1	U	1	U	1	U	10	U	10	U
SW8260C	m,p-Xylene	ug/l	5		2	U	2	U	2	U	2	U	2	U
SW8260C	Methyl Ethyl Ketone (2-Butanone)	ug/l	50		10	U	10	U	10	U	50	U	50	U
SW8260C	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/l			5	U	5	U	5	U	10	U	10	U
SW8260C	Methylene Chloride	ug/l	5		1	U	1	U	1	U	5	U	5	U
SW8260C	O-Xylene (1,2-Dimethylbenzene)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Styrene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Tetrachloroethylene (PCE)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Toluene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Trans-1,2-Dichloroethene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Trans-1,3-Dichloropropene	ug/l	0.4		1	U	1	U	1	U	1	U	1	U
SW8260C	Trans-1,4-Dichloro-2-Butene	ug/l	5		1	U	1	U	1	U	5	U	5	U

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				Location Description										
				Location ID	8-WAY-001-MW-01		8-WAY-001-MW-02		8-WAY-001-MW-03		8-WAY-001-SEEP-01		8-WAY-001-SEEP-02	
				Sample ID	8-WAY-001-001-02		8-WAY-001-001-01		8-WAY-001-001-03		8-WAY-001-002-01		8-WAY-001-002-02	
				Matrix	WG		WG		WG		WS		WS	
				Lab Sample ID	480-128629-2		480-128629-1		480-128629-3		480-128714-1		480-128714-2	
				Sample Date	12/7/2017		12/7/2017		12/7/2017		12/19/2017		12/19/2017	
				Sample Type Code	N		N		N		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit										
SW8260C	Trichloroethylene (TCE)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Trichlorofluoromethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260C	Vinyl Acetate	ug/l			5	U	5	U	5	U	10	U	10	U
SW8260C	Vinyl Chloride	ug/l	2		1	UJ	1	UJ	1	UJ	1	U	1	U
SW8260C	Xylenes, Total	ug/l	5		2	U	2	U	2	U	3	U	3	U
SW8270DSIM	1,4-Dioxane (P-Dioxane)	ug/l			0.4	U	0.4	U	0.4	U	0.33	J		
SW8270DSIM	Acenaphthene	ug/l	20		0.05	U	0.05	U	0.05	U	0.067			
SW8270DSIM	Acenaphthylene	ug/l			0.05	U	0.05	U	0.05	U	0.052	U		
SW8270DSIM	Anthracene	ug/l	50		0.05	U	0.05	U	0.05	U	0.011	J		
SW8270DSIM	Benzo(A)Anthracene	ug/l	0.002		0.05	U	0.05	U	0.05	U	0.052	U		
SW8270DSIM	Benzo(A)Pyrene	ug/l			0.05	U	0.05	U	0.05	U	0.052	U		
SW8270DSIM	Benzo(B)Fluoranthene	ug/l	0.002		0.05	U	0.05	U	0.05	U	0.023	J		
SW8270DSIM	Benzo(G,H,I)Perylene	ug/l			0.05	U	0.05	U	0.05	U	0.052	UJ		
SW8270DSIM	Benzo(K)Fluoranthene	ug/l	0.002		0.05	UJ	0.05	UJ	0.05	UJ	0.052	U		
SW8270DSIM	Chrysene	ug/l	0.002		0.05	U	0.05	U	0.05	U	0.021	J		
SW8270DSIM	Dibenz(A,H)Anthracene	ug/l			0.05	U	0.05	U	0.05	U	0.052	U		
SW8270DSIM	Fluoranthene	ug/l	50		0.05	UJ	0.05	UJ	0.05	UJ	0.06			
SW8270DSIM	Fluorene	ug/l	50		0.05	U	0.05	U	0.05	U	0.052	U		
SW8270DSIM	Indeno(1,2,3-C,D)Pyrene	ug/l	0.002		0.05	U	0.05	U	0.05	U	0.052	U		
SW8270DSIM	Naphthalene	ug/l	10		0.05	U	0.05	U	0.05	U	0.042	J		
SW8270DSIM	Phenanthrene	ug/l	50		0.05	U	0.05	U	0.05	U	0.052	U		
SW8270DSIM	Pyrene	ug/l	50		0.05	U	0.05	U	0.05	U	0.044	J		
SW9060	Total Organic Carbon	mg/l			1.7		1.5		0.67	J	5.2		4.8	

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				Location Description				
				Location ID	8-WAY-001-SEEP-02		8-WAY-001-SEEP-03	
				Sample ID	8-WAY-001-003-01		8-WAY-001-002-03	
				Matrix	WS		WS	
				Lab Sample ID	480-129214-1		480-128714-3	
				Sample Date	12/19/2017		12/19/2017	
				Sample Type Code	N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit				
A2320B	Alkalinity, Total (As CaCO3)	mg/l					1120	
E300.0	Bromide	mg/l	2				2	U
E300.0	Chloride (As Cl)	mg/l	250				377	
E300.0	Sulfate (As SO4)	mg/l	250				107	
E350.1	Nitrogen, Ammonia (As N)	mg/l	2		0.68		3.7	
E410.4	COD - Chemical Oxygen Demand	mg/l			616		10400	
E537-LL	2-(N-methyl perfluorooctanesulfonamido) acetic acid	ng/l					20	U
E537-LL	N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine	ng/l					16	J
E537-LL	Perfluorobutanesulfonic acid (PFBS)	ng/l					2.5	
E537-LL	Perfluorodecanoic acid (PFDA)	ng/l					1.6	J
E537-LL	Perfluorododecanoic acid (PFDoA)	ng/l					2	U
E537-LL	Perfluoroheptanoic acid (PFHpA)	ng/l					49	
E537-LL	Perfluorohexanesulfonic acid (PFHxS)	ng/l					13	
E537-LL	Perfluorohexanoic acid (PFHxA)	ng/l					58	
E537-LL	Perfluorononanoic acid (PFNA)	ng/l					2.7	
E537-LL	Perfluorooctanesulfonic acid (PFOS)	ng/l		20			120	
E537-LL	Perfluorooctanoic acid (PFOA)	ng/l		20			1800	
E537-LL	Perfluorotetradecanoic acid (PFTA)	ng/l					2	U
E537-LL	Perfluorotridecanoic Acid (PFTriA)	ng/l					2	U
E537-LL	Perfluoroundecanoic Acid (PFUnA)	ng/l					2	U
SM 2340 C	Hardness (As CaCO3)	mg/l			1900		1800	
SM2540C	Total Dissolved Solids	mg/l					1740	
SW6010C	Aluminum	mg/l	0.1		226		330	
SW6010C	Antimony	mg/l	0.003		0.5	U	0.1	U
SW6010C	Arsenic	mg/l	0.025		2		0.64	
SW6010C	Barium	mg/l	1		20		27.8	
SW6010C	Beryllium	mg/l	0.003		0.0099	J	0.018	
SW6010C	Boron	mg/l	1		3.1		3.1	
SW6010C	Cadmium	mg/l	0.005		0.019	J	0.031	
SW6010C	Calcium	mg/l			2280		3220	
SW6010C	Chromium, Total	mg/l	0.05		0.33		0.53	
SW6010C	Cobalt	mg/l			0.26		0.23	
SW6010C	Copper	mg/l	0.2		1.2		3.2	
SW6010C	Iron	mg/l	0.3		3330		2170	
SW6010C	Lead	mg/l	0.025		1.3		2.6	
SW6010C	Magnesium	mg/l	35		515		608	
SW6010C	Manganese	mg/l	0.3		66.6		47.9	
SW6010C	Nickel	mg/l	0.1		0.43		0.68	
SW6010C	Potassium	mg/l			107		115	
SW6010C	Selenium	mg/l	0.01		0.13	U	0.13	U
SW6010C	Silver	mg/l	0.05		0.15	U	0.03	U
SW6010C	Sodium	mg/l	20		203		204	
SW6010C	Thallium	mg/l	0.0005		0.1	U	0.1	U
SW6010C	Vanadium	mg/l			0.48		0.68	
SW6010C	Zinc	mg/l	2		4		17.3	

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				Location Description				
				Location ID	8-WAY-001-SEEP-02		8-WAY-001-SEEP-03	
				Sample ID	8-WAY-001-003-01		8-WAY-001-002-03	
				Matrix	WS		WS	
				Lab Sample ID	480-129214-1		480-128714-3	
				Sample Date	12/19/2017		12/19/2017	
				Sample Type Code	N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit				
SW7470A	Mercury	mg/l	0.0007		0.0018		0.012	
SW8260C	1,1,1,2-Tetrachloroethane	ug/l	5				1	U
SW8260C	1,1,1-Trichloroethane (TCA)	ug/l	5				1	U
SW8260C	1,1,2,2-Tetrachloroethane	ug/l	5				1	U
SW8260C	1,1,2-Trichloroethane	ug/l	1				1	U
SW8260C	1,1-Dichloroethane	ug/l	5				1	U
SW8260C	1,1-Dichloroethene	ug/l	5				1	U
SW8260C	1,2,3-Trichloropropane	ug/l	0.04				1	U
SW8260C	1,2-Dibromo-3-Chloropropane	ug/l	0.04				10	UJ
SW8260C	1,2-Dibromoethane (Ethylene Dibromide)	ug/l	0.0006				1	U
SW8260C	1,2-Dichlorobenzene	ug/l	3				1	U
SW8260C	1,2-Dichloroethane	ug/l	0.6				1	U
SW8260C	1,2-Dichloropropane	ug/l	1				1	U
SW8260C	1,4-Dichlorobenzene	ug/l	3				1.1	
SW8260C	2-Hexanone	ug/l	50				10	U
SW8260C	Acetone	ug/l	50				25	
SW8260C	Acrylonitrile	ug/l	5				10	U
SW8260C	Benzene	ug/l	1				1	U
SW8260C	Bromochloromethane	ug/l	5				1	U
SW8260C	Bromodichloromethane	ug/l	50				1	U
SW8260C	Bromoform	ug/l	50				1	U
SW8260C	Bromomethane	ug/l	5				1	U
SW8260C	Carbon Disulfide	ug/l	60				1	U
SW8260C	Carbon Tetrachloride	ug/l	5				1	UJ
SW8260C	Chlorobenzene	ug/l	5				1.1	
SW8260C	Chloroethane	ug/l	5				1	U
SW8260C	Chloroform	ug/l	7				1	U
SW8260C	Chloromethane	ug/l	5				1	U
SW8260C	Cis-1,2-Dichloroethylene	ug/l	5				1	U
SW8260C	Cis-1,3-Dichloropropene	ug/l	0.4				1	U
SW8260C	Dibromochloromethane	ug/l	50				1	U
SW8260C	Dibromomethane	ug/l	5				1	U
SW8260C	Ethylbenzene	ug/l	5				1	U
SW8260C	Iodomethane (Methyl Iodide)	ug/l	5				10	U
SW8260C	m,p-Xylene	ug/l	5				2	U
SW8260C	Methyl Ethyl Ketone (2-Butanone)	ug/l	50				50	U
SW8260C	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/l					10	U
SW8260C	Methylene Chloride	ug/l	5				5	U
SW8260C	O-Xylene (1,2-Dimethylbenzene)	ug/l	5				1	U
SW8260C	Styrene	ug/l	5				1	U
SW8260C	Tetrachloroethylene (PCE)	ug/l	5				1	U
SW8260C	Toluene	ug/l	5				1	U
SW8260C	Trans-1,2-Dichloroethene	ug/l	5				1	U
SW8260C	Trans-1,3-Dichloropropene	ug/l	0.4				1	U
SW8260C	Trans-1,4-Dichloro-2-Butene	ug/l	5				5	U

NYSDEC- Inactive Landfill Initiative
Validated Data

				Location Description				
				Location ID	8-WAY-001-SEEP-02		8-WAY-001-SEEP-03	
				Sample ID	8-WAY-001-003-01		8-WAY-001-002-03	
				Matrix	WS		WS	
				Lab Sample ID	480-129214-1		480-128714-3	
				Sample Date	12/19/2017		12/19/2017	
				Sample Type Code	N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit				
SW8260C	Trichloroethylene (TCE)	ug/l	5				1	U
SW8260C	Trichlorofluoromethane	ug/l	5				1	U
SW8260C	Vinyl Acetate	ug/l					10	U
SW8260C	Vinyl Chloride	ug/l	2				1	U
SW8260C	Xylenes, Total	ug/l	5				3	U
SW8270DSIM	1,4-Dioxane (P-Dioxane)	ug/l			0.41	U	0.39	J
SW8270DSIM	Acenaphthene	ug/l	20		0.051	U	0.029	J
SW8270DSIM	Acenaphthylene	ug/l			0.051	U	0.052	U
SW8270DSIM	Anthracene	ug/l	50		0.051	U	0.052	U
SW8270DSIM	Benzo(A)Anthracene	ug/l	0.002		0.051	U	0.052	U
SW8270DSIM	Benzo(A)Pyrene	ug/l			0.051	U	0.052	U
SW8270DSIM	Benzo(B)Fluoranthene	ug/l	0.002		0.051	U	0.036	J
SW8270DSIM	Benzo(G,H,I)Perylene	ug/l			0.051	U	0.052	UJ
SW8270DSIM	Benzo(K)Fluoranthene	ug/l	0.002		0.051	U	0.052	U
SW8270DSIM	Chrysene	ug/l	0.002		0.051	U	0.026	J
SW8270DSIM	Dibenz(A,H)Anthracene	ug/l			0.051	U	0.052	U
SW8270DSIM	Fluoranthene	ug/l	50		0.044	J	0.051	J
SW8270DSIM	Fluorene	ug/l	50		0.051	U	0.052	U
SW8270DSIM	Indeno(1,2,3-C,D)Pyrene	ug/l	0.002		0.051	U	0.052	U
SW8270DSIM	Naphthalene	ug/l	10		0.12	J	0.052	U
SW8270DSIM	Phenanthrene	ug/l	50		0.18	J	0.052	U
SW8270DSIM	Pyrene	ug/l	50		0.048	J	0.039	J
SW9060	Total Organic Carbon	mg/l					9.2	

PARSONS

				Location Description										
				Location ID	8-WAY-001-MW-04		8-WAY-001-MW-05		8-WAY-001-MW-05		8-WAY-001-MW-06		8-WAY-001-MW-07	
				Sample ID	8-WAY-001-005-03		8-WAY-001-005-01		8-WAY-001-005-02		8-WAY-001-004-04		8-WAY-001-004-03	
				Matrix	WG		WG		WG		WG		WG	
				Lab Sample ID	JC69654-3		JC69654-1		JC69654-2		JC69545-4		JC69545-3	
				Sample Date	7/10/2018		7/10/2018		7/10/2018		7/9/2018		7/9/2018	
				Sample Type Code	N		N		FD		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit										
A5220C	COD - Chemical Oxygen Demand	mg/l			20	U	20	U	11.1	J	20	U	35.6	
E537	2-(N-methyl perfluorooctanesulfonamido) acetic acid	ng/l			42	U	45	U	42	U	42	U	45	U
E537	6:2 Fluorotelomer sulfonate	ng/l			17	U	18	U	17	U	17	U	18	U
E537	8:2 Fluorotelomer sulfonate	ng/l			17	U	18	U	17	U	17	U	18	U
E537	N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine	ng/l			42	U	45	U	42	U	42	U	22.4	J
E537	Perfluorobutanesulfonic acid (PFBS)	ng/l			4.2	U	4.5	U	4.2	U	4.2	U	2.5	J
E537	Perfluorobutanoic Acid	ng/l			17	U	8.77	J	9.1	J	54.7		32.7	
E537	Perfluorodecane Sulfonic Acid	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
E537	Perfluorodecanoic acid (PFDA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
E537	Perfluorododecanoic acid (PFDoA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
E537	Perfluoroheptane Sulfonate (PFHPS)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
E537	Perfluoroheptanoic acid (PFHpA)	ng/l			4.2	U	4.5	U	4.2	U	4.2	U	43.8	
E537	Perfluorohexanesulfonic acid (PFHxS)	ng/l			4.2	U	4.5	U	4.2	U	4.2	U	10.1	
E537	Perfluorohexanoic acid (PFHxA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	34.5	
E537	Perfluorononanoic acid (PFNA)	ng/l			4.2	U	4.5	U	4.2	U	4.2	U	3.95	J
E537	Perfluorooctane Sulfonamide (FOSA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
E537	Perfluorooctanesulfonic acid (PFOS)	ng/l		20	4.2	U	4.5	U	4.2	U	4.2	U	53.4	
E537	Perfluorooctanoic acid (PFOA)	ng/l		20	4.2	U	4.5	U	4.2	U	4.37		4360	
E537	Perfluoropentanoic Acid (PFPeA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	UJ	9.1	UJ
E537	Perfluorotetradecanoic acid (PFTA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
E537	Perfluorotridecanoic Acid (PFTriA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
E537	Perfluoroundecanoic Acid (PFUnA)	ng/l			8.3	U	9.1	U	8.3	U	8.3	U	9.1	U
M4500A	Nitrogen, Ammonia (As N)	mg/l	2		0.2	U	0.16	J	0.18	J	0.33		37.6	
SM 2320 B	Alkalinity, Total (As CaCO3)	mg/l			262		374	J	171	J	543		645	
SM2340B	Hardness (As CaCO3)	mg/l			670		1380		1220		774		645	
SM2540C	Total Dissolved Solids (Residue, Filterable)	mg/l			880		2050		1950		1120		1150	
SW6020	Arsenic	mg/l	0.025		0.0025		0.0024		0.0024		0.0025		0.0067	
SW6010	Barium	mg/l	1		0.0399	J	0.0227	J	0.0228	J	0.0546	J	0.759	
SW6010	Beryllium	mg/l	0.003		0.001	U	0.001	U	0.001	U	0.001	U	0.001	U
SW6010	Boron	mg/l	1		0.1	U	0.138		0.137		0.299		0.366	
SW6010	Chromium, Total	mg/l	0.05		0.002	J	0.01	U	0.01	U	0.01	U	0.01	U
SW6010	Copper	mg/l	0.2		0.01	U	0.01	U	0.01	U	0.01	U	0.0141	
SW6010	Iron	mg/l	0.3		2.04		2.5		2.44		3.2		22.9	
SW6010	Lead	mg/l	0.025		0.003	U	0.003	U	0.003	U	0.003	U	0.003	U
SW6010	Manganese	mg/l	0.3		0.0447		0.0304		0.03		0.0384		0.166	
SW6010	Nickel	mg/l	0.1		0.01	U	0.01	U	0.01	U	0.01	U	0.0056	J
SW6010	Selenium	mg/l	0.01		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
SW6020	Thallium	mg/l	0.0005		0.001	U	0.001	U	0.001	U	0.00026	J	0.001	U
SW6010	Zinc	mg/l	2		0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
SW7470A	Mercury	mg/l	0.0007		0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U
SW8260	1,1,1,2-Tetrachloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	1,1,1-Trichloroethane (TCA)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	1,1,2,2-Tetrachloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	1,1,2-Trichloroethane	ug/l	1		1	U	1	U	1	U	1	U	1	U
SW8260	1,1-Dichloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	1,1-Dichloroethene	ug/l	5		1	UJ	1	UJ	1	UJ	1	U	1	U
SW8260	1,2,3-Trichloropropane	ug/l	0.04		2	U	2	U	2	U	2	U	2	U
SW8260	1,2-Dibromo-3-Chloropropane	ug/l	0.04		2	U	2	U	2	U	2	U	2	U

				Location Description										
				Location ID	8-WAY-001-MW-04		8-WAY-001-MW-05		8-WAY-001-MW-05		8-WAY-001-MW-06		8-WAY-001-MW-07	
				Sample ID	8-WAY-001-005-03		8-WAY-001-005-01		8-WAY-001-005-02		8-WAY-001-004-04		8-WAY-001-004-03	
				Matrix	WG		WG		WG		WG		WG	
				Lab Sample ID	JC69654-3		JC69654-1		JC69654-2		JC69545-4		JC69545-3	
				Sample Date	7/10/2018		7/10/2018		7/10/2018		7/9/2018		7/9/2018	
				Sample Type Code	N		N		FD		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit										
SW8260	1,2-Dibromoethane (Ethylene Dibromide)	ug/l	0.0006		1	U	1	U	1	U	1	U	1	U
SW8260	1,2-Dichlorobenzene	ug/l	3		1	U	1	U	1	U	1	U	1	U
SW8260	1,2-Dichloroethane	ug/l	0.6		1	U	1	U	1	U	1	U	1	U
SW8260	1,2-Dichloropropane	ug/l	1		1	U	1	U	1	U	1	U	1	U
SW8260	1,4-Dichlorobenzene	ug/l	3		1	U	1	U	1	U	1	U	1.1	
SW8260	2-Hexanone	ug/l	50		5	U	5	U	5	U	5	U	5	U
SW8260	Acetone	ug/l	50		10	U	27.3		22.1		6.1	J	10	U
SW8260	Acrylonitrile	ug/l	5		10	U	10	U	10	U	10	U	10	U
SW8260	Benzene	ug/l	1		0.5	U	0.5	U	0.5	U	0.5	U	1.5	
SW8260	Bromochloromethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Bromodichloromethane	ug/l	50		1	U	1	U	1	U	1	U	1	U
SW8260	Bromoform	ug/l	50		1	U	1	U	1	U	1	U	1	U
SW8260	Bromomethane	ug/l	5		2	U	2	U	2	U	2	U	2	U
SW8260	Carbon Disulfide	ug/l	60		2	UJ	2	UJ	2	UJ	2	U	2	U
SW8260	Carbon Tetrachloride	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Chlorobenzene	ug/l	5		1	U	1	U	1	U	1	U	4.8	
SW8260	Chloroethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Chloroform	ug/l	7		1	U	1	U	1	U	1	U	1	U
SW8260	Chloromethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Cis-1,2-Dichloroethylene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Cis-1,3-Dichloropropene	ug/l	0.4		1	U	1	U	1	U	1	U	1	U
SW8260	Dibromochloromethane	ug/l	50		1	U	1	U	1	U	1	U	1	U
SW8260	Dibromomethane	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Ethylbenzene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Iodomethane (Methyl Iodide)	ug/l	5		2	UJ	2	UJ	2	UJ	2	U	2	U
SW8260	M,P-Xylene (Sum Of Isomers)	ug/l			1	U	1	U	1	U	1	U	1	U
SW8260	Methyl Ethyl Ketone (2-Butanone)	ug/l	50		10	U	10	U	10	U	10	U	10	U
SW8260	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/l			5	U	5	U	5	U	5	U	5	U
SW8260	Methylene Chloride	ug/l	5		2	U	2	U	2	U	2	U	2	U
SW8260	O-Xylene (1,2-Dimethylbenzene)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Styrene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Tetrachloroethylene (PCE)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Toluene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Trans-1,2-Dichloroethene	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Trans-1,3-Dichloropropene	ug/l	0.4		1	U	1	U	1	U	1	U	1	U
SW8260	Trans-1,4-Dichloro-2-Butene	ug/l	5		5	UJ	5	UJ	5	UJ	5	U	5	U
SW8260	Trichloroethylene (TCE)	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8260	Trichlorofluoromethane	ug/l	5		2	U	2	U	2	U	2	U	2	U
SW8260	Vinyl Acetate	ug/l			10	U	10	U	10	U	10	U	10	U
SW8260	Vinyl Chloride	ug/l	2		1	U	1	U	1	U	1	U	1	U
SW8260	Xylenes, Total	ug/l	5		1	U	1	U	1	U	1	U	1	U
SW8270	1,4-Dioxane (P-Dioxane)	ug/l			0.095	U	0.245		0.25		0.374		1.38	
SW8270	Acenaphthene	ug/l	20		0.095	U	0.095	U	0.1	U	0.2	U	0.0503	J
SW8270	Acenaphthylene	ug/l			0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Anthracene	ug/l	50		0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Benzo(A)Anthracene	ug/l	0.002		0.048	U	0.048	U	0.05	U	0.1	U	0.05	U
SW8270	Benzo(A)Pyrene	ug/l			0.048	U	0.048	U	0.05	U	0.1	U	0.05	U
SW8270	Benzo(B)Fluoranthene	ug/l	0.002		0.095	U	0.095	U	0.1	U	0.2	U	0.1	U

				Location Description										
				Location ID	8-WAY-001-MW-04		8-WAY-001-MW-05		8-WAY-001-MW-05		8-WAY-001-MW-06		8-WAY-001-MW-07	
				Sample ID	8-WAY-001-005-03		8-WAY-001-005-01		8-WAY-001-005-02		8-WAY-001-004-04		8-WAY-001-004-03	
				Matrix	WG		WG		WG		WG		WG	
				Lab Sample ID	JC69654-3		JC69654-1		JC69654-2		JC69545-4		JC69545-3	
				Sample Date	7/10/2018		7/10/2018		7/10/2018		7/9/2018		7/9/2018	
				Sample Type Code	N		N		FD		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit										
SW8270	Benzo(G,H,I)Perylene	ug/l			0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Benzo(K)Fluoranthene	ug/l	0.002		0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Chrysene	ug/l	0.002		0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Dibenz(A,H)Anthracene	ug/l			0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Fluoranthene	ug/l	50		0.095	U	0.0442	J	0.0493	J	0.2	U	0.1	U
SW8270	Fluorene	ug/l	50		0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Indeno(1,2,3-C,D)Pyrene	ug/l	0.002		0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW8270	Naphthalene	ug/l	10		0.095	U	0.095	U	0.1	U	0.2	U	0.748	
SW8270	Phenanthrene	ug/l	50		0.095	U	0.252		0.235		0.0527	J	0.0433	J
SW8270	Pyrene	ug/l	50		0.095	U	0.095	U	0.1	U	0.2	U	0.1	U
SW9056	Bromide	mg/l	2		0.26	J	0.45	J	0.48	J	0.97		1.7	
SW9056	Chloride (As Cl)	mg/l	250		113		123		103		153		319	
SW9056	Sulfate (As SO4)	mg/l	250		376		897		906		262		1.2	J
SW9060M	Total Organic Carbon	mg/l			1.1		1.8		1.8		2.8		10.1	

				Location Description						
				Location ID	8-WAY-001-MW-08		8-WAY-001-SW-01		8-WAY-001-SW-02	
				Sample ID	8-WAY-001-004-01		8-WAY-001-005-04		8-WAY-001-005-05	
				Matrix	WG		WS		WS	
				Lab Sample ID	JC69545-1		JC69654-4		JC69654-5	
				Sample Date	7/9/2018		7/10/2018		7/10/2018	
				Sample Type Code	N		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit						
A5220C	COD - Chemical Oxygen Demand	mg/l			21.9		44.5		103	
E537	2-(N-methyl perfluorooctanesulfonamido) acetic acid	ng/l			42	U	42	U	38	U
E537	6:2 Fluorotelomer sulfonate	ng/l			17	U	17	U	31	U
E537	8:2 Fluorotelomer sulfonate	ng/l			17	U	17	U	15	U
E537	N-Ethyl-N-((heptadecafluorooctyl)sulphonyl) glycine	ng/l			42	U	42	U	38	U
E537	Perfluorobutanesulfonic acid (PFBS)	ng/l			4.2	U	5.47		8.87	
E537	Perfluorobutanoic Acid	ng/l			17	U	10.9	J	145	
E537	Perfluorodecane Sulfonic Acid	ng/l			8.3	U	8.3	U	7.7	U
E537	Perfluorodecanoic acid (PFDA)	ng/l			8.3	U	8.3	U	7.7	U
E537	Perfluorododecanoic acid (PFDoA)	ng/l			8.3	U	8.3	U	7.7	U
E537	Perfluoroheptane Sulfonate (PFHPS)	ng/l			8.3	U	4.68	J	5.97	J
E537	Perfluoroheptanoic acid (PFHpA)	ng/l			4.2	U	17.9		41.2	
E537	Perfluorohexanesulfonic acid (PFHxS)	ng/l			4.2	U	9.76		17.9	
E537	Perfluorohexanoic acid (PFHxA)	ng/l			8.3	U	10.1		30.1	
E537	Perfluorononanoic acid (PFNA)	ng/l			4.2	U	3.55	J	4.37	
E537	Perfluorooctane Sulfonamide (FOSA)	ng/l			8.3	U	3.1	J	3.15	J
E537	Perfluorooctanesulfonic acid (PFOS)	ng/l		20	7.04	J+	177		176	
E537	Perfluorooctanoic acid (PFOA)	ng/l		20	12		751		540	
E537	Perfluoropentanoic Acid (PFPeA)	ng/l			8.3	UJ	8.64		25.8	
E537	Perfluorotetradecanoic acid (PFTA)	ng/l			8.3	U	8.3	U	7.7	U
E537	Perfluorotridecanoic Acid (PFTriA)	ng/l			8.3	U	8.3	U	7.7	U
E537	Perfluoroundecanoic Acid (PFUnA)	ng/l			8.3	U	8.3	U	7.7	U
M4500A	Nitrogen, Ammonia (As N)	mg/l	2		0.75		0.47		1.1	
SM 2320 B	Alkalinity, Total (As CaCO3)	mg/l			410		753		1060	
SM2340B	Hardness (As CaCO3)	mg/l			454		984		1420	
SM2540C	Total Dissolved Solids (Residue, Filterable)	mg/l			673		620		960	
SW6020	Arsenic	mg/l	0.025		0.0025		0.0397		0.0471	
SW6010	Barium	mg/l	1		0.324		1.87		1.63	
SW6010	Beryllium	mg/l	0.003		0.001	U	0.0035	J	0.0035	J
SW6010	Boron	mg/l	1		0.0936	J	0.531		1.48	
SW6010	Chromium, Total	mg/l	0.05		0.01	U	0.0925		0.098	
SW6010	Copper	mg/l	0.2		0.01	U	0.162		0.229	
SW6010	Iron	mg/l	0.3		12.8		116		142	
SW6010	Lead	mg/l	0.025		0.003	U	0.13		0.209	
SW6010	Manganese	mg/l	0.3		1.28		19.7		6.58	
SW6010	Nickel	mg/l	0.1		0.0018	J	0.0765		0.099	
SW6010	Selenium	mg/l	0.01		0.01	U	0.05	U	0.05	U
SW6020	Thallium	mg/l	0.0005		0.001	U	0.0011	J	0.00094	J
SW6010	Zinc	mg/l	2		0.02	U	0.962		1.44	
SW7470A	Mercury	mg/l	0.0007		0.0002	U	0.001		0.002	
SW8260	1,1,1,2-Tetrachloroethane	ug/l	5		1	U	1	U	1	U
SW8260	1,1,1-Trichloroethane (TCA)	ug/l	5		1	U	1	U	1	U
SW8260	1,1,2,2-Tetrachloroethane	ug/l	5		1	U	1	U	1	U
SW8260	1,1,2-Trichloroethane	ug/l	1		1	U	1	U	1	U
SW8260	1,1-Dichloroethane	ug/l	5		1	U	1	U	1	U
SW8260	1,1-Dichloroethene	ug/l	5		1	U	1	UJ	1	UJ
SW8260	1,2,3-Trichloropropane	ug/l	0.04		2	U	2	U	2	U
SW8260	1,2-Dibromo-3-Chloropropane	ug/l	0.04		2	U	2	U	2	U

				Location Description						
				Location ID	8-WAY-001-MW-08		8-WAY-001-SW-01		8-WAY-001-SW-02	
				Sample ID	8-WAY-001-004-01		8-WAY-001-005-04		8-WAY-001-005-05	
				Matrix	WG		WS		WS	
				Lab Sample ID	JC69545-1		JC69654-4		JC69654-5	
				Sample Date	7/9/2018		7/10/2018		7/10/2018	
				Sample Type Code	N		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit						
SW8260	1,2-Dibromoethane (Ethylene Dibromide)	ug/l	0.0006		1	U	1	U	1	U
SW8260	1,2-Dichlorobenzene	ug/l	3		1	U	1	U	1	U
SW8260	1,2-Dichloroethane	ug/l	0.6		1	U	1	U	1	U
SW8260	1,2-Dichloropropane	ug/l	1		1	U	1	U	1	U
SW8260	1,4-Dichlorobenzene	ug/l	3		1	U	1	U	1	U
SW8260	2-Hexanone	ug/l	50		5	U	5	U	5	U
SW8260	Acetone	ug/l	50		10	U	6.6	J	8.5	J
SW8260	Acrylonitrile	ug/l	5		10	U	10	U	10	U
SW8260	Benzene	ug/l	1		0.24	J	0.5	U	0.5	U
SW8260	Bromochloromethane	ug/l	5		1	U	1	U	1	U
SW8260	Bromodichloromethane	ug/l	50		1	U	1	U	1	U
SW8260	Bromoform	ug/l	50		1	U	1	U	1	U
SW8260	Bromomethane	ug/l	5		2	U	2	U	2	U
SW8260	Carbon Disulfide	ug/l	60		2	U	2	UJ	2	UJ
SW8260	Carbon Tetrachloride	ug/l	5		1	U	1	U	1	U
SW8260	Chlorobenzene	ug/l	5		1	U	1	U	1	U
SW8260	Chloroethane	ug/l	5		1	U	1	U	1	U
SW8260	Chloroform	ug/l	7		1	U	1	U	1	U
SW8260	Chloromethane	ug/l	5		1	U	1	U	1	U
SW8260	Cis-1,2-Dichloroethylene	ug/l	5		1	U	1	U	1	U
SW8260	Cis-1,3-Dichloropropene	ug/l	0.4		1	U	1	U	1	U
SW8260	Dibromochloromethane	ug/l	50		1	U	1	U	1	U
SW8260	Dibromomethane	ug/l	5		1	U	1	U	1	U
SW8260	Ethylbenzene	ug/l	5		1	U	1	U	0.54	J
SW8260	Iodomethane (Methyl Iodide)	ug/l	5		2	U	2	UJ	2	UJ
SW8260	M,P-Xylene (Sum Of Isomers)	ug/l			1	U	1	U	1	U
SW8260	Methyl Ethyl Ketone (2-Butanone)	ug/l	50		10	U	10	U	10	U
SW8260	Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	ug/l			5	U	5	U	5	U
SW8260	Methylene Chloride	ug/l	5		2	U	2	U	2	U
SW8260	O-Xylene (1,2-Dimethylbenzene)	ug/l	5		1	U	1	U	1	U
SW8260	Styrene	ug/l	5		1	U	1	U	1	U
SW8260	Tetrachloroethylene (PCE)	ug/l	5		1	U	1	U	1	U
SW8260	Toluene	ug/l	5		1	U	1	U	12.4	
SW8260	Trans-1,2-Dichloroethene	ug/l	5		1	U	1	U	1	U
SW8260	Trans-1,3-Dichloropropene	ug/l	0.4		1	U	1	U	1	U
SW8260	Trans-1,4-Dichloro-2-Butene	ug/l	5		5	U	5	UJ	5	UJ
SW8260	Trichloroethylene (TCE)	ug/l	5		1	U	1	U	1	U
SW8260	Trichlorofluoromethane	ug/l	5		2	U	2	U	2	U
SW8260	Vinyl Acetate	ug/l			10	U	10	U	10	U
SW8260	Vinyl Chloride	ug/l	2		1	U	1	U	1	U
SW8260	Xylenes, Total	ug/l	5		1	U	1	U	1	U
SW8270	1,4-Dioxane (P-Dioxane)	ug/l			0.1	U	0.325		0.111	
SW8270	Acenaphthene	ug/l	20		0.1	U	0.1	U	0.095	U
SW8270	Acenaphthylene	ug/l			0.1	U	0.1	U	0.095	U
SW8270	Anthracene	ug/l	50		0.023	J	0.1	U	0.095	U
SW8270	Benzo(A)Anthracene	ug/l	0.002		0.05	U	0.05	U	0.048	U
SW8270	Benzo(A)Pyrene	ug/l			0.05	U	0.05	U	0.048	U
SW8270	Benzo(B)Fluoranthene	ug/l	0.002		0.1	U	0.1	U	0.095	U

					Location Description						
					Location ID	8-WAY-001-MW-08		8-WAY-001-SW-01		8-WAY-001-SW-02	
					Sample ID	8-WAY-001-004-01		8-WAY-001-005-04		8-WAY-001-005-05	
					Matrix	WG		WS		WS	
					Lab Sample ID	JC69545-1		JC69654-4		JC69654-5	
					Sample Date	7/9/2018		7/10/2018		7/10/2018	
					Sample Type Code	N		N		N	
Analytical Method	Chemical Name	Unit	NYSDEC Class GA	PFC Action Limit							
SW8270	Benzo(G,H,I)Perylene	ug/l				0.1	U	0.1	U	0.095	U
SW8270	Benzo(K)Fluoranthene	ug/l	0.002			0.1	U	0.1	U	0.095	U
SW8270	Chrysene	ug/l	0.002			0.1	U	0.1	U	0.095	U
SW8270	Dibenz(A,H)Anthracene	ug/l				0.1	U	0.1	U	0.095	U
SW8270	Fluoranthene	ug/l	50			0.0262	J	0.1	U	0.095	U
SW8270	Fluorene	ug/l	50			0.0262	J	0.1	U	0.095	U
SW8270	Indeno(1,2,3-C,D)Pyrene	ug/l	0.002			0.1	U	0.1	U	0.095	U
SW8270	Naphthalene	ug/l	10			0.1	U	0.1	U	0.095	U
SW8270	Phenanthrene	ug/l	50			0.0527	J	0.1	U	0.095	U
SW8270	Pyrene	ug/l	50			0.0194	J	0.1	U	0.095	U
SW9056	Bromide	mg/l	2			0.38	J	1.7		1.9	
SW9056	Chloride (As Cl)	mg/l	250			79.1		325		283	
SW9056	Sulfate (As SO4)	mg/l	250			74.8		0.89	J	15.1	
SW9060M	Total Organic Carbon	mg/l				8.6		12.2		44.5	

APPENDIX 6

Guidelines for Sampling and Analysis of PFAS

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

GUIDELINES FOR SAMPLING AND ANALYSIS OF PFAS

Under NYSDEC's Part 375 Remedial Programs

January 2020

www.dec.ny.gov

Contents

ERRATA SHEET for

Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Program
Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date

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

Objective

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

Applicability

Sampling for PFAS has already been initiated at numerous sites under DER-approved work plans, in accordance with specified procedures. All future work plans should include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

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

Field Sampling Procedures

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

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

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

Data Assessment and Application to Site Cleanup

Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10.

Water Sample Results

PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt). In addition, further assessment of water may be warranted if either of the following screening levels are met:

a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or
b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L

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

Soil Sample Results

The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase.

Sites in the site management phase should evaluate for PFAS to determine if modification to any components of the SMP is necessary (e.g., monitoring for PFAS, upgrading treatment facilities, or performing an RSO).

Testing for Imported Soil

Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the *PFAS Analyte List* (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs.

If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Analysis and Reporting

As of January 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.

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

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

Routine Analysis

Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP) does not offer certification for PFAS in matrices other than finished drinking water. However, laboratories analyzing environmental samples for PFAS (e.g., soil, sediments, and groundwater) under DER's Part 375 remedial programs need to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537.1 or ISO 25101. Laboratories should adhere to the guidelines and criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids). Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist.

Additional Analysis

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

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

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

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

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

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

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

General Guidelines in Accordance with DER-10

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

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by LC-MS/MS for PFAS using methodologies based on EPA Method 537.1
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
- Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537.1, EPA Method 533, or ISO 25101
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per matrix

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

General

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

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

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

Equipment

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

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

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

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

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification. Previous results of "non-detect" for PFAS from the UCMR3 water supply testing program are acceptable as verification.

Sampling Techniques

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

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

Sample Identification and Logging

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

Quality Assurance/Quality Control

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

Documentation

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

Personal Protection Equipment (PPE)

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

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

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

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

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

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

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

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

Equipment

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

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

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

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

Equipment Decontamination

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

Sampling Techniques

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

Sample Identification and Logging

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

Quality Assurance/Quality Control

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

Documentation

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

Personal Protection Equipment (PPE)

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

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

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

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

Appendix D - Sampling Protocols for PFAS in Surface Water

General

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

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

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

Equipment

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

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

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

- stainless steel cup

Equipment Decontamination

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

Sampling Techniques

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

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

Sample Identification and Logging

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

Quality Assurance/Quality Control

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

Documentation

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

Personal Protection Equipment (PPE)

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

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

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

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

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

General

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

Laboratory Analysis and Container

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

Equipment

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

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

Equipment Decontamination

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

Sampling Techniques

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

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

Sample Identification and Logging

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

Quality Assurance/Quality Control

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

Documentation

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

Personal Protection Equipment (PPE)

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

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

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the latest guidelines developed by the Division of Fish and Wildlife (DFW) entitled "General Fish Handling Procedures for Contaminant Analysis" (Ver. 8).

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

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

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

Version: 8

Previous Version Date: 21 March 2018

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

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

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

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

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

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

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

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

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

1. Project and Site Name.

2. DEC Region.

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

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

5. Preservation Method.

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

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

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

3. Date collected.

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

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

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

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

D. General data collection recommendations:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Project and Site Name ____ DEC Region ____________

Collections made by (include all crew) ____

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

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

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

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

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, ______________________________, of ____ collected the
(Print Name) (Print Business Address)

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

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

Town of _______________________________________, in _________________________________ County.

Item(s) ____

____

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

____ ____________________________
Signature Date

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

_______________________________________ ___________________
Signature Date

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

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

NOTICE OF WARRANTY

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

HANDLING INSTRUCTIONS

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

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

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

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

EQUIPMENT LIST

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

Fish measuring board.

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

Individually numbered metal tags for fish.

Manila tags to label bags.

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

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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

General

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) developed the following guidelines for laboratories analyzing environmental samples for PFAS under DER programs. If laboratories cannot adhere to the following guidelines, they should contact DER's Quality Assurance Officer, Dana Maikels, at dana.maikels@dec.ny.gov prior to analysis of samples.

Isotope Dilution

Isotope dilution techniques should be utilized for the analysis of PFAS in all media.

Extraction

For water samples, the entire sample bottle should be extracted, and the sample bottle rinsed with appropriate solvent to remove any residual PFAS.

For samples with high particulates, the samples should be handled in one of the following ways:

1. Spike the entire sample bottle with isotope dilution analytes (IDAs) prior to any sample manipulation. The sample can be passed through the SPE and if it clogs, record the volume that passed through.
2. If the sample contains too much sediment to attempt passing it through the SPE cartridge, the sample should be spiked with isotope dilution analytes, centrifuged and decanted.
3. If higher reporting limits are acceptable for the project, the sample can be diluted by taking a representative aliquot of the sample. If isotope dilution analytes will be diluted out of the sample, they can be added after the dilution. The sample should be homogenized prior to taking an aliquot.

If alternate sample extraction procedures are used, please contact the DER remedial program chemist prior to employing. Any deviations in sample preparation procedures should be clearly noted in the case narrative.

Signal to Noise Ratio

For all target analyte ions used for quantification, signal to noise ratio should be 3:1 or greater.

Blanks

There should be no detections in the method blanks above the reporting limits.

Ion Transitions

The ion transitions listed below should be used for the following PFAS:

PFOA	413 > 369
PFOS	499 > 80
PFHxS	399 > 80
PFBS	299 > 80
6:2 FTS	427 > 407
8:2 FTS	527 > 507
N-EtFOSAA	584 > 419
N-MeFOSAA	570 > 419

Branched and Linear Isomers

Standards containing both branched and linear isomers should be used when standards are commercially available. Currently, quantitative standards are available for PFHxS, PFOS, NMeFOSAA, and NEtFOSAA. As more standards become available, they should be incorporated in to the method. All isomer peaks present in the standard should be integrated and the areas summed. Samples should be integrated in the same manner as the standards.

Since a quantitative standard does not exist for branched isomers of PFOA, the instrument should be calibrated using just the linear isomer and a technical (qualitative) PFOA standard should be used to identify the retention time of the branched PFOA isomers in the sample. The total response of PFOA branched and linear isomers should be integrated in the samples and quantitated using the calibration curve of the linear standard.

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated for each target analyte and the ratio compared to standards. Lab derived criteria should be used to determine if the ratios are acceptable.

Reporting

Detections below the reporting limit should be reported and qualified with a J qualifier.

The acid form of PFAS analytes should be reported. If the salt form of the PFAS was used as a stock standard, the measured mass should be corrected to report the acid form of the analyte.

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

General

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

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 14 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

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

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

Initial Calibration

The initial calibration should contain a minimum of five standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%. Linear fit calibration curves should have an R^2 value greater than 0.990.

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

%RSD >20%	J flag detects and UJ non detects
R^2 >0.990	J flag detects and UJ non detects
Low-level calibration check <50% or >150%	J flag detects and UJ non detects
Mid-level calibration check <70% or >130%	J flag detects and UJ non detects

Initial Calibration Verification

An initial calibration verification (ICV) standard should be from a second source (if available). The ICV should be at the same concentration as the mid-level standard of the calibration curve.

ICV recovery <70% or >130%	J flag detects and non-detects

Continuing Calibration Verification

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

CCV recovery <70 or >130%	J flag results

Blanks

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

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

Field Duplicates

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

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

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

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

Matrix Spike/Matrix Spike Duplicate

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

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

Extracted Internal Standards (Isotope Dilution Analytes)

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

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

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated from the standards for each target analyte. Lab derived criteria should be used to determine if the ratios are acceptable. If the ratios fall outside of the laboratory criteria, qualify results as an estimated maximum concentration.

Signal to Noise Ratio

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

Branched and Linear Isomers

Observed branched isomers in the sample that do not have a qualitative or quantitative standard should be noted and the analyte should be qualified as biased low in the final data review summary report. Note: The branched isomer peak should also be present in the secondary ion transition.

Reporting Limits

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

Peak Integrations

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