South Brooklyn Marine Terminal
Remedial Investigation Work Plan

Portions of Lots 1, 130, 136, 137, and 155, Block 662
2nd Avenue
Brooklyn, New York 11232

DEC Site No. C224360
Revision 0
November 16, 2022

PRESENTED TO

SBMT Asset LLC
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PRESENTED BY

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

Robert C. Cantagallo **11/16/22**

Robert C. Cantagallo, CHMM. **Date**

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1.0 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech), on behalf of SBMT Asset LLC (SBMT Asset), has prepared this Remedial Investigation Work Plan (RIWP) for portions of the South Brooklyn Marine Terminal (SBMT) Site located in Brooklyn, New York (the "Site"; Figure 1). The Site will be used for two separate projects: the Empire Wind 1 offshore wind project (EW1 Project), as the location for the submarine export cable landfall and onshore substation, and the SBMT Port Infrastructure Improvement Project, which will allow SBMT to serve as a staging and operations-and-maintenance base for the offshore wind industry.

The purpose of this RIWP is to define the remedial investigation (RI) work scope that will be used to complete the site characterization in conjunction with the data collected by Tetra Tech during the December 2021 Phase II Environmental Site Assessment (ESA). The RI data will be used to further characterize the subsurface conditions on-site and evaluate the need for future remedial measures. The RIWP includes the methodologies and approach for soil borings and monitoring well installation, groundwater, and soil sampling, and preparation of the Remedial Investigation Report (RIR).

1.1 Scope of Work

The Scope of Work for the RIWP includes the collection and analysis of additional on-Site soil and groundwater samples throughout the SBMT site to further characterize the extent of previously identified subsurface, and in areas where subsurface work will be conducted during facility construction. These activities include:

- Completing a geophysical survey at the proposed boring locations to evaluate the presence or absence of subsurface utilities. Boring locations will also be hand-cleared to 5 feet below ground surface (BGS) using appropriate tools;
- Collecting 6 surface soil samples;
- Advancing 44 soil borings to approximately 12-15 feet (Figure 2, Proposed Sample Location Plan);
- Screening soil samples for evidence of contamination such as staining, odors, or vapors with a photoionization detector (PID);
- Collecting a total of 99 soil samples (including QA/QC samples) for off-site laboratory analysis;
- Installation of ten (10) permanent groundwater monitoring wells;
- Collection of one (1) round of groundwater samples from the monitoring wells including (QA/QC samples);
- Collection of eight (8) soil vapor samples (including a QA/QC sample) primarily located in those areas where PID readings were noted during the Phase II Assessment or construction of buildings is planned;
- Conducting a tidal study;
- Surveying all sampling locations;

- Performing data validation/data usability;
- Reviewing analytical results against the soil cleanup objectives (SCOs) described in New York Codes, Rules and Regulations (NYCRR) Part 375 and the groundwater criteria in NYSDEC Ambient Water Quality Standards and Guidance Values; and
- Preparing the Remedial Investigation Report.

The investigation activities presented herein will be performance in accordance with the Health and Safety Plan (HASP) and the Quality Assurance Project Plan (QAPP). The HASP and QAPP are included in this work plan as Appendices A and B, respectively. The proposed RI sample locations are depicted on Figure 2.

1.2 Project Schedule

Implementation of the field activities will begin immediately following approval of the RIWP, pending any short delays due to inclement weather. The results of the RI will be incorporated into a RIR. It is anticipated that completion of the soil borings and monitoring well installations for the RI will be completed in approximately three weeks, with groundwater sample collection following two weeks later after the monitoring wells have been properly developed and allowed to equilibrate. Appendix C provides a schedule, showing the duration of all activities for the remedial investigation.

1.3 Project Organization and Personnel

An organization structure has been developed to identify the roles and responsibilities of the various personnel involved with the SBMT site. The team will consist of the following personnel, with a brief description of their responsibilities as shown in Table 1-1 below.

Table 1-1 – Key Project Personnel

Project Personnel Title	Company	Personnel Name	Contact Email
Project Manager	Tetra Tech	Robert Cantagallo, CHMM	Robert.Cantagallo@tetratech.com
Project Quality Assurance Manager	Tetra Tech	Lauren McHugh	Lauren.McHugh@tetratech.com
Field Operations Lead	Tetra Tech	Alex Valli	Alex.Valli@tetratech.com
Third Party Validator	Tetra Tech	Angel Guzman	Angel.guzman@tetratech.com

Resumes of the key project personnel are included in Attachment 3 of the Quality Assurance Project Plan.

1.4 SITE DESCRIPTION AND BACKGROUND

1.5 General Site Conditions

The Site is irregular in shape, and is bounded by 2nd Avenue to the southeast, 39th Street to the southwest, a recycling facility and 29th Street to the northeast and the Gowanus Bay to the northwest (Figure 1). The total Site area includes an approximately 73.68-acre tract of land within portions of Lots 1, 130, 136, 137, and 155 of Block 662. The Site is largely vacant and primarily consists of asphalt and concrete pavement, existing above-grade structures, railway spurs, and bulkheads. There are seven existing structures located on the property, including the J1 Shed, J2 Shed, N Shed, Graffiti Building, two temporary structures near 650 2nd Avenue, and the Tower Building located at 632 2nd Avenue. The Site is surrounded by an approximately eight-foot-tall chain-link fence, and access is restricted to the entrance near the northwest terminus of 39th Street with a security guard present. The topography at the Site is relatively flat and ground elevations vary between 2 feet to 10 feet above mean sea level (AMSL).

As early as 1888, the Site was undeveloped and consisted of open waters. Between 1888 and 1922, the Site elevation was progressively raised with fill to construct a series of piers formerly known as the City of New York Piers. Based on aerial imagery, the site has been in its current condition since at least 2011. Additional historical information for the site is included in the Phase 1 Environmental Site Assessment prepared by AECOM in May 2018.

1.6 Site Geology and Hydrology

1.6.1 Regional Geology

The Site is situated within the glaciated Atlantic Coastal Plain physiographic province. Limited public data is available regarding to the depth to bedrock within the project area. According to the Geology and Engineering Geology of the New York Metropolitan Area, Field Trip Guidebook T361 (Baskerville 1989) and the Geologic Map of New York City, SBMT is underlain by the Cambro-Ordovician age Hartland Formation. The Hartland Formation is generally comprised of gneiss and belongs to the Pelham Bay Member. Surficial deposits in this region of New York are also mapped as glacial till. Based on a review of historic aerial imagery, low-lying portions of the site have been raised using fill materials as early as 1888 (AECOM 2018).

According to a review of the Natural Resources Conservation Service (NRCS) Web Soil Survey, the majority of the Site is mapped within the Urban land, reclaimed substratum, 0-3 percent slopes map unit. The typical soil profile for this map unit includes 0 to 15 inches of cemented material, and up to 15 to 79 inches of gravelly sandy loam. A small portion of the Site is mapped within the Urban land, till substratum, 0 to 3 percent slopes map unit. The typical soil profile for this map unit also includes cemented material and gravelly sandy loam.

1.6.2 Site Geology

A subsurface exploration program was completed by AECOM at SBMT between December 2017 and February 2018 to characterize the geotechnical conditions. The 2021 Phase II ESA conducted by Tetra Tech supported the AECOM observations. The site is generally underlain by fill consisting of fine to coarse sands with varying amounts of gravel and silt, as well as brick, wood, gravel etc. within the upper 6-8 feet. Shallow layers of fine to coarse gravel with sand and

silt, approximately eight to eleven feet thick, were observed in three borings. Deeper strata containing clay, sand, and silt, approximately 15 to 20 feet thick, were observed at depths between 40 and 102 feet BGS.

1.6.3 Site Hydrogeology

During the Phase II ESA performed by Tetra Tech in December 2021, depth to groundwater varied across the Site, but was generally observed to be approximately eight to ten feet BGS. The groundwater flow direction has not been investigated but is assumed to follow the general topography of the Site and flow northwest towards Gowanus Bay.

1.7 Previous Investigations

Based on a review of prior reports for the Site, environmental investigations have been completed for the SBMT since at least October 1997. In March 1998, two 550-gallon gasoline underground storage tanks (USTs), four 4,000-gallon gasoline USTs, one 4,000-gallon diesel UST, one 550-gallon waste oil UST, one 1,000-gallon above-ground storage tank (AST) of unknown contents, and one 550-gallon fuel AST were removed from the property. Since impacted soils were detected through post-excavation sampling around the tanks and associated pumps, four spill cases (No. 97-14187, 97-14188, 97-14189, and 97-14190) were opened by NYSDEC on March 23, 1998. No additional USTs were located during a 1998 geophysical investigation performed at eight portions of the Site following removal of the tanks (TRC, 2004). Impacted soils surrounding the former UST area were excavated and transported off-Site for disposal. Thirteen groundwater monitoring wells were installed around the former tank area and quarterly groundwater sampling was completed by URS Corporation (URS) for various wells between August 2003 and March 2005. Once groundwater contaminant concentrations were measured below the NYSDEC Groundwater Quality Criteria, a request for spill closure was submitted and approved for both cases in May 2005.

An April 2004 investigation by TRC included the advancement of 12 soil borings throughout the Site that revealed the presence of petroleum-related volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), and metals in subsurface soils between 0 and 10.5 feet BGS. It was suspected that four former 160,000-gallon ASTs existed in in the location of the "N Shed" along the 39th Street Pier. Based on a review of historic aerial photographs, it was estimated that these tanks were active between 1940 and 1953. However, information regarding the decommissioning of the tanks and any impacted soil removal was not available (AECOM 2018). Petroleum-related impacts were observed in four shallow and two subsurface soil samples collected from four borings in the vicinity of the former ASTs (TRC, 2004).

A Phase I Environmental Site Assessment was performed by AECOM for the Site in May 2018. AECOM documented that due to the potential for orphan USTs and presence historic urban fill, subsurface contamination may exist at the SBMT. A brass cap within a concrete pad was observed behind the two temporary structures associated with the auto maintenance facility near 37th Street and Second Avenue. The Phase I report also recognized the history of reported spills and removal of the former USTs in 1999.

Several USTs located at the SBMT were listed as being closed on March 1, 2018 according to the Petroleum Bulk Storage (PBS) database. The Site (# 2-604051) indicated the presence of eight (8) USTs as shown in the table below:

Table 2-1 – Summary of Former Closed USTs Listed at the Site

Tank No.	Tank Location	Status	Capacity (gal.)	UST Contents
1	Buried	Closed	4,000	Diesel
2	Buried	Closed	4,000	Diesel
3	Buried	Closed	4,000	Diesel
4	Buried	Closed	4,000	Diesel
5	Buried	Closed	4,000	Diesel
6	Buried	Closed	550	Gasoline
7	Buried	Closed	550	Gasoline
8	Buried	Closed	550	Used Oil (Heating)

AECOM also completed a Phase II Limited Site Investigation at SBMT in October 2018 that included the advancement of 15 soil borings to a maximum depth of 20 feet BGS, collection of groundwater grab samples from eight borings, and an inspection of an underground vault located near the New York Department of Transportation (DOT) building in the northeast portion of the Site. Elevated SVOCs concentrations were detected above unrestricted, residential, and commercial SCOs in eight borings at the Site, but primarily in the location of the former ASTs within the "N Shed". Poly chlorinated biphenyls (PCBs) were also detected above the commercial SCOs in the vicinity of the DOT building. No VOCs were detected in any soil samples above the unrestricted Site Cleanup Objective (SCO) criteria. SVOCs above the New York Technical and Operational Guidance Series (TOGS) 1.1.1 standards were detected in only one groundwater sample from a boring located near the 39th Street parking lot.

A subsurface investigation was completed by TRC in July 2019 throughout the Site that included a geophysical survey, advancement of 20 soil borings, installation of eight temporary wells, and installation of eight soil vapor sample locations. The geophysical survey identified an additional UST in the southwestern portion of the Site near 39th Street. No information regarding the registration and closure of the UST was available in the report. Information regarding the four former 160,000-gallon ASTs was not provided in this investigation report. According to the TRC Phase II Investigation Report, the following contaminants were identified for on-Site soils:

- Select VOCs were detected over the Unrestricted Use SCO and Commissioner's Policy-51 Table 2 and/or Table 3 Soil Cleanup Levels (SCLs), but below the Restricted Residential Use, Restricted Commercial Use, and Restricted Industrial Use SCOs;

- Select SVOCs and metals were detected above the Unrestricted Use, Restricted Residential, Restricted Commercial, and Restricted Industrial SCOs;

- Total PCBs were detected in one sample at a concentration above the Unrestricted Use SCO, but below the Restricted Residential Use, Restricted Commercial Use, and Restricted Industrial Use SCOs; and,

- Select pesticides were detected over the Unrestricted Use SCOs but below the Restricted Residential Use, Restricted Commercial Use, and Restricted Industrial Use SCOs.

- Impacts to adjacent subsurface materials were not observed downgradient of the UST.

A supplemental Phase II ESA was completed by Tetra Tech in December 2021 that included a geophysical survey, advancement of 40 soil borings to a depth of approximately 10 feet BGS, installation of 11 temporary monitoring wells to depths between 6 and 10 feet BGS and collection of groundwater samples, installation of 13 temporary soil vapor points and collection of 13 soil vapor samples below ground cover, collection of one ambient air sample from the Site and laboratory analyses for parameters of environmental concern by laboratory certified under the New York Environmental Laboratory Approval Program (ELAP). Category B deliverables are available only for the most recent Tetra Tech Phase II. Data usability summary reports will be prepared for the Phase II data and the RI data.

The analytical results for soil samples were compared to the NYSDEC Industrial Use SCO and produced the following exceedances:

- Benzo(a)pyrene was detected in 33 of 42 samples, ranging from 22.9 to 9,330 µg/kg, and exceeded the NYSDEC Industrial Use SCO in eight (8) samples.

- Dibenzo(a,h)anthracene was detected in 24 of 42 samples, ranging from 19.2 to 1,530 µg/kg, and exceeded the NYSDEC Industrial Use SCO in one (1) sample.

The analytical results for groundwater samples were compared to the NYSDEC Ambient Water Quality Stands and Guidance Values for groundwater (GA) and revealed the following exceedances:

- Benzo(a)anthracene was detected in 2 of 12 samples, ranging from 0.47 to 0.76 µg/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.

- Benzo(b)fluoranthene was detected in 2 of 12 samples, ranging from 0.61 to 0.9 µg/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.

- Benzo(k)fluoranthene was detected in 2 of 12 samples, ranging from 0.21 to 0.38 µg/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.

- Chrysene was detected in 2 of 12 samples, ranging from 0.37 to 0.64 µg/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.
- Indeno(1,2,3-cd)Pyrene was detected in 3 of 12 samples, ranging from 0.57 to 1.1 µg/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in all three (3) samples.
- Antimony was detected in one (1) sample, at a concentration of 6.2 µg/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values.
- Arsenic was detected in 9 of 11 samples, ranging from 3.1 to 66.6 µg/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one (1) location.
- Beryllium was detected in 5 of 11 samples, ranging from 1.1 to 7.1 µg/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one (1) location.
- Chromium was detected in 4 of 11 samples, ranging from 11.7 to 140 µg/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one (1) location.
- Manganese was detected in all 11 samples, ranging from 20.5 to 10,700 µg/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at six (6) locations.
- Nickel was detected in 5 of 11 samples, ranging from 11.2 to 206 µg/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one (1) location.

A total of 68 VOC parameters were analyzed using the TO-15 method. Of the 68 VOC parameters analyzed, 46 analytes were detected at 13 of the soil vapor locations. Below is a summary of the VOCs that were detected above ambient air concentrations:

- Benzene was detected at concentrations ranging from 0.7 to 45.4 µg/m^3,
- Cyclohexane was detected at concentrations ranging from 0.27 to 372 µg/m^3,
- Ethylbenzene was detected at concentrations ranging from 0.42 to 2.9 µg/m^3,
- Heptane was detected at concentrations ranging from 0.49 to 422 µg/m^3,
- Hexane was detected at concentrations ranging from 0.49 to 206 µg/m^3,
- Methyl ethyl ketone was detected at concentrations ranging from 0.41 to 121 µg/m^3,
- Toluene was detected at concentrations ranging from 1.5 to 51.6 µg/m^3, and
- Xylenes (total) was detected at concentrations ranging from 0.91 to 136 µg/m^3.

One ambient air sample was collected as part of the sampling event. There were 17 VOC analytes that were detected in the ambient air sample.

1.8 Areas of Concern

Based on a review of the Site geology and hydrogeology as well as the description and results of previous investigations conducted at the Site, the following Areas of Concern (AOCs) have been identified:

- AOC-1: Former USTs – Previous investigation identified presence of SVOCs
- AOC-2: Vacant/Temporary Buildings near 37th Street and Second Avenue – Previous investigations identified the presence of PAHs.
- AOC-3: Tower Building and Scale House (DOT Building) – Previous investigation identified elevated PID readings and detections of PCBs
- AOC-4: N Shed – Previous investigation identified presence of PAHs
- AOC-5: 33rd Street Pier – Previous investigation identified elevated PID readings – potential surficial soil exposures in this area
- AOC-6: Test Pit Area – Previous geotechnical investigation identified presence of sheen on ground water in test pit in this area
- AOC-7: Miscellaneous Areas of Concern – Previous investigations identified elevated PID readings or other areas that had not been previously investigated/need confirmatory sampling.

2.0 FIELD SAMPLING PROGRAM

This section describes the tasks to be performed as part of the Remedial Investigation. Sampling of soil and groundwater will be consistent with the guidance provided in NYSDEC Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10) Sections 3.5.1 and 3.5.3.

The proposed sampling locations and frequency are intended to further characterize the extent of subsurface contamination in areas of previously observed impacts, and in areas where subsurface work will be conducted during facility construction. The sampling locations may be field adjusted as needed if previously unknown utilities are identified or if shallow refusal is encountered due to bricks, large rocks, or other unknown obstructions. Category B deliverables are available only for the most recent Tetra Tech Phase II ESA. Data usability summary reports will be prepared for the Phase II data.

2.1 Sample Locations

The field sampling program has been developed to identify and the nature and extent of contaminants related to the AOCs identified in Section 2. It also includes sampling to ensure full characterization of the areas where subsurface construction activities are planned. The sampling program will consist of collecting soil samples from 44 soil boring locations, collecting surficial soil samples from six (6) locations, the collection of soil vapor samples from eight (8) locations and the collection of groundwater samples from ten (10) monitoring wells to be installed as part of the field effort. The proposed sampling locations are depicted on Figure 2. The number and type of samples to be collected are broken down by AOC as described below.

Table 3-1: Proposed Boring and Sample Distribution between Site AOCs

AOC #	Number of Borings	Soil Samples	Surficial Soil Samples	Soil Vapor Samples	Groundwater Samples
1	3	6	2	---	1
2	7	14	---	---	1
3	4	8	---	1	1
4	5	10	---	---	---
5	6	12	4	3	1
6	4	8	---	1	1
7	15	30	---	2	5

2.2 Utility Clearance

Prior to commencing ground-intrusive activities on-Site, a public utility mark out will be requested through notification to the New York 811 System (800-272-4480). The mark out request must be placed at least 48 hours, but no more than 10 days, prior to drilling. A private utility location company will also be subcontracted to clear the proposed sample locations prior to drilling. If any utilities are identified, then the proposed sampling locations may be modified to avoid overhead, or subsurface obstructions as needed. Borings will also be hand-cleared to approximately five feet BGS.

2.3 Collection of Surface soil Samples and Installation of Soil Borings

Surface soil samples (0-2" bgs) will be collected from two areas on site where surface soil is accessible – the north side of the small pier, and a vegetated area near planned MW-7. The surface soil samples will collected by hand, using an En Core® for VOCs and a trowel or scoop and bowl for the remaining parameters.

Soil borings will be advanced at 44 locations within SBMT. The soil sampling will be performed by a field engineer, scientist, or technician under the supervision of a New York-licensed geologist or engineer. Soil samples will be continuously collected using direct-push drilling methods with macro-core samplers and acetate liners from ground surface to the target boring depths. If required due to the soil conditions (i.e., fill/lag layer), a hollow stem auger (HSA) may be used to facilitate the collection of soil samples at depth.

Two soil samples will be collected from each boring for off-Site laboratory analysis. One sample will be collected from the two-foot interval exhibiting the greater evidence of impact (e.g., elevated PID readings, odors, or staining). Samples may be also collected at target depths to delineate impacts observed at adjacent soil borings with SCO industrial exceedances. If no evidence of impacts is observed during soil boring advancement, a soil sample will be collected from the interval immediately above the groundwater table. A second sample will be collected from the final two-foot interval of the boring. The target boring depth is approximately 12-15 feet BGS, which is approximately five feet below the anticipated water table, in order to assess the possible presence of a smear zone.

Quality assurance / quality control (QA/QC) samples will be collected at a ratio of 1:20. Therefore, it is anticipated that three duplicate soil samples will be collected.

Soil samples will be logged and classified according to the Unified Soil Classification (USC) system per ASTM 2488 to aid in determining if the soils are fill material or native soils.

The soil cores will be screened with a photoionization detector (PID) for volatiles, and detections will be noted on the boring log. Any unusual soil conditions identified through visual and olfactory observations will also be recorded.

Samples selected for off-Site laboratory analysis will be transferred to certified-clean containers provided by the laboratory by personnel wearing clean, disposable latex or nitrile gloves. The soil fraction for TCL VOCs will be collected using an En Core® sampler before removing the soil from the core tube. Collected soils will then be placed into a clean, disposable aluminum tin using a

disposable plastic trowel, and mixed to ensure a homogeneous sample that is representative of the sampling interval. The remaining analytical fractions will then be transferred into the appropriate glass jars, labeled, recorded on a chain-of-custody, and placed into an ice-chilled cooler pending transport to the analytical laboratory (additional details are provided below).

Soil samples will be analyzed for the Target Compound List (TCL) VOCs, TCL SVOCs, Target Analyte List (TAL) Metals, Total Organic Carbon (TOC), PCBs, PFAS, 1,4 Dioxane and cyanide (CN). In addition, 25% of the samples will be analyzed for pesticides.

Each soil sample location will be surveyed by a Professional Land Surveyor licensed in New York State.

Table 3-2: Soil Boring and Sampling Rationale

AOC #	Soil Borings	Surface Samples	Rationale
1	3	2	Identify nature and extent of previous PAH detections in the area, possibly related to former USTs. Surface Samples collected in support of FWIA and qualitative human health exposure assessment (QHHEA)
2	7	---	Identify nature and extent of potential impacts related to elevated PID readings and prior PAH detections in this area
3	4	---	Identify nature and extent of impacts related to elevated PID readings and detections of PCBs related to a transformer
4	5	---	- Identify nature and extent of previous PAH detections in this area
5	6	4	Identify nature and extent of potential impacts related previous elevated PID readings in this area. Surface Samples collected in support of FWIA and qualitative human health exposure assessment (QHHEA)
6	4	---	Identify nature and extent of potential impacts related to a sheen noted on a test pit completed in this area
7	15	---	Identify nature and extent of potential impacts related to elevated PID readings and characterize areas of planned subsurface construction that had not been previously investigated/need confirmatory sampling -

Table 3-3: Soil Sampling and Analysis Plan

Parameter	Interval(s)	No. of Samples	QA/QC
TCL VOCs	based on field observations, previous sampling, and/or termination of boring (at GW table)	88	5 duplicates, 5 MS/MSD
TCL SVOCs	based on field observations, previous sampling, and/or termination of boring (at GW table)	88	5 duplicates, 5 MS/MSD
TAL Metals and CN	based on field observations, previous sampling, and/or termination of boring (at GW table)	88	5 duplicates, 5 MS/MSD
TOC	based on field observations, previous sampling, and/or termination of boring (at GW table)	88	5 duplicates, 5 MS/MSD
PCBs	based on field observations, previous sampling, and/or termination of boring (at GW table)	88	5 duplicates, 5 MS/MSD
1,4 Dioxane	based on field observations, previous sampling, and/or termination of boring (at GW table)	88	5 duplicates, 5 MS/MSD
PFAS	based on field observations, previous sampling, and/or termination of boring (at GW table)	88	5 duplicates, 5 MS/MSD
Pesticide	25% of the samples will be analyzed based on field observations, previous sampling, and/or termination of boring (at GW table)	22	2 duplicates, 2 MS/MSD

2.4 Groundwater Investigation and Sampling Methods

Ten (10) new permanent groundwater monitoring wells will be installed on-Site to further characterize groundwater contamination at SBMT. One well will be constructed in the northwestern portion of the 33rd Street Pier, three wells will be installed along the southeastern boundary of the Site near 2nd Avenue, one well will be installed adjacent to the DOT building, two wells will be installed in the central portion of the site. The typical well construction will consist of a ten (10) ft. long two-inch diameter Schedule 40 PVC 0.2-inch slot screen and solid PVC riser pipe. The annular space will be filled with appropriately sized sand pack up to two (2) ft. above the top of the slotted screen followed by at least one (1) ft. of a bentonite pellet layer on top which will be hydrated. The remaining annular space will be filled with additional bentonite pellets subsequently hydrated or a cement-bentonite grout. It is anticipated that the well screen will be installed between 5 feet and 15 feet BGS, based on depth to the groundwater table, with 5 ft. of screen above the water table, depending on tidal influence at the Site. Average tides in Gowanus Bay fluctuate about 5.5 ft between low and high tide. The finished well will be completed with a

flush-mount road box and a concrete collar at the surface. The well will also have a locking well cap.

Table 3-4: Monitoring Well Installation Detail and Rationale

Well ID	Location	Type	Rationale
MW-1	On site	Flushmount	Upgradient location southern corner of the site
MW-2	On site	Flushmount	Upgradient location southeast portion of the site
MW-3	On site	Flushmount	Upgradient location southeast portion of the site
MW-4	On site	Flushmount	Southern corner of the site to characterize area of anticipated subsurface construction and impacts around TT-SB-17
MW-5	On site	Flushmount	North corner of Tower Building to characterize potential PCB impacts
MW-6	On site	Flushmount	Near cable landing area to characterize area of anticipated subsurface construction and impacts around SBMT-TW-7
MW-7	On site	Flushmount	Southwest portion of the site to characterize impacts around TT-SB-13
MW-8	On site	Flushmount	Northwest central portion of the site to characterize downgradient groundwater conditions
MW-9	On site	Flushmount	Northeast corner of the site to characterize groundwater conditions in this area and potentially characterize any off-site influences to the north
MW-10	On site	Flushmount	Proposed substation location in northeast corner of the site to characterize groundwater conditions in this area

After approximately 24 hours, the monitoring wells will be developed. Development consists of surging the well using a surge block to for approximately 5 minutes, followed by pumping with a submersible pump to remove accumulated fines from the well. Wells will be developed until there is no longer an appreciable decrease in turbidity as measured using turbidity meter. Well elevations will be surveyed prior to sampling.

No less than two weeks after well development, a full round of synoptic groundwater level measurements will be collected from the monitoring wells prior to sampling. The tidal stage (rising/falling) and height will also be noted during water level collections activities. Each monitoring well will be screened with a PID immediately upon opening the casing and the value noted. If NAPL is observed in any of the monitoring wells it will be noted in the field notebook and a sample will be collected for forensic fingerprint analysis.

Groundwater samples will be collected from the monitoring wells following the USEPA Region 2 low-flow purge and sampling methods using a bladder or submersible pump and the following parameters will be recorded via field instrumentation until stabilization requirements are met (~ ±10%): temperature, redox potential, dissolved oxygen, conductivity, pH and turbidity. A blind duplicate and trip blank will also be collected for QA/QC purposes. Purge water will be collected in 5-gallon buckets and transferred to 55-gallon steel drums for disposal. Purged water will be placed into 55-gallon drums and temporarily stored awaiting off-Site disposal. Purging rates will be set below the maximum sustainable flow rate in order to minimize drawdown.

Groundwater samples for PFAS will be collected in accordance with the June 2021 NYSDEC guidance, *Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs and* will be outlined in the project specific SOPs developed for the QAPP.

QA/QC samples will be collected at a ratio of 1:20. Therefore, it is anticipated that one blind duplicate groundwater sample will be collected.

Table 3-5: GW Sampling and Analysis Plan

ID	GW Level	Sampling Method	Sampling Analysis
MW-1	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PCBS, PFAS, 1,4 -dioxane, pesticides
MW-2	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PCBs, PFAS, 1,4 -dioxane
MW-3	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PCBs, PFAS, 1,4 -dioxane, pesticides
MW-4	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PFAS, 1,4 -dioxane
MW-5	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PCBs, PFAS, 1,4 -dioxane
MW-6	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PFAS, 1,4 -dioxane
MW-7	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PFAS, 1,4 -dioxane
MW-8	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PFAS, 1,4 -dioxane, pesticides
MW-9	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PFAS, 1,4 -dioxane
MW-10	X	Low-Flow	TCL VOCs, TCL SVOCs, TAL Metals, PFAS, 1,4 -dioxane, pesticides

2.5 Soil Vapor Sampling

In order to evaluate the subsurface soil and soil vapor conditions in the area, 8 soil vapor samples will be collected from the subject property at a depth of 6 to 8 feet bgs, below the ground cover (concrete slabs, asphalt, etc.) but above the water table. These samples will be obtained from within areas where future structures are planned, or near elevated PIDS readings noted in previous investigations. QA/QC samples will be collected at a ratio of 1:20. Therefore, it is anticipated that one duplicate sample will be collected.

Table 3-6: Soil Vapor Sampling and Analysis Plan

AOC #	# of Soil Vapor Points	Rationale	Sampling Analysis
1	0	No soil vapor points proposed	---
2	0	No soil vapor points proposed	---
3	1	Soil vapor points in footprint of existing building	TO-15
4	0	No soil vapor points proposed	---
5	3	Soil vapor points near borings with elevated PID readings	TO-15
6	1	Soil vapor point near test pit with observed LNAPL present on water	TO-15
7	3	Soil vapor points to provide site-wide coverage	TO-15

Soil vapor sampling will be conducted in general accordance with the applicable New York State Department of Health Soil Vapor Intrusion Guidance Document dated 2006 (and relevant updates). The soil vapor points will be installed by drilling through the concrete pads or asphalt with a portable concrete coring machine. The soil vapor points will then be installed using direct push methods with a 4-inch diameter stainless steel screen to the target. The void around the screen will be filled with #1 Morie sand and the upper portion concreted into the slab or asphalt. The sub-slab ports will be completed with a two-inch stainless-steel security cap.

2.6 Surveying

A New York State licensed land surveyor will survey the vertical and horizontal locations of the new monitoring wells and soil boring locations. The elevation of the reference point of each monitoring well (the top of the well casing) will be surveyed for aid in determining groundwater elevations and corresponding flow direction.

2.7 Tidal Study

A tidal study will be conducted and will include the installation of transducers in approximately 6 wells to determine tidal fluctuations of groundwater across tidal and rain events, and a stilling well or equivalent on the bulkhead to measure tidal fluctuations of the surface water in Gowanus Bay. Transducers will be selected that are capable of measuring conductivity or salinity.

2.8 Off-Site Laboratory Sample Analytical Methods

The representative soil samples will be analyzed by New York ELAP-certified laboratory with a standard 10-day turn-around-time. The analytical methods proposed for the remedial investigation are summarized below:

- TCL VOCs using USEPA Method 8260;
- TCL semi-volatile organic compounds SVOCs using USEPA Method 8270;
- Chlorinated Pesticides using method EPA 8081
- TAL metals using USEPA Methods 6010 and 7471;
- TOC under SW-846 using USEPA Method 9060A;
- PCBs using USEPA Method 8082;
- 1,4-dioxane by USEPA Method 8270 SIM, and;
- Per- and polyfluoroalkyl substances (PFAS) by USEPA Method 1633.

The ground water samples will be submitted to a New York State Department of Health (NYSDOH) approved laboratory for the following analyses:

- VOCs by USEPA Method 8260;
- SVOCs by USEPA Method 8270;

- Chlorinated Pesticides by USEPA Method 8081;
- Total Metals (total and dissolved metals);
- PCBs by USEPA Method 8082;
- Per- and poly-fluoroalkyl (PFAS) compounds by USEPA Method 1633;

The soil vapor samples will be submitted to a New York State Department of Health (NYSDOH) approved laboratory for T)-15 analyses.

The laboratory will provide a Category B data deliverable (PDF) and a NYSDEC EQuIS-formatted electronic data deliverable (EDD). Data Usability Summary Reports (DUSRs) will be required for all data packages, including previously collected Phase II data.

2.9 Boring Abandonment and Waste Disposal

Due to the relatively shallow nature of the sampling, the sampling locations will be restored to grade using a cement/bentonite slurry. Investigation-derived waste that is generated during this sampling effort will be placed in 55-gallon drums, labeled appropriately, and stored on-Site in an owner-designated area for proper off-Site disposal of the investigation-derived waste using a licensed waste hauler and disposal facility.

2.10 Field Log

Field sampling personnel, under the supervision of a Qualified Environmental Professional, will keep a daily record of the field activities, including work completed that day, samples collected, visitors to the Site, and any other pertinent observations. Photographs taken during field activities will be noted in the daily field log with the date and time of the photo, location, direction of the photo and description of the subject of the photograph.

3.0 HEALTH AND SAFETY PLAN AND COMMUNITY AIR MONITORING PLAN

A site-specific Health and Safety Plan (HASP) to be used during field activities is attached as Appendix A. The HASP includes the following content:

1. Describe the expected hazardous substances that could be encountered during field work;
2. Specify appropriate personal protective equipment levels for the work;
3. Specify the monitoring equipment and monitoring procedures for on-site activities;
4. Identify safe work practices around drilling equipment and during sampling activities;
5. Describe measures to be implemented in the event of an emergency; and
6. Describe the COVID-19 precautions that will be used.

On-site personnel will be required to review the HASP prior to the start of field activities; and will be required to conduct field activities in accordance with procedures specified in the HASP.

A Community Air Monitoring Plan (CAMP) is included as Appendix D. The CAMP describes the activities that will be undertaken as part of subsurface excavation activities at the Site. These activities will include the monitoring of VOCs and particulates upwind and downwind of the exclusion zones. Exclusion zones will be established at areas of subsurface investigation. Monitoring will be conducted at one upwind and one downwind station, the locations of which will be determined on a daily basis based on wind direction and will be adjusted throughout the day as conditions change.

4.0 REPORTING

Daily and monthly reports will be submitted to appropriate agencies. Daily reports will be submitted by noon the day following the reporting period and will include a summary of the day's field activities, any CAMP excursions, photos of the daily work activities and a look ahead for upcoming work. Monthly reports format and contents will follow guidance as presented in DER-10, Section 5.7 – Remedial Action Schedule and Progress Reports.

Upon completion of the remedial investigation activities discussed above, a Remedial Investigation Report will be prepared for submission to the NYSDEC. The RIR will describe the nature and extent, as well as the fate and transport of contaminants associated with SBMT, and will identify specific contaminant concentrations throughout each media (e.g., soil, groundwater, etc.). The RIR will also include the following documentation:

- Descriptions of soil sampling activities and encountered surface soils;
- Results of the subsurface geophysical survey;
- Soil sampling logs;
- Groundwater sampling logs;
- Monitoring well completion logs;
- Site photographs;
- Analytical results in the electronic data deliverables EQuIS format; and
- Recommendations for further investigation and/or remediation based on the sampling results.

A qualitative human health exposure assessment (QHHEA) and a fish and wildlife impact analysis (FWIA) will be included in the RIR. Surface soil samples collected from the limited areas where it is accessible will be used to support the FWIA. In addition, subsurface soil and groundwater samples will evaluate potential groundwater to surface water pathways.

The QHHEA will be completed to identify any potential exposure pathways and/or risks to human receptors from those site contaminants of concern identified during the RI, and will include:

- Characterization of the exposure setting (including the physical environment and potentially exposed human populations);
- Identification of exposure pathways;
- Evaluation of contaminant fate and transport, and;
- Determination of potential exposure of human receptors relative to site related contaminants of concern.

The FWRIA will be completed to identify any potential impacts to fish and wildlife resources from those site contaminants of ecological concern identified during the Remedial Investigation. The FWRIA will consist of:

- Identification of fish and wildlife resources;
- Identification of contaminant migration pathways and fish and wildlife exposure pathways;
- Description of the resources on and within one-half mile of the Site;

- Identification of contaminants of ecological concern, and;
- Provide conclusions regarding the actual or potential adverse impacts to fish and wildlife resources.

5.0 REFERENCES

AECOM, 2018 Phase I Environmental Site Assessment, South Brooklyn Marine Terminal, Second Avenue between 33rd and 39th Streets, Brooklyn, New York

AECOM, 2018, Phase II Limited Site Investigation Results Report, South Brooklyn Marine Terminal.

AECOM, 2018, Subsurface Exploration Report, 269 37th Street, Brooklyn, New York.

KC Engineering and Land Surveying, P.C., 2021, Survey of South Brooklyn Marine Terminal Lease Parcels for Equinor Wind.

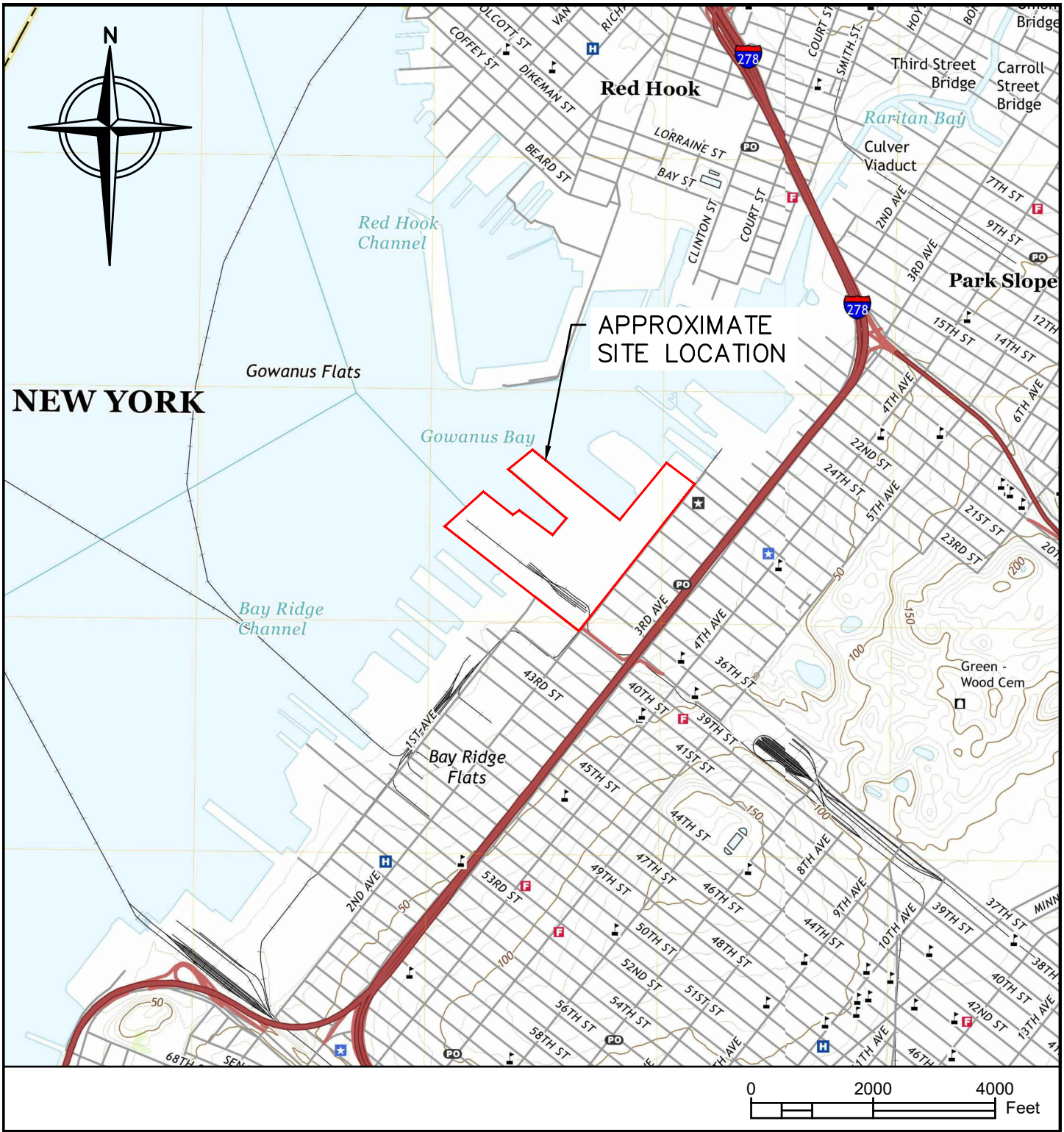
New York State Department of Environmental Conservation (NYSDEC), 2010; DER-10 - Technical Guidance for Site Investigation and Remediation.

Tetra Tech, 2021, Empire Wind 1 Phase 2 Sediment Sampling Plan, Empire Offshore Wind Lease Area OCS-A 0512, Empire Wind 1 Project.

TRC Companies, 2019, Phase II Environmental Site Investigation (ESI) Summary Report, NYCEDC – South Brooklyn Marine Terminal.

TRC Companies, 2004, Supplemental Site Investigation Report, South Brooklyn Marine Terminal, Brooklyn, New York.

FIGURES



TETRA TECH

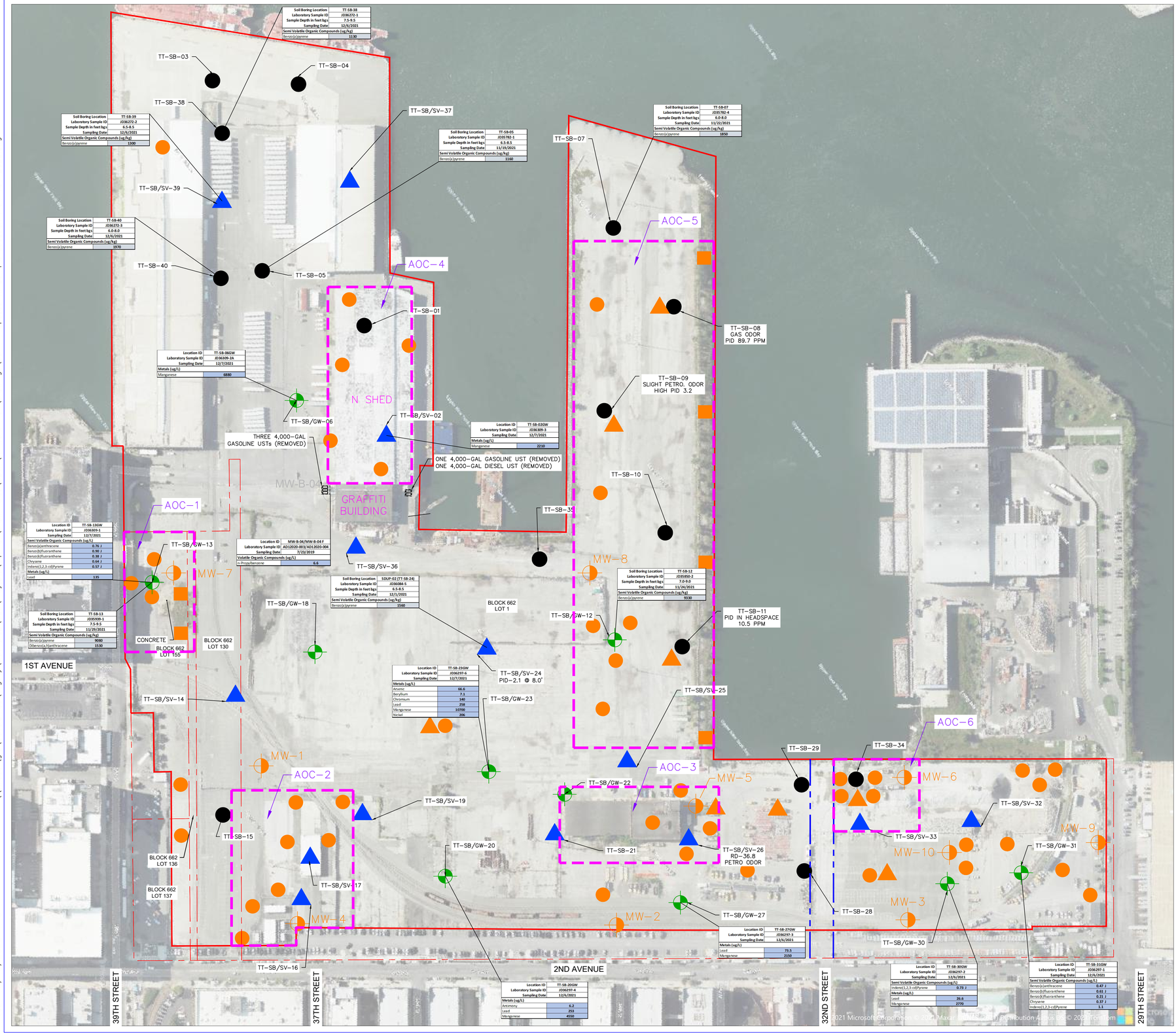
TETRA TECH, INC.
6 CENTURY DRIVE, SUITE 3
PARSIPPANY, NJ 07054
(973) 630-8000

FIGURE 1 - SITE LOCATION MAP

SOUTH BROOKLYN MARINE
TERMINAL
2ND AVENUE
BROOKLYN, NY 11232

SBMT Asset LLC

80 State Street
Albany, NY 12207



Soil Boring Location	TT-SB-38
Laboratory Sample ID	JD36272-1
Sample Depth in feet bgs	7.5-9.5
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1130

Soil Boring Location	TT-SB-39
Laboratory Sample ID	JD36272-2
Sample Depth in feet bgs	6.5-8.5
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1300

Soil Boring Location	TT-SB-05
Laboratory Sample ID	JD35782-1
Sample Depth in feet bgs	6.5-8.5
Sampling Date	11/19/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1160

Soil Boring Location	TT-SB-07
Laboratory Sample ID	JD35782-4
Sample Depth in feet bgs	6.0-8.0
Sampling Date	11/22/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1850

Soil Boring Location	TT-SB-40
Laboratory Sample ID	JD36272-3
Sample Depth in feet bgs	6.0-8.0
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1970

Location ID	TT-SB-06GW
Laboratory Sample ID	JD36309-2A
Sampling Date	12/7/2021
Metals (ug/L)	
Manganese	6880

Location ID	TT-SB-02GW
Laboratory Sample ID	JD36309-3
Sampling Date	12/7/2021
Metals (ug/L)	
Manganese	2210

Location ID	TT-SB-13GW
Laboratory Sample ID	JD36309-1
Sampling Date	12/7/2021
Semi Volatile Organic Compounds (ug/L)	
Benzo(a)anthracene	0.76 J
Benzo(b)fluoranthene	0.90 J
Benzo(k)fluoranthene	0.38 J
Chrysene	0.64 J
Indeno(1,2,3-cd)Pyrene	0.57 J
Metals (ug/L)	
Lead	135

Location ID	MW-B-04/MW-B-04 F
Laboratory Sample ID	AD12020-003/AD12020-004
Sampling Date	7/23/2020
Volatile Organic Compounds (ug/L)	
n-Propylbenzene	6.6

Soil Boring Location	TT-SB-13
Laboratory Sample ID	JD35539-1
Sample Depth in feet bgs	7.5-9.5
Sampling Date	11/25/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	9080
Dibenzo(a,h)anthracene	1530

Soil Boring Location	SOUP-02 (TT-SB-24)
Laboratory Sample ID	JD36084-5
Sample Depth in feet bgs	6.5-8.5
Sampling Date	12/1/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1560

Soil Boring Location	TT-SB-12
Laboratory Sample ID	JD35850-2
Sample Depth in feet bgs	7.0-9.0
Sampling Date	11/24/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	9330

Location ID	TT-SB-23GW
Laboratory Sample ID	JD36297-6
Sampling Date	12/7/2021
Metals (ug/L)	
Arsenic	66.6
Beryllium	7.1
Chromium	140
Lead	258
Manganese	10700
Nickel	206

Location ID	TT-SB-27GW
Laboratory Sample ID	JD36297-3
Sampling Date	12/6/2021
Metals (ug/L)	
Lead	73.5
Manganese	2150

Location ID	TT-SB-20GW
Laboratory Sample ID	JD36297-4
Sampling Date	12/6/2021
Metals (ug/L)	
Antimony	6.2
Lead	253
Manganese	4550

Location ID	TT-SB-30GW
Laboratory Sample ID	JD36297-2
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/L)	
Indeno(1,2,3-cd)Pyrene	0.73 J
Metals (ug/L)	
Lead	26.6
Manganese	2770

Location ID	TT-SB-31GW
Laboratory Sample ID	JD36297-1
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/L)	
Benzo(a)anthracene	0.47 J
Benzo(b)fluoranthene	0.61 J
Benzo(k)fluoranthene	0.21 J
Chrysene	0.37 J
Indeno(1,2,3-cd)Pyrene	1.1

LEGEND

- SOIL BORING AND SOIL SAMPLES
- SOIL BORING AND GROUNDWATER GRAB SAMPLE
- COLLOCATED SOIL BORING AND SOIL VAPOR SAMPLE
- PROPOSED RI SOIL BORINGS
- PROPOSED MONITORING WELL LOCATIONS
- PROPOSED SV LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION
- PROJECT AREA
- PARCEL BOUNDARIES
- NYCDEP STORMWATER EASEMENT
- AOC BOUNDARY

0 120 240 Feet

TETRA TECH

STAMP:

DRAFT
NOT FOR CONSTRUCTION

SOUTH BROOKLYN MARINE TERMINAL
EQUINOR WIND US LLC
2ND AVENUE
BROOKLYN, NY 11232

PROJECT NUMBERS:
194-1247-0003

SHEET TITLE:
PROPOSED REMEDIAL INVESTIGATION SAMPLE LOCATION PLAN

SHEET SIZE:
ARCH "D"
24" X 36" (610 x 914)
0 ½" 1"

NO.	REVISION	DATE	INIT.

DATE: 2/25/2022
DRAWN BY:
ENGINEER:
APPROVED BY:

PROJECT PHASE:
N/A

SCALE:
1" = 120'

SHEET NO.:
FIGURE 2

\\tt-local\gfs\USVolume3\Legacy\tts119fs2\CES\Projects\Equinor\Brownfields\SBMT\RI Work Plan\Drawings\SBMT Proposed RI Sample Location Plan 10142022.dwg
Printed: 10/19/2022 4:13 PM

Appendix A – Health and Safety Plan

Health and Safety Plan

For
Phase II ESA Services

at

South Brooklyn Marine Terminal
Brooklyn, New York

Prepared for:
Equinor Wind US LLC
Brooklyn, New York

Prepared by:

Tetra Tech, Inc.
6 Century Drive, 3rd Floor
Parsippany, NJ 07054

Preparation Date:

September 2022

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LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	Activity Hazard Analysis
AIDS	Acquired Immune Deficiency Syndrome
ANSI	American National Standards Institute
^{o}C	degrees Celsius
Ca	Carcinogen
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CNS	Central Nervous System
CORE	CORE Occupational Services
COVID-19	Coronavirus Disease 2019
CPR	Cardiopulmonary Resuscitation
dBA	decibels
EHS	Environmental Health and Safety
Equinor	Equinor Wind US LLC
ESS	Environmental and Safety Supervisor
eV	Electronvolt
^{o}F	degrees Fahrenheit
FCR	Field Change Request
FOL	Field Operations Lead
g/cm^3	grams per cubic centimeter
GFCIs	Ground Fault Circuit Interrupters
GI	Gastrointestinal
HASP	Health and Safety Plan
IDLH	Immediately Dangerous to Life and Health
IDW	Investigative Derived Waste
IP	Ionization Potential
LEL	Lower Explosive Limit
mg/m^3	milligram per cubic meter
mm Hg	millimeters of Mercury
NIOSH	National Institute for Occupational Safety and Health
NYDEC	New York Department of Environmental Conservation
O2	Oxygen
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit
PFD	Personal Floatation Device
PID	Photoionization Detector

ppm	parts per million
PESM	Project Environmental and Safety Manager
PM	Project Manager
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
SBMT	South Brooklyn Marine Terminal
SDSs	Safety Data Sheets
STEL	Short-Term Exposure Limit
Tetra Tech	Tetra Tech, Inc.
TCE	Trichloroethene
TLV	Threshold Limit Value
TWA	Time Weighted Average
UEL	Upper Explosive Limit
UL	Underwriters Laboratory
USCG	United States Coast Guard
VP	Vapor Pressure

APPROVALS

By their signature, the undersigned hereby certify that this Site-Specific Health and Safety Plan has been reviewed and approved for use at the Equinor South Brooklyn Marine Terminal Site.

Robert C. Cantagallo

11/10/21
Date

Robert Cantagallo
Project Manager

Tami Froelich, CIH
Project Environmental and Safety Manager

Date

Environmental Safety Supervisor/FOL

Date

1 INTRODUCTION

Purpose

This Health and Safety Plan (HASP) addresses the health and safety practices that will be employed by all site workers participating in field activities at the South Brooklyn Marine Terminal (SBMT). This HASP presents procedures to be followed by Tetra Tech, Inc. (Tetra Tech), its subcontractors, and all other on-site personnel in order to avoid and, if necessary, protect against health and/or safety hazards.

Activities performed under this HASP will comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926, and Tetra Tech's Environmental Health and Safety (EHS) Program. Many programs from the EHS Program are referenced in this HASP and are included in the appendices. Modifications to the HASP may be made with the approval of the Project Environmental and Safety Manager (PESM) and the Project Manager using the Field Change Request (FCR) Form found in **Appendix A**.

Site Background and Description

The South Brooklyn Marine Terminal (SBMT) located in Brooklyn, New York is approximately 73.68 acres in size. The SBMT Site forms an irregular shape and is bounded by 29th Street to the northeast, 39th Street to the southwest, 2nd Avenue to the southeast, and New York Harbor and Gowanus Bay to the northwest.

The Site is currently being used by the New York City Police Department for the storage and distribution of new automobiles, vehicle parking, and secure automobile impounding; by the New York City Department of Transportation (NYCDOT) for equipment and material storage; as warehouse space by a private commercial entity, and for parking. The facility was historically an active marine terminal and then was utilized afterwards for the importation and distribution of cocoa beans, as well as for warehouses and vehicle storage and maintenance buildings. The Site is largely vacant and primarily consists of asphalt and concrete pavement, existing above-grade structures, railway spurs, and bulkheads.

Scope

This HASP has been developed to address health and safety concerns, which may be encountered during field activities at the Site. The HASP and Work Plans will be maintained on site during the entire course of the activities. The following list is a summary of field activities which will be implemented as part of the field activities. Further details are provided in the Work Plan.

- Completing a geophysical survey at the proposed boring locations to evaluate the presence or absence of subsurface utilities. Boring locations will also be hand-cleared to 5 feet below ground survey (BGS) using appropriate tools;
- Advancing 39 soil borings to approximately 10 feet BGS;
- Screening soil samples for evidence of contamination such as staining, odors, or vapors with a photoionization detector (PID);
- Collecting 41 soil samples (including 2 duplicates) for off-site laboratory analysis;
- Collecting approximately 10 groundwater grab samples;
- Collecting approximately 13 soil vapor samples;
- Surveying all sampling locations;

Application

The HASP applies to all personnel involved in site tasks who wish to gain access to active work areas, including but not limited to:

- Federal, State, or local representatives
- Tetra Tech employees and subcontractors

Summary of Major Risks

- Underground utilities
- Slips, trips and falls;
- Carrying materials for long distances;
- Working near heavy equipment and facility traffic;
- Contact with soil or groundwater during sampling/excavation; and
- Installation of Soil Boring/Hydropunch via drill or Geoprobe rig.

2 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section outlines the Tetra Tech Project Organization and responsibilities for the site activities.

Equinor Site Representative

The Equinor Representative, Mr. Bryan Turner, is the point of contact for the Site. He is not required to fulfill the role or perform the duties of any contractor/subcontractor.

Project Manager

The Project Manager (PM) and the Contractor Responsible Person is Mr. Robert Cantagallo. It is the responsibility of the PM to:

- Provide the major point of control to ensure that the program's technical, financial, and scheduling objectives are achieved.
- Ensure that the program meets Equinor's objectives and Tetra Tech quality standards.
- Coordinate problem resolution/corrective action implementation.
- Ensure implementation of this program through coordination with the responsible PESM.
- Conduct periodic inspections.
- Participate in all incident investigations.
- Ensure the HASP has all the required approvals before any site work is conducted.
- Ensure that the PESM or Environmental and Safety Supervisor (ESS) is informed of project changes which require modifications of the HASP.
- Have overall project responsibility for Project Health and Safety.

Project Environmental and Safety Manager

The PESM is a senior Health & Safety staff member with experience in hazardous and non-hazardous waste site investigations, remediation, and mitigation activities. The PESM for Tetra Tech for this project is Ms. Tami Froelich, CIH. Ms. Froelich's responsibilities include the following:

- Provide for the development and approval of the HASP.
- Serve as the primary contact to review health and safety matters that may arise.
- Approve revised or new safety protocols for field operations.
- Approve individuals who are assigned ESS responsibilities.
- Approve ESS to fulfill other project roles.
- Coordinate revisions of this HASP with field personnel.
- Coordinate upgrading or downgrading of personal protective equipment (PPE) with the ESS.
- Assist in the investigation of all accidents.

Environmental and Safety Supervisor/Field Operations Lead

The ESS/Field Operations Lead (FOL) is a person knowledgeable in appropriate safety and health regulations with at least one year of experience or specialized training in serving in a health and safety staff role on hazardous waste or non-hazardous sites. The ESS/FOL is Alex Valli; alternates include Chris Beers . The ESS has the following responsibilities:

- Works as a member of the project team to ensure implementation of the HASP.
- Ensures that all health and safety activities identified in the HASP are conducted and/or implemented.
- Performs air monitoring.
- Identifies operational changes which require modifications to health and safety procedures and the health and safety plan and ensures that the procedure modifications are implemented and documented through changes to the HASP.
- Directs and coordinates health and safety monitoring activities.
- Ensures that proper PPE is utilized by field teams.
- Assists in conducting and documenting daily safety briefings.
- Monitors compliance with this HASP.
- Notifies PESM of all incidents.
- Coordinates with the PM in any incident investigation.
- Maintains Incident Report Forms.
- Determines downgrades of PPE based on site conditions. Upgrades will be determined following consultation with the PESM.
- Reports to PESM to provide summaries of field operations and progress.
- Maintains health and safety field log books.

Site Personnel

Site personnel include all other persons entering the site for the purpose of assisting in the completion of the project. This includes, but is not limited to, client representatives, subcontractors, regulatory personnel, and site workers. The responsibilities of all site personnel are:

- All site personnel have the right and obligation of Stop Work Authority. All personnel shall exercise Stop Work Authority, with no repercussions, if they observe any potentially unsafe work practices. When Stop Work is invoked:
    - All work activities will safely cease
    - The Field Operations Lead, ESS, and Project Manager will be notified
    - A Job Safety Analysis will be conducted on the task in question, and operations adjusted
    - Work will only resume when all personnel agree that the situation has been addressed
- Report any unsafe or potentially hazardous conditions to the ESS.
- Maintain knowledge of the information, instructions and emergency response actions contained in the HASP.
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions.
- Prevent admittance to work sites by unauthorized personnel.

- Inspect all tools and equipment daily, including PPE, prior to use.

3 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the site activities at the Site. These hazards and the relevant AHAs for each day's work will be discussed in daily tailgate briefings/toolbox talks before work begins each day. Tailgate meeting forms, found in Appendix A, will be completed each day.

Chemical Hazards

All raw materials and compounds manufactured on site are within the confines of Site buildings and therefore are not expected to be encountered during field activities. Constituents that are anticipated in groundwater, discharge water, and soil are at low concentrations and shall be sampled with proper PPE as described in Table 5-1. Site contaminants of concern related to human health risk include:

- Polycyclic aromatic hydrocarbons (PAHs) (in soils)
- Chlorinated Volatiles
- Metals

Contaminants that may exist in the soil and groundwater do not pose significant exposure risks. Anticipated exposure levels to site contaminants are anticipated to be low. Site contaminants are not encountered in their pure form, they are markedly diluted, bound to, or reacted with, other compounds and substrates.

Based on historical data regarding concentrations of the site contaminants, maximum exposures to contaminants in the soil via airborne dust can be easily controlled below the PEL with standard dust suppression methods.

Although the exposure potential is low, it is important for all personnel to use good judgment and firsthand observations to limit their exposure when working in this area. The application of appropriate PPE (e.g., gloves, safety glasses, etc.) will greatly reduce the potential for direct contact.

See Table 3-1 for information on exposure limits and symptoms.

In addition to the compounds on-site, chemicals used in the processing of samples and for the decontamination of equipment are potentially hazardous to human health if not used properly. Prior to working with these materials on-site, Safety Data Sheets (SDSs) shall be obtained and reviewed by all potentially affected personnel. A copy of all SDSs shall be available at the site location.

TABLE 3-1
EXPOSURE LIMITS AND SYMPTOMS

COMPOUNDS	ACGIH TLV	OSHA PEL	IDLH	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
Arsenic	0.01 mg/m^3	0.01 mg/m^3	Ca [5 mg/m^3]	Inhalation, Absorption, Ingestion, Contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyper pigmentation of skin	Skin, respiratory system, kidneys, CNS, liver, GI tract, reproductive system	Silver-gray or tin-white, brittle, odorless solid Incompatible with strong oxidizers, bromine azide Specific Gravity: 5.73
Xylene	20 ppm	(isomer dependent)	900 ppm	Inhalation Ingestion Skin Absorption Skin Contact	Irritation to eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, blood, CNS, bone marrow	Colorless to light-yellow liquid with an aromatic odor IP: 9.24 eV VP: 75 mm Hg LEL: 1.2% UEL: 7.8%
Lead	0.05 mg/m^3	0.05 mg/m^3	100 mg/m^3	Inhalation, Ingestion, Skin Absorption	Weakness, exhaustion, insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension [possible occupational carcinogen]	Eyes, GI tract, CNS, kidneys, blood gingival tissue	A heavy, ductile, soft gray solid. IP: VP: 1.3 mm Hg Melting Point: 621 ° F Boiling Point:3164 ° F Density 11.3 g/cm^3

COMPOUNDS	ACGIH TLV	OSHA PEL	IDLH	ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
PCBs – assume 54% chlorine	0.5 mg/m^3	0.5 mg/m^3	Not available	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]	Skin, eyes, liver, reproductive system	Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor. IP: unknown VP: 0.00006 mm Hg LEL: N/A UEL: N/A
PAHs as petroleum hydrocarbons	0.2 mg/m3	0.2 mg/m^3		Inhalation Skin contact	Irritant to eyes, swelling, acne contact dermatitis,	Respiratory System, CNS, liver, kidneys, skin, bladder	Colorless/ pale green, solid, faint aromatic odor

Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists
Ca = Carcinogen
CNS = Central Nervous System
eV = Electronvolt
^{o} F = degrees Fahrenheit
g/cm^3 = grams per cubic centimeter
GI = Gastrointestinal
IDLH = Immediately Dangerous to Life and Health
IP = Ionization Potential
LEL = Lower Explosive Limit
mg/m^3 = milligram per cubic meter
mm Hg = millimeters of mercury
NIOSH = National Institute for Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
PEL = Permissible Exposure Limit
ppm = parts per million
STEL = Short-Term Exposure Limit
TLV = Threshold Limit Value
TWA = Time Weighted Average
UEL = Upper Explosive Limit
VP = Vapor Pressure

Table 3-2
Detections of Contaminants of Concern in Soil

Contaminant	No. of Samples	No. of detections	Maximum concentration
Xylene	72	5	140 µg/kg
PAHS (benzo(a)pyrene)	75	53	6,720 µg/kg
PCBs (Aroclor 1254)	4	2	61 mg/kg
Arsenic	42	42	42 mg/kg
Lead	42	42	1,100 mg/kg

Biological Hazards

During the course of the project, there is a potential for workers to come into contact with biological hazards such as animals, insects, and plants. The Activity Hazard Analysis (AHAs) found in **Appendix B** will include specific hazards and control measures for each task.

Animals

During site operations, animals such as dogs, cats, rats, and snakes may be encountered. Workers shall use discretion and avoid all contact with animals. If these animals present a problem, efforts will be made to remove these animals from the Site by contacting a licensed pest control technician.

Insects and Other Arthropods

The ESS will instruct the field crew in the recognition and procedures for encountering insects at the Site. Additionally, any individuals who have been bitten or stung by an insect will notify the ESS. The following is a list of preventive measures:

- Apply insect repellent prior to fieldwork and as often as needed throughout the work shift. Apply DEET (vapor-active repellent) to any exposed skin surface (except eyes and lips) as needed.
- Wear proper protective clothing (work boots, socks, and pants).
- Field personnel who may have insect allergies will provide this information to the ESS prior to commencing work, and shall have allergy medication on site.

Mild insect bites should be treated by applying a baking soda paste or ice wrapped in a wet cloth. Bee stingers should be gently scraped off the skin, working from the side of the stinger. The suction device in commercially available snakebite kits can also be used to remove the stinger. If insect bites become red or inflamed or symptoms such as nausea, dizziness, shortness of breath, etc., appear, medical care will be sought. Immediate care is needed if a person is allergic to insect bites/stings. If an allergic person receives a spider bite or insect bite/sting, seek immediate medical attention, keep the victim calm, and check vital signs frequently. Rescue breathing should be given if necessary to supply oxygen to the victim.

Ticks

Lyme disease is caused by bites from infected ticks that are common in and near wooded areas, tall grass, and brush. Ticks are small, ranging from the size of a comma up to about one-quarter inch. When embedded into the skin, they may resemble a small freckle. Tick season extends from spring through summer, but may extend year-round in areas without significant cold weather.

Lyme Disease

Lyme disease is caused by infection from a deer and lone star ticks that carries a spirochete. Deer ticks range in size from approximately one-eighth inch to one-quarter inch and can be black or brick red in color. Lone star ticks are larger and chestnut brown in color. During the painless tick bite, the spirochete may be transmitted into the bloodstream, which could lead to the worker contracting Lyme disease. Lyme disease may cause a variety of medical conditions including arthritis, which can be treated successfully if the symptoms are recognized early and medical attention is received. Treatment with antibiotics has been successful in preventing more serious symptoms from developing. The effects of the disease vary from person to person, which often makes it difficult to diagnose. Typically, the incubation period ranges from two days to two weeks. Early signs may include a flu-like illness, an expanding skin rash and joint pain. If left untreated, Lyme disease can cause serious nerve or heart problems as well as a disabling type of arthritis.

Symptoms can include a stiff neck, chills, fever, sore throat, headache, fatigue and joint pain. This flu-like illness is out of season, commonly happening between May and October when ticks are most active. A large expanding skin rash usually develops around the area of the bite. More than one rash may occur. The rash may feel hot to the touch and may be painful. Rashes vary in size, shape, and color, but often look like a red ring with a clear center. The outer edges expand in size. It's easy to miss the rash and the connection between the rash and a tick bite. The rash develops from three days to as long as a month after the tick bite. Almost one third of those with Lyme disease never get the rash. Joint or muscle pain may be an early sign of Lyme disease. These aches and pains may be easy to confuse with the pain that comes with other types of arthritis. However, unlike many other types of arthritis, this pain seems to move or travel from joint to joint.

Lyme disease can affect the nervous system. Symptoms include stiff neck, severe headache, and fatigue usually linked to meningitis. Symptoms may also include pain and drooping of the muscles on the face, called Bell's Palsy. Lyme disease may also mimic symptoms of multiple sclerosis or other types of paralysis. Lyme disease can also cause serious but reversible heart problems, such as irregular heartbeat. Finally, Lyme disease can result in a disabling, chronic type of arthritis that most often affects the knees. Treatment is more difficult and less successful in later stages. Often, the effects of Lyme disease may be confused with other medical problems.

Prevention

Control measures to prevent contracting Lyme disease includes:

- Avoid dense or high brush, when possible.
- Wear light colored clothing.
- Spray DEET on your skin and Permethrin on clothing and work boots.
- Tuck pant legs into socks and shirts into gloves, if possible.
- Self/Buddy check of neck, hairline, groin, and body after working in areas that may contain deer ticks. Shower immediately after returning home from the job site.

If a tick is found biting an individual, the ESS will be contacted immediately. The tick can be removed by grasping the tick with tweezers as close to the skin as possible, and pulling gently or

using a tick removal system (e.g., Pro-Tick, www.scs-mall.com/store/). The affected area should then be disinfected with alcohol or similar antiseptic. If personnel feel sick or have signs similar to those above, they will notify the ESS immediately. Additionally, employees finding engorged ticks on their body will be given a medical examination.

Poisonous Plants

The potential for contact with poisonous plants (*i.e.,* poison ivy, poison oak, and poison sumac) exists when performing fieldwork in disturbed areas. Poison ivy can be found as vines on tree trunks or as upright bushes. Poison ivy consists of three leaflets with notched edges. Two leaflets form a pair on opposite sides of the stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison oak resembles poison ivy, but the leaflets are less notched and rounded at the ends. Both poison oak and poison ivy have white berries and red or yellow foliage in the fall. Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, which are velvety dark green on top and pale underneath. The branches of immature trees have a velvety "down." Poison sumac has white, hairy berry clusters.

Contact with poison ivy may lead to a skin rash in susceptible individuals. A rash results from a toxin found in the sap that is extruded from the leaves and contained in the stems and roots. The rash is characterized by reddened, itchy, blistering skin that needs first aid treatment. If you believe you have contacted one of these plants, immediately wash skin thoroughly with soap and water, taking care not to touch your face or other body parts.

Avoidance of plant/sap contact is the only effective means of preventing the poisoning. A person experiencing symptoms of poisoning should remove contaminated clothing; wash all exposed areas thoroughly with soap and water, taking care not to touch your face or other body parts. Apply calamine or other poison ivy lotion if the rash is mild. Seek medical advice if a severe reaction occurs, or if there is a known history of previous sensitivity. Employees will be trained in the identification of these species and will be advised to wear protective clothing such as gloves and long sleeve shirts when working conditions permit. Employees should also consider applying barrier lotions (e.g. Ivy Block) to skin that has the potential to contact these species. Clorox Wipes and Technu can be used to decontaminate skin and reusable clothing to prevent exposure to poison ivy. Gloves should be worn when removing and decontaminating clothing potentially exposed to poison ivy. These products can be obtained by calling (800) 421-1223.

Bloodborne Pathogens

Bloodborne pathogens enter the human body and blood circulation system through punctures, cuts or abrasions of the skin or mucous membranes. They are not transmitted through ingestion (swallowing), through the lungs (breathing), or by contact with whole, healthy skin. However, under the principle of universal precautions all blood should be considered infectious, and all skin and mucous membranes should be considered to have possible points of entry for pathogens.

There are a number of infections that are transmitted by insects and arthropods where the infection cycle includes the human blood system. Examples include malaria and Lyme disease, which are

transmitted by mosquitoes and ticks, respectively. These diseases are serious, and the possibility for infection should be considered. However, these diseases cannot be transmitted through personal contact with human blood, and are not covered by the OSHA Bloodborne Pathogen Standard. Potential bloodborne pathogen exposure includes:

- Medical emergency response operations such as administering First Aid or cardiopulmonary resuscitation (CPR).
- Contact with human wastes such as domestic sewage.
- Two primary bloodborne pathogens include Hepatitis B and Acquired Immune Deficiency Syndrome (AIDS).
- To reduce the risk of contracting a bloodborne pathogen, take the following precautions:
  - Avoid contact with blood and other bodily fluids.
  - Use protective equipment when giving First Aid/CPR, such as disposable gloves and breathing barriers.
  - Thoroughly wash your hands with soap and water immediately after giving care.
- When cleaning up blood or other bodily fluids:
  - Clean up the spill immediately or as soon as possible after the spill occurs.
  - Use disposable gloves and other PPE when cleaning spills.
  - Wipe up the spill with paper towels or other absorbent materials.
  - After the area has been wiped up, flood the area with a solution of ¼ cup of liquid chlorine bleach to 1 gallon of fresh water and allow it to stand for at least 20 minutes.
  - Dispose of the contaminated material used to clean up the spill in a labeled biohazard container.

The ESS should be notified of any potential contact with blood or bodily fluids resulting from first aid or CPR administered on the job.

Infectious Disease

- Following other measures detailed in the AHA-6 COVID-19 Precautions.

Physical Hazards

Most safety hazards are discussed in the AHAs in **Appendix B**.

Splashing During Sampling/Bottle Preparation

Exposure to splashing hazards can occur during sampling activities. Exposure to splashing can include eye injury. PPE will include American National Standards Institute (ANSI) approved safety glasses as shown in Table 5-1.

Traffic Control Activities

Activities may be conducted in access roads and parking areas.

- Personnel are not allowed to use a cellular phone while driving a vehicle on-site.
- All personnel directly involved will wear high visibility vests, shirts, or jackets at all times.
- Use proper controls to restrict traffic (if necessary) and/or inform personnel in daily tailgate safety meeting.
- Put cones/barriers up at a safe distance, taper the cones from near the shoulder to the lane line to send traffic in that direction and to keep unnecessary traffic out of work area(s). When working in a traffic area, the area will be zoned off with cones and tape or other traffic barriers. Employees will need to pay attention to operations around and adjacent to their work and continually evaluate the need for traffic control measures.

Heat Stress/Cold Stress

There is a potential for injuries related to exposure to temperature extremes during work activities.

Heat Stress

Specific potential hazards include:

- Heat rash
- Fainting
- Heat cramps
- Heat Exhaustion
- Heat Stroke

Sweating does not cool the body unless the sweat evaporates. Heat stress related problems include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. Heat rash occurs because sweat is not evaporating, causing irritation and vesicular inflammation. Standing erect and immobile in the heat allows blood to pool in the lower extremities. As a result, blood does not return to the heart to be pumped back to the brain and fainting may occur. Heat cramps are painful spasms of the muscles due to excessive water and salt loss from profuse sweating. Similarly, heat exhaustion occurs due to the large fluid and salt loss from profuse sweating. Heat exhaustion is characterized by clammy and moist skin, nausea, dizziness, headaches, and low blood pressure.

Heat stroke occurs when the body's temperature regulatory system has failed. Skin is hot, dry, red, and spotted. The affected person may be mentally confused, delirious, and convulsions may occur. A person exhibiting signs of heat stroke should be removed from the work area and moved to a shaded area immediately. The injured person should be soaked with water and fanned to promote evaporation. Medical attention must be obtained immediately. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.

Early symptoms of heat stress related problems include the following:

- Decline in task performance
- Lack of coordination
- Decline in alertness

- Unsteady walk
- Excessive fatigue
- Muscle cramps
- Dizziness

Proper training and preventive measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illnesses. To avoid heat stress, the following steps, as necessary, will be implemented:

1. Adjust work schedules.

    - Modify work/rest schedules according to monitoring requirements.
    - Mandate work slowdowns as needed.
    - Perform work during cooler hours of the day, if possible, or at night if adequate lighting can be provided.
    - Perform physiological monitoring.
    - Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.

2. Maintain worker's body fluids at normal levels. This is necessary to ensure the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, *e.g.* 8 fluid ounces (0.23 liters) of water must be ingested for approximately every 8 ounces (0.23 kilograms) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:

    - Maintain water temperature at 50° to 60°F (10° – 16.6°C).
    - Provide small disposable cups that hold about 4 ounces (0.1 liter).
    - Have workers drink 16 ounces (0.5 liters) of fluid, preferably water or dilute drinks, before beginning work.
    - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
    - Train workers to recognize the symptoms of heat-related illnesses.
    - Rotate personnel and alternate job functions.
    - Utilize cooling vests when impermeable clothing is worn.
    - Additional procedures to be followed are provided in EHS Program, Temperature Extremes, EHS 4-6.

<u>Cold Stress</u>

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, poor judgment and unauthorized

procedural changes. The following are the main elements of Tetra Tech Health and Safety Program:

- Engineering controls (i.e. heaters, wind shields, covered metal handles);
- Administrative controls (i.e. work/warm up schedule, acclimatization);
- PPE (i.e. hard hat liners, boot and glove liners, insulated coveralls);
- Recognition of Cold Stress Related Injury (frostbite and hypothermia);
- Warm rest area; and
- Employee training.

Noise

Noise is a potential hazard associated with the operation of pumps, and generators. A general field rule is to wear hearing protection if you cannot hear normal conversation within an arm length of the person talking.

Slips, Trips, and Falls

Slips, trips and falls are a leading cause of injuries in field-related work settings, therefore, a concerted effort to identify, control, and eliminate these hazards and the measures needed to reduce or eliminate the possibility of injury will be communicated to all site personnel.

Site personnel will be instructed to look for these potential safety hazards and immediately inform the ESS about any new hazards. If the hazard cannot be immediately removed, action must be taken to warn site workers about the hazard. Proper housekeeping (tools, equipment, and material will be picked up and stored) must be maintained on site, particularly in vehicle and pedestrian traffic routes. Small holes and pits along high foot traffic areas should be covered or barricaded to prevent injury.

When applicable, proper routes to sample locations will be flagged to mitigate tripping and slipping hazards.

Working Near and Over Water

The work activities planned for this Project may present physical hazards that are inherent to working on or around water bodies and that can result in serious physical harm. All work on or around water bodies will be conducted according to Tetra Tech SWP 05-06, Safe Work Practices for Working Over or Near Water (see Appendix A). Tetra Tech-owned boats will be operated according to Tetra Tech's Boating procedure, EHS-09, which is provided in Appendix A.

The FOL and ESS will work with each designated vessel captain to verify that vessel inspections are being performed before each use and periodically in accordance with manufacturer recommendations and that the inspections are documented. The FOL and SSO will verify with each captain that the required safety and emergency equipment is on board and in serviceable condition. The boat operator (captain) is responsible for the safety of all personnel on the boat and for the integrity of the vessel and its safety equipment.

Person in Water (Overboard)

When working on vessels or near water, the possibility exists that a person could fall from the vessel or other location adjacent to water. Since no work on water is to be conducted by one person alone, there will typically be another person to act in the event of an overboard incident. If there is occasion where a single person is working on, over, or adjacent to water, then the person must be equipped with a means of communication with another party (buddy system). Regular well-being checks should be made using this communication method. If a person does go overboard from a vessel or otherwise falls into a water body, then the following applies:

Small Watercraft (on Boats, Skiffs, etc.)

- If a person goes overboard, yell "Person Overboard" and what side the person fell off and keep eyes on person at all times. Throw the life ring (Type IV PFD) to the person and try to pull them to boat. Give five short blasts of the onboard emergency air horn to alert additional nearby Tetra Tech vessels and personnel. Additional personnel on vessel will call 911, Channel 16 on VFH radio, and ESS. If the boat has traveled too far from the person, maneuver the boat closer before throwing the ring.
- It is important to maintain clear communication between Captain and crew during this event. The crew should always continue to pass information to the captain on the location of the person in the water and the condition of the person.
- In most cases the boat will be spudded down or anchored, and the person will have been carried away by the swift current. Person in water should immediately head to shore if too far away to reach thrown life ring as it may take a few minutes to get the rescue boat mobile. Personnel left on boat will raise spuds and/or anchors, motor upstream or downstream of person in water (dependent on tide) and let person drift to boat. Once alongside, motor must be in neutral.
- Instruct the person to hold the ring, and slowly bring the person to the side of the boat. Depending on the boat size and configuration, the person may be able to climb back into the boat with assistance. For smaller boats like johnboats, it is almost impossible to bring someone on board without capsizing the boat. In this case, have person hang onto the boat and carefully maneuver the boat to the nearest shore.
- If the person cannot get into the boat because of the boat limitations, injuries, or unconsciousness, have the person stay with the boat, or have personnel hold that person alongside the boat until shoreline is reached or assistance arrives.
- Notify other site vessels and emergency responders and the USCG by VHF radio or cell phone (if appropriate), get them into dry clothes, and await assistance.

Land-Based Areas

- If a person goes into the water, yell "Person Overboard" and location where they went overboard and throw them a life ring (Type IV PFD).
- It is important to maintain clear communication between all personnel assisting during this event. Personnel should always continue to pass information to the SSO on the location of the person in the water and the condition of the person.
- Notify the ESS, 911/CH 16/USCG and other Tetra Tech vessels.

- Depending on the configuration of the area, the person may, with the assistance of the life ring and line, be able to come to the shoreline and exit the water.
- If the person cannot exit the water, with assistance, use nearby Tetra Tech vessels to reach the person.
- Instruct the person to hold the ring, and slowly bring the person to the side of the vessel. Depending on the vessel size and configuration, the person may be able to climb onto the vessel with assistance.
- If the person cannot get into the vessel because of the vessel's limitations, injuries, or unconsciousness, then have the person stay with the boat, or hold them alongside so they do not drift away.
- When vessels or existing egress ladders are unavailable; emergency throw lines and ladders may be used to assist person in the water.
- In this case, either anchor and deploy an emergency ladder to allow the person to exit the water or call 911 for the NY Harbor Police to extract the person from the water.
- Once ashore get them into dry clothes.
- Seek assistance.

Manual Lifting

Manual lifting will be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted time, and long treatment and recovery periods. Basic lifting and material handling techniques will be reviewed with all personnel prior to the on-site activities. All tasks will be evaluated on site prior to commencement or during activities in order to evaluate the potential for injury. Controls may include engineering controls, reducing weight of objects that are carried, distance of carrying, or reducing loss potential by rotating workers.

Tetra Tech's EHS policy states individual employees are not to lift loads greater than 50 pounds. The following procedure should be used to lift anything, particularly heavier loads, safely:

- Make sure the path of travel is clear.
- Size up the load as to its weight, size and shape.
- Place the feet about a foot apart and close to the object for good balance.
- Bend the knees to a comfortable position and get a good handhold.
- Using both leg and back muscles, lift the load straight up, smoothly and evenly. Pushing with the legs, keep the load close to the body.
- Lift the object into carrying position, avoiding twisting movements until the lift is completed.
- Turn the body with changes of foot position. Do not twist at the waist when lifting.
- Using both leg and back muscles, comfortably lower the load by bending the knees. When the load is securely in place, release the grip. Setting down the load is just as important as picking it up.

The same steps apply to team lifting, with the emphasis on coordination. All should start and finish the lift action at the same time and perform turning movements together.

Soil Boring Installation

In order to install soil borings, a direct push rig will be used. Working with or near this equipment poses many potential hazards, including being struck by or against, or pinched/caught by, that can result in serious physical harm. Additionally, all employees will be briefed on the potential hazards prior to the start of the job.

Fire and Explosion

The use of a drill rig, diesel engine, and tools that are gasoline powered presents the possibility of encountering fire and explosion hazards. Diesel fuel and gasoline shall be stored in Underwriters Laboratory (UL) approved metal cans equipped with self-closing lids and flash arrestors.

Hand Tools

In order to complete the various tasks for the project, personnel may utilize hand tools. Hand tools can present many hazards including: flying objects and particles, cuts and punctures, having a body part caught in or between. The following protective measures will be implemented to minimize exposure to the hazards presented by the use of hand tools:

- Daily inspections of each tool prior to use.
- Remove broken or damaged tools.
- Use of personal protective equipment.
- Use in accordance with the Operator's Manual.
- Use the tool for its intended purpose.
- Ensure proper guards are in place and not removed or bypassed.

4 ACTIVITY HAZARD ANALYSES

The Activity Hazard Analysis (AHA) is a systematic way of identifying the potential health and safety hazards and the methods to avoid, control and mitigate those hazards. AHAs are included in **Appendix B** of this HASP. AHAs have been developed for the following phases of work:

- General site activities
- Mobilization/demobilization
- Soil, soil vapor, and groundwater sampling
- Site inspections including utility clearance, surveying, and visual inspections of engineering controls and monitoring wells
- Soil Boring/HydroPunch
- COVID-19 Precautions for Field Activities
- Bulkhead work over/near the water

5 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment specified in Table 5-1 represents the initial level of PPE selection for each activity required by 29 CFR 1910.132. Specific information on the selection rationale for each activity can be found in the Activity Hazard Analyses in **Appendix B**.

PPE selection shall be made by the ESS and approved by the PESM. Additional tasks not included in Table 5-1 shall be reviewed by the ESS and PESM. Any additional PPE requirements will be incorporated into the HASP by completing the FCR found in **Appendix A**. All FCR and PPE selection will require approval by the PESM.

Modifications for initial PPE selection may also be made by the ESS in consultation with the PESM using the same form. A written justification for downgrade will be provided to the PESM for approval on a FCR.

Upgrade Conditions

Due to the nature of the activities it is not anticipated that upgrading to Level C or B may be required during the Site activities. Level D or modified Level D is anticipated for all Site work but the ESS has the responsibility for monitoring site and work conditions and deciding the appropriate level of protection based on indications of potential exposure.

Hazard Assessment For Selection of Personal Protective Equipment

The initial levels of protection were selected by performing a hazard assessment taking into consideration the following:

- Potential site physical hazards present or suspected.
- Work operations to be performed.
- Potential routes of exposure.
- Characteristics, capabilities and limitations of PPE, and any hazards that the PPE presents or magnifies.

TABLE 5-1
PERSONAL PROTECTIVE EQUIPMENT SELECTION

TASK	HEAD	EYE/ FACE	FEET	HANDS	BODY	HEARING	RESPIRATOR
Mobilization/Demobilization	HH	SG	STB	LWG	Work	None	Level D
Groundwater Sampling	HH	SG	STB	Nit, Sur	Work	None	Level D
Soil vapor Sampling	HH	SG	STB	Nit, Sur	Work	None	Level D
Soil Vapor point install	HH	SG	STB	LWG	Work	EP as needed*	Level D
Soil Sampling	HH	SG	STB	Nit, Sur	Work	None	Level D
Soil Boring/HydroPunch	HH	SG	STB	Nit, Sur	Work	EP as needed*	Level D
Surveying	HH	SG	STB	LWG	Work	None	Level D
Bulkhead Work	HH	SG	STB	LWG	Work; PFD	EP as needed*	Level D

HEAD PROTECTION HH = Hard Hat HEARING PROTECTION EP = ear plugs RESPIRATORY PROTECTION Level D = No respiratory protection required	EYE/FACE PROTECTION SG = ANSI approved sealed safety glasses or safety glasses with side shields BODY PROTECTION Work Clothes PFD	FOOT PROTECTION STB = Leather work boots with steel or composite toe. HAND PROTECTION LWG = Leather Work Gloves Nit = Nitrile Sur = Surgical

*** See AHA details.**

6 AIR MONITORING

The following sections contain information describing the types, frequency and location of real time air monitoring.

The same hazard assessment considerations that were used to determine the types and levels of PPE (Section 5.2, Hazard Assessment for Selection of Personal Protective Equipment) were used to determine the types, frequency, and locations of real-time air monitoring described in this section.

Work Area Monitoring

The following monitoring instruments will be used:

- During sampling activities: Photoionization Detector (PID), Photovac Microtip with 10.6 eV probe or equivalent.
- During drilling activities: Combustible Gas Indicator (CGI)/Oxygen (O2) meter, RAE, MSA model Five Star or equivalent.

Organic vapor concentrations shall be measured continuously using the PID during the sampling activities. Organic vapor concentrations shall be measured upwind of sample locations to determine background concentrations in the morning prior to work. The ESS/FOL will interpret monitoring results using professional judgment.

A CGI/O2 meter shall be used to monitor for oxygen followed by combustible gases in the boreholes and surrounding areas and elsewhere as necessary. During drilling operations, combustible gas readings shall be collected each time the casing is removed from the borehole.

The National Institute for Occupational Safety and Health (NIOSH) has established guidelines concerning the action levels for work in a potentially explosive environment. These guidelines are as follows:

- 10% LEL - Limit all activities to those which do not generate sparks.
- 20% LEL - Cease all activities in order to allow time for the combustible gases to vent.

If the combustible gases in the borehole are not diminished after allowing adequate time to vent, then the following steps may be taken:

- Obtain an air compressor (minimum 1.5 horsepower).
- Place the compressor a safe distance from the borehole (at least 20 feet). This precaution is necessary since the compressor is an ignition source.
- Place a hose into the hole until it reaches bottom.
- Run compressor for 15 minutes.

Measure the percent LEL in the borehole. If the reading continues above 20% LEL, continue to run the compressor. If levels are below 20% LEL, continue to monitor the borehole for 5 minutes;

if readings remain below 20% LEL, resume drilling, and continue to monitor. If levels do not drop below 20% LEL the borehole will be sealed and work at that location will cease.

Calibration

Monitoring instrument calibration will be documented and included in the log book or on separate calibration pages. All monitoring instruments must be calibrated before each shift's use of the equipment with a calibration check at the end of the day to ensure proper readings throughout the day's activities. Calibration checks may be used during the day as well to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

Operations

All instruments will be operated in accordance with the manufacturer's specifications. Manufacturer's literature, including an operations manual for each piece of monitoring equipment, will be maintained on-site by the ESS for reference.

Data Review

The ESS will interpret all monitoring data based on action levels listed in Table 6-1 and his/her professional judgment. The ESS shall review the data with the PESM to evaluate the potential for worker exposure, and upgrades/downgrades in PPE. The previous days monitoring results, both positive and negative readings, will be discussed with all site personnel at the tailgate safety meeting prior to commencing work activities for that day.

TABLE 6-1
REAL-TIME AIR MONITORING ACTION LEVELS

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON
PID	Breathing Zone	<0.5 ppm (1)	No respiratory protection is required	Level D conditions present
	Breathing Zone	≥ 0.5 ppm	**Stop work if > 0.5 ppm.** Notify PM & PESM for further instructions.	Based on the TLV for Benzene (0.5 ppm). Further characterization may be necessary. Level C conditions may be present for VOCs
CGI/O_2 meter	Borehole	< 19.5% O_2	Stop work, notify PESM	
	Borehole	> 23.5% O_2	Stop work and evacuate the work area. Eliminate all ignition sources. Purge borehole if necessary. Identify source of oxygen.	
	Borehole	> 10% LEL	Proceed with caution	
	Borehole	> 20% LEL	Stop work, allow to vent	

Note: (1) Non-transient, sustained reading greater than 1 minute

7 MATERIAL HANDLING AND DECONTAMINATION

Material Handling

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on-site. All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for off-site disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal as non-hazardous solid waste. Investigative Derived Waste (IDW) will be containerized, characterized, and disposed in accordance with applicable regulations.

Decontamination

Equipment Decontamination

Equipment must be decontaminated before leaving the Site or before use. A central decon area will be constructed with an impervious liner. The rinse waters will be collected and stored in drums for appropriate disposition. When equipment must be decontaminated in areas other than the central decon area, a temporary decontamination station will be set up. The ESS shall be consulted for specific decontamination requirements and procedures. Verification that equipment leaving the Site has been adequately decontaminated is the responsibility of the ESS.

Personnel Decontamination

Dry decontamination procedures (removal and disposal of gloves and no re-use of PPE, etc.) will be implemented. Based on site knowledge and prior work activities upgrade from level D is not anticipated for sampling activities. The following describes dry decontamination procedures as mentioned above and shall be followed when leaving the site;

- Remove and dispose of Tyvek suit in plastic-lined container or plastic bag.
- Remove gloves; dispose in plastic-lined containers or plastic bags if not to be reused. Place in “Decontaminated PPE” container or area if to be used again.
- Wash face and hands before leaving the Site, eating food, smoking, or placing chewing tobacco or gum in the mouth. Wash hands before using the restroom.

8 ZONES AND COMMUNICATION

Site access is controlled at the entrance by security guards and is intended to control the potential of unauthorized individuals entering the Site.

All personnel within Site boundaries will be required to use the specified level of protection. No eating, drinking, or smoking will be allowed in the exclusion or decontamination zones.

Cell Phones - Cell phones will be available by supervising personnel for communication with emergency support services/facilities.

Hand Signals - the field team along with the buddy system shall use hand signals. The entire field team shall know them before operations commence:

SIGNAL	**MEANING**
Hand gripping throat	Out of air, can't breathe
Grip on a partner's wrist or placement of both hands around a partner's waist.	Leave the area immediately, no debate.
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand.
Thumbs down	No, negative.

9 MEDICAL SURVEILLANCE PROCEDURES

All personnel performing field work where potential exposure to contaminants exist are required to have passed a medical surveillance examination in accordance with 29 CFR 1910.120(f).

The Tetra Tech Corporate Medical Surveillance Program is described in detail in EHS 4-5 of the Health and Safety Program. The Corporate Medical Consultant is with CORE Occupational Services (CORE), of Deer Park, TX. CORE Connect may be reached at (855) 683-9006.

Medical Data Sheet

A medical data sheet is provided in **Appendix A**. This medical data sheet is voluntary and should be completed by all on-site personnel and will be maintained at the site. It is intended to provide basic information that would be useful to professional medical personnel if medical treatment or transport to emergency medical facilities is required. Where possible, this medical data sheet will accompany the personnel needing medical assistance. The medical data sheet will be maintained in a secure location, treated as confidential, and used only on a need-to-know basis.

10 SAFETY CONSIDERATIONS

General Health and Safety Work Rules

At a minimum, the work rules and general site work practices will be reviewed with site personnel during their initial site briefing. Any additional rules/safety requests supplied by Equinor Wind representatives will be followed and made a part of this plan.

11 EMERGENCY RESPONSE PLAN

This ERP:

- Describes the actions to be taken in response to an emergency situation.
- Provides an up-to-date list of names, addresses, and telephone numbers of the primary emergency coordinator and the designated alternate, who have responsibility for responding in the event of anemergency by implementing this plan. In addition, telephone numbers to fire, police, and contact information required for release of any hazardous materials into the environment is contained herein.
- Provides the locations of and directions to local hospitals and clinics. Project staff members shouldnot transport patients to a hospital. They should instead rely on Emergency Medical Services (dial911) for transport and onsite care.

For purposes of this ERP, an emergency will be declared when a sudden situation occurs that causes injuryor illness, degradation in the level of site safety, and/or a threat to human health or to the environment.

Situations of this nature require time-sensitive response efforts and assistance from outside agencies or specially trained personnel in order to mitigate severe injury to individuals, adverse impacts to the environment or major damage to property. Emergencies involving site work could potentially escalate the probability of risks requiring outside assistance to respond and manage the emergency because of the incident's impact on site personnel, site evacuation, offsite property, public, and the environment.

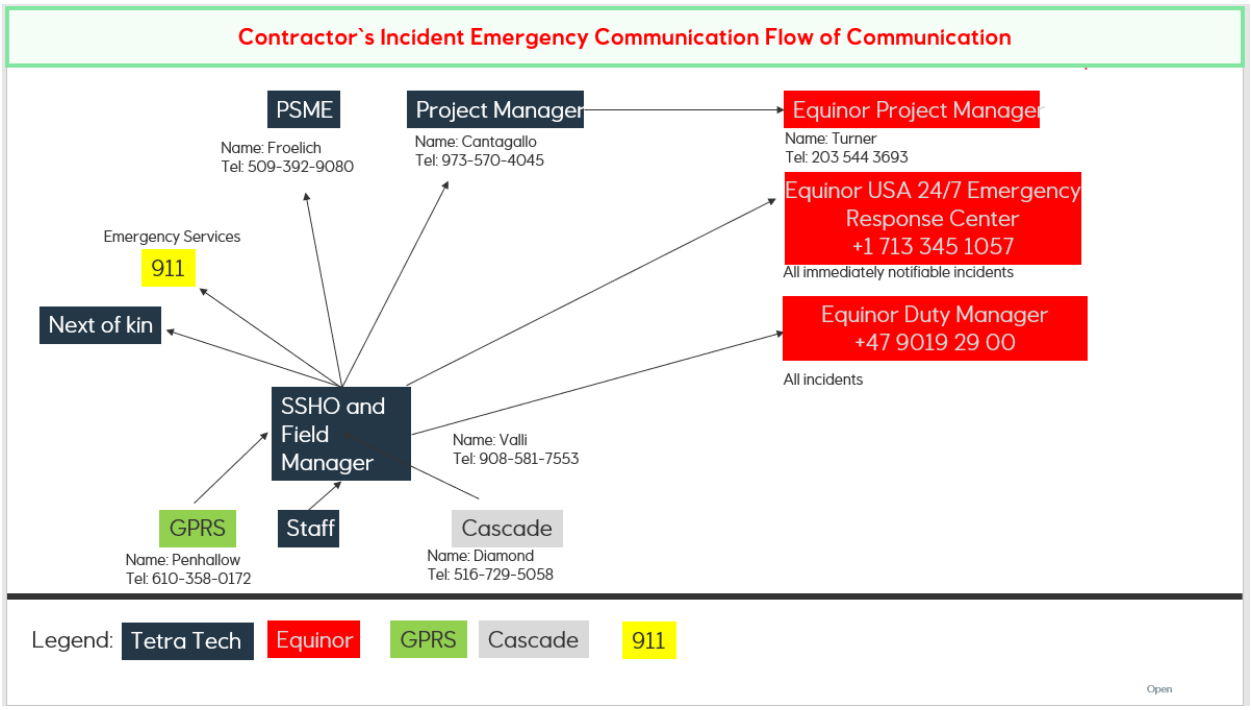
Certain minor incidents may occur that involve the need for incidental responses, such as minor first aid, orminor property damage responses. This ERP does not address the minor incident actions and responses,which will be covered in detail in the Site Health and Safety Plan.

Overall project authority rests with the Supervising Contractor's Project Manager (PM) or his/her delegate.Overall responsibility for Health and Safety rests with the Health and Safety Lead (HSL). Figure 1-1 displays the incident response command chart. The Incident Command System is used based on the tenants of the National Incident Management System as devised by the Department of Homeland Security and specifiedin Occupational Safety and Health Administration (OSHA) **1910.120(q)(3)(i)**.

Table 11-1 provides project emergency contact numbers.

Emergency Coordinator (EC): The ESS will serve as the EC. The responsibilities of the EC/ESS are:

- Implementation of this ERP.
- Serve as Incident Commander until relieved by municipal responders.
- Notify offsite emergency response units and the appropriate management staff and coordinate with offsite emergency response units upon their arrival.
- Notify Tetra Tech and Equinor in the event of an emergency. The notification flowchart is presented on the following page.
- Ensure that maps of evacuation routes and emergency equipment and contact phone numbers are communicated and available to all site workers. This should be updated whenever conditions or procedures change at the direction of the EC/ESS. The primary evacuation route and rally point are provided in Appendix C.
- Call 911 to request assistance for: medical emergencies; fire, explosion or damage from severe weather; personnel rescue; and releases of chemicals or wastes.
- Assume control of all emergency events upon arrival on the scene. The EC/SSO will relinquish control of the emergency scene only to more highly trained or specially trained responders upon their arrival as appropriate.
- Inform site personnel when the emergency situation is terminated, make an "all clear" radio announcement only after civil authorities have rendered it safe to re-enter the work area.
- Maintain inventories of onsite emergency response equipment and supplies.
- ESS continue site safety activities.
- In the event that an emergency or incident involves the exposure of project personnel to hazardous or toxic materials, provide Safety Data Sheet (SDS) to the Emergency Responders to accompany the worker to the medical facility.
- Document all emergency communications and notifications.


Contractor`s Incident Emergency Communication Flow of Communication
PSME
Name: Froelich
Tel: 509-392-9080
Project Manager
Name: Cantagallo
Tel: 973-570-4045
Equinor Project Manager
Name: Turner
Tel: 203 544 3693
Equinor USA 24/7 Emergency Response Center
+1 713 345 1057
All immediately notifiable incidents
Emergency Services
911
Next of kin
Equinor Duty Manager
+47 9019 29 00
All incidents
SSHO and Field Manager
Name: Valli
Tel: 908-581-7553
GPRS
Name: Penhallow
Tel: 610-358-0172
Staff
Cascade
Name: Diamond
Tel: 516-729-5058
Legend:
Tetra Tech
Equinor
GPRS
Cascade
911
Open

Communication

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

Cell Phone

Cell phones will be the primary sources of communication in the field. The locations of cell phones will be with supervising personnel.

Audible Signals

Audible signals will be utilized in the event of an emergency or a need to evacuate the site. These may include air horns or a series of car horn signals. The specific signals used will be identified during the on-site health and safety training.

Local Emergency Support Units

In order to be able to deal with any emergency that might occur during activities at the Site, an emergency telephone number list (Table 11-1) will be placed in all on-site vehicles. A hospital route map is provided in **Appendix D** for non-emergency trips to the hospital. Additionally, The facility that can be used for non-emergency treatment is:

NYU Langone Hospital, formerly known as NYU Lutheran Medical Center
150 55th Street
Brooklyn, NY 11220

Tetra Tech personnel will drive the route to the hospital and the non-emergency facility to verify the directions are correct and easy to follow.

Pre-Emergency Planning

Tetra Tech will communicate directly with administrative personnel from the emergency room at the hospital in order to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from exposure to hazards expected to be on the Site. Tetra Tech personnel will make a site visit to the clinic and discuss treatment options with the physician. Instructions for finding the hospital and emergency phone numbers will be posted conspicuously in each site vehicle.

Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the ESS/FOL and the PM immediately. First-aid equipment will be available on site at the following locations:

First Aid Kit: Field Team Vehicle
ANSI Approved Emergency Eye Wash: Facility Maintained or in Field Team Vehicle

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment.

When personnel are transported to the hospital, the ESS will provide a copy of the Medical Data Sheet to the paramedics and treating physician.

Only in non-emergency situations will an injured person be transported to the hospital by means other than an ambulance.

TABLE 11-1

EMERGENCY TELEPHONE NUMBERS

Contact	Firm or Agency	Telephone Number
Police	Brooklyn Police Department	911 / (718) 834-3211
Fire	Brooklyn Fire Department	911 / (718) 625-4085
Hospital for Emergency and Non-Emergency	NYU Langone Hospital 150 55th Street Brooklyn, NY 11220	911 / (718) 630-7000
Tetra Tech Project Manager	Robert Cantagallo	(973) 630-8132 (o) (973) 570-4045 (c)
PESM	Tami Froelich, CIH	(509) 392-9080
Equinor Contact	Mr. Bryan Turner	(203) 544-3693
Poison Control Center		(800) 962-1253
Chemtrec		(800) 424-9300
CORE Connect		(855) 683-9006
USCG	USCG	911 / VHF Ch16

Emergency and Non-Emergency Response

Emergency Response

Some physical signs/symptoms that require emergency medical treatment and a call to 911/ambulance service include: chest pain, difficulty breathing, uncontrolled bleeding, bone fracture, loss of consciousness, severe head injury, poisoning, shock, loss of limb, and sudden and prolonged dizziness. In an emergency situation:

- Call 911 for initial employee evaluation and transport to the hospital. A designated Tetra Tech employee shall accompany the injured worker to the hospital.
- Administer first aid to minimize the injury effects.
- Call the PESM, PM, and Equinor Wind representative.

Non-Emergency Response

In a non-emergency situation:

- Administer first aid to minimize the injury effects.
- Call CORE at 1-(855) 683-9006 for a triage call/discussion with an Occupational Health Nurse or physician. Mention ASAP that the call is regarding an injury. The Occupational Health Nurse will assist the supervisor to determine the best treatment plan.
- Provide the following information to CORE:
    - Name of Supervisor calling.
    - Phone Number.
    - Location calling from.
    - Name of individual injured and social security number.
    - Date and type of injury.
- During CORE off-hours, dial the 855 number and identify yourself. A CORE health care representative will call you back shortly. Do not delay treatment while awaiting a return phone call.
- CORE will advise as to next steps in treating the employee.
- Call the PESM, PM, and Equinor Wind Representative.
- You may transport the injured employee to the local clinic in a privately owned vehicle. A designated Tetra Tech employee must accompany the injured worker to the local clinic.

Emergency Site Evacuation Routes and Procedures

The ESS/FOL will take charge of all emergency response activities and dictate the procedures that will be followed for the duration of the emergency. The ESS/FOL will report immediately to the scene of the emergency, assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive. At his/her discretion, the ESS/FOL also may order the closure of the site for an indefinite period.

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. All equipment will be shut down and all personnel will evacuate the work areas and assemble at the designated rally point, which shall be determined upon arrival at the Site.

The ESS/FOL will give directions for implementing whatever actions are necessary. Any project team member may be assigned to be in charge of emergency communications during and emergency. He/she will attend the site telephone specified by the ESS/FOL from the time the alarm sounds until the emergency has ended.

After sounding the alarm and initiating emergency response procedures, the ESS/FOL will check and verify that access roads are not obstructed. If traffic control is necessary, as in the event of a fire or explosion, a project team member, who has been trained in these procedures and designated at the site safety meeting, will take over these duties until local police and fire fighters arrive.

The ESS/FOL will remain at the Site to provide any assistance requested by emergency-response squads as they arrive to deal with the situation. Evacuation routes, meeting places, and location of emergency equipment and first aid supplies shall be discussed during the site-specific briefing.

Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the Site, and notifying the guards at the guard house. Equinor Wind will perform notification of local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

Adhering to the following precautions will prevent fires:

- Good housekeeping and storage of materials;
- Storage of flammable liquids and gases away from oxidizers;
- Smoking will be allowed only in designated areas appointed by ESS/FOL;
- No hot work without a properly executed hot work permit;
- Shutting off engines to refuel;
- Grounding and bonding metal containers during transfer of flammable liquids;
- Use of UL approved flammable storage cans;
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, and near all hot work activities; and
- Inspections of all fire extinguishers.

Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the SDS or recommended by the Corporate Medical Consultant will be followed, when necessary. See Appendix E for SDSs.

SKIN AND EYE CONTACT:	Use copious amounts of water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.
INHALATION:	Move to fresh air. Decontaminate and transport to hospital or local medical provider.
INGESTION:	Decontaminate and transport to emergency medical facility.
PUNCTURE WOUND OR LACERATION:	Decontaminate and transport to emergency medical facility.

Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone:

1. Robert Cantagallo, PM (973) 630-8132 / C (973) 570-4045
2. Tami Froelich, PESM (509) 392-9080
3. The employer of any injured worker who is <u>not</u> a Tetra Tech employee
4. The Equinor Representative:
   - Bryan Turner (203)544-3693

Incident reporting needs to occur to Tetra Tech immediately to assure that any injury is properly managed. Written confirmations of verbal reports are to be submitted within 10 working days. The accident/incident report is found in the Tetra Tech Corporate Health and Safety Program Section EHS 1-7. This report will be done by the employee(s) involved in the incident, and the ESS or PM. If the employee(s) involved is not a Tetra Tech employee, his employer shall receive a copy of the report.

Adverse Weather Conditions

In the event of adverse weather conditions, the ESS/FOL, or designee, will determine if work can continue without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress/cold stress related injuries
- Treacherous weather-related working conditions (snow, hail, rain, high winds)
- Limited visibility (fog)
- Potential for electrical storms
- Other major incident

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The ESS/FOL will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the SDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed as hazardous waste. An exclusion zone of 50-100 feet around the spill area should be established depending on the size of the spill.

The following steps should be taken by the ESS:

- Determine the nature, identity and amounts of major spill components.
- Make sure all unnecessary persons are removed from the spill area.
- Notify on-site Equinor Representative, PM, and PESM (see Table 11-1).
- Use proper PPE.
- If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.).
- If possible, try to stop the leak with appropriate material.
- Remove all surrounding materials that can react with or compound the spill.
- Protect storm drains and sewer manholes by surrounding them with sorbent materials or berms.
- Attempt to divert spilled liquids from entering streams, surface waters, or drainage ditches using berms or sorbent materials.

Emergency Equipment

The following minimum emergency equipment will be kept and maintained on site:

- Industrial first aid kit.
- ANSI approved eye wash with capability of 15-minutes non-stop operation.
- Fire extinguisher (one per vehicle).
- Spill control equipment to include, but not limited to, absorbent booms, absorbent pads, and absorbent material, scoop or shovel and disposal container.

Postings

The following information will be available at the Site within all Tetra Tech vehicles:

- Emergency telephone numbers.
- Emergency evacuation routes and staging area.
- Route to Hospital and Non-Emergency Clinic.

Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers;
- Refilling medical supplies;
- Recharging eyewashes;
- Replenishing spill control supplies.

12 TRAINING

General Health and Safety Training

Project personnel shall receive site training during initial site visit including review of this HASP, the duties the employees are expected to perform and a review of Tetra Tech's SWP 5-1, Work Rules for general health and safety procedures.

Hazardous Waste Operations and Emergency Response Training

Employees engaging in hazardous waste operations or emergency response shall receive appropriate training as required by 29 CFR 1910.120, 29 CFR 1926.65 (or if required by Subcontract). At a minimum, the training shall have consisted of instruction in the topics outlined in 29 CFR 1910.120 and 29 CFR 1926.65. Personnel who have not met these training requirements will not be allowed to engage in hazardous waste operations or emergency response activities.

Initial Training

General site workers engaged in hazardous waste operations shall, at the time of job assignments, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations, unless otherwise noted in the above-referenced standards.

Employees engaged in emergency response operations shall be trained to the level of required competence in accordance with 29 CFR 1910.120, paragraphs (p) and/or (q).

Refresher Training

General site workers shall receive 8 hours of refresher training annually (within the previous 12-month period) to maintain qualifications for fieldwork. Employees engaged in emergency response operations shall receive annual refresher training of sufficient content and duration to maintain their competencies or shall demonstrate competency in those areas at least annually.

Site-Specific Health and Safety Training

Prior to beginning any investigation activities, Tetra Tech will schedule a site-specific training with all personnel who work on the Site. During this meeting, Tetra Tech will review the site specific HASP. This meeting will be documented and signed by all parties attending the training. As work progresses, additional training may be required for new worker(s) entering the site. Personnel who have not received the site-specific training will not be allowed unescorted.

On-Site Safety Briefings

Project personnel and visitors will be given on-site health and safety briefings by the ESS/FOL to assist site personnel in safely conducting their work activities. The briefings will include information on new operations to be conducted, changes in work practices or changes in the site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. Prior to starting any new activity, a training session using the AHAs will be held for workers involved in the activity. A copy of the attendance sheet for these daily briefings is included in Appendix A.

First Aid And CPR

The ESS/FOL will identify those individuals requiring first aid and CPR training in order to ensure that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross Association; OSHA 29 CFR 1910.1030, Bloodborne Pathogen Standard; and DCN 02-3, Bloodborne Pathogens.

Hazard Communication

Hazard communication training will be provided and documented in accordance with the requirements contained in DCN 02-1, Hazard Communication, a copy of which will be maintained on site. This training will be included, at a minimum, during the initial site briefing and additionally during daily site safety briefings as necessary or indicated.

13 LOGS, REPORTS AND RECORDKEEPING

The following is a summary of required health and safety logs, reports and recordkeeping.

Field Change Request

FCRs are to be completed for initiating a change to the HASP. The PESM and PM approval is required. The original will be kept in the project file. Approved changes will be reviewed with affected field personnel at a safety briefing. A FCR is provided in Appendix A**.**

Medical and Training Records

Copies or verification of training for site-specific training will be maintained on-site. Records for all subcontractor employees will also be kept on-site. All employee medical records will be maintained by the Corporate Medical Consultant.

On-site Log

The ESS/FOL or designee will keep each day a log of personnel on-site.

Weekly Safety Reports

Weekly safety reports are not anticipated since work is typically periodic in nature and less than a week per mobilization. The ESS/FOL shall complete daily briefings as required.

Accident/Incident Reports

Incident reporting needs to occur to Tetra Tech immediately to assure that any injury is properly managed. The incident reporting and investigation during site work will follow DCN 02-02, Incident Reporting and Investigation Program. Written confirmation of verbal reports is to be submitted within 24 hours.

Hazard Communication Program/SDS

The hazard communication program will be maintained on-site and training on the program information and requirements will be provided in accordance with 29 CFRs 1910.1200 and 1926.59, *Hazard Communication,* 1910.1201, *Retention of DOT Markings, Placards and Labels,* and DCN 02-1, Hazard Communication.

SDSs will be obtained for applicable substances and included in the site hazard communication file. A copy of the SDSs will be obtained and maintained in the file for all chemicals to which the requirements apply; this will apply to both Tetra Tech personnel and any subcontractors for which Tetra Tech has responsibility and/or oversight responsibilities. All chemical containers will be properly labeled in accordance with the requirements of the applicable standards.

14 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the ESS/FOL as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan for the Equinor Brooklyn Site, and understand the information presented. I will comply with the provisions contained therein.

Name (Print and Sign)	***Date***

Name (Print and Sign)	*Date*

15 REFERENCES

American Conference of Governmental Industrial Hygienists, Inc., 2007, "Threshold limit values for chemical substances and physical agents in the work environment and biological exposure indices;" ACGIH, Cincinnati, Ohio.

Tetra Tech CES Health and Safety Program

U.S. Department of Labor, Occupational Safety & Health Administration, 2007, 29 CFR 1910 - General Industry, and 29 CFR 1926 - Construction Industry Standards.

APPENDIX A

HEALTH AND SAFETY FORMS

TETRA TECH
HASP FIELD CHANGE REQUEST FORM

PROJECT:

TASK OR PHASE: _____

PROJECT LOCATION: _____

DESCRIPTION OF CHANGE: _____

REASON FOR CHANGE: _____

RECOMMENDED DISPOSITION:

PM: _____ _____
Signature Date

Site Superintendent: _____ _____
Signature Date

ESS: _____ _____
Signature Date

PESM: _____ _____
Signature Date

DISTRIBUTION:

PESM	_____
ESS	_____
Site Superintendent	_____
PM	_____

TETRA TECH
HASP FIELD CHANGE DOCUMENTATION

Field Change Number: _____ Date Effective: _____

Pen and ink changes to be made in the HASP to alert the reader of this change:

_____

_____

_____

_____

Reason for the change to be incorporated into the HASP:

_____

_____

_____

_____

_____

_____

TEXT OF CHANGE TO BE INCORPORATED:

TETRA TECH

HASP FIELD CHANGE RECORDS

Record of Field Changes:

Initial for attaching any Field Changes to this HASP. Enter the Field Change Number and Date Issued. File the completed Field Changes to this HASP at the end as attachments. Make PEN AND INK changes to the text to alert the reader to the changes that are required in the Field Change. As required, distribute revised text pages to holders of controlled copies of the HASP and document on List of Changes/Additions.

Field Change No.	Date Entered	Synopsis of Change	Initials

TETRA TECH

MEDICAL DATA SHEET

The brief medical data sheet shall be completed by all on-site personnel and will be kept in the Support Zone by the ESS as a project record during the conduct of site operations. It accompanies any personnel when medical assistance is needed or if transport to a hospital is required.

Project: _____

Name: _____ Home Telephone: _____

Address: _____

Age: _____ Height: _____ Weight: _____ Blood Type: ___

Name and Telephone Number of Emergency Contact: _____

_____

Drug or Other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? _____

Provide A Check List Of Previous Illnesses: _____

_____

_____

What Medications Are You Presently Using?_____

_____

_____

_____

Do You Have Any Medical Restrictions? _____

_____

Name, Address, and Phone Number of Personal Physician: _____

_____

_____

TETRA TECH

DAILY PROJECT/TAILGATE SAFETY MEETING FORM

Meeting Details				Signed by attendee
Project No.:		No of Attendees:		
Job Location:				
Meeting Date:		Time of Meeting:		
National Weather Service Forecast:				
Meeting Conducted By:				
Topics Discussed:				
Accidents Reviewed:				
Tasks for the Day:				
Potential Hazards:				
Precautions to Take:				

RISK REALITY CHECK

Lead by:

What could go wrong? And the worst thing that can happen if it does?

What procedures, tools/equipment, PPE, and knowledge are in place to address this risk?

Comments:

AIR MONITORING:
Real Time

Major Activity	Location(s)	Worker Occupation	FID/PID Range	CGI/O2 Range	PDM Range	Other

PERSONAL AIR MONITORING

Analyte	Activity Monitored	Occupation	Location	Result	Type of Sample*

SUBCONTRACTORS ON SITE

Company Name	Task or Function	Return to Site Next Week (Y/N)

_____ _____

Health and Safety Officer - Signature **Date**

PERSONAL PROTECTIVE EQUIPMENT (PPE) SELECTION

ACTIVITY: _____

TASK	HEAD	EYE/FACE	FEET	HANDS	BODY	HEARING	RESPIRATOR

APPENDIX B

ACTIVITY HAZARD ANALYSIS

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: General Site Hazards**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
1. General Site Hazards	a. Back Injuries and Strains	a. Back Injuries and Strains • Site personnel will be instructed on proper lifting techniques (keep back straight, lift with legs, limit twisting, etc). • Mechanical devices should be used to reduce manual handling of materials. Team lifting should be utilized if mechanical devices are not available. • An individual will not lift loads greater than 50 pounds. **The ESS may lower this limit depending on individual's fitness level.**
	b. Slips/Trips/Falls	b. Slips/Trips/Falls • Visually inspect work areas and mark, barricade, or eliminate slip, trip and fall hazards if feasible. • Maintain work areas safe and orderly. Unloading areas should be on even terrain. • Watch and prepare for uneven terrain, stumps, and vegetation in walk areas. • Replace work boots when worn out or the tread on the sole does not provide traction. • Tools and supplies/equipment will be properly stored.
	c. Dropped Objects	c. Dropped Objects • Steel toe boots meeting ANSI Standard Z41 will be worn as directed.
	d. Noise	d. Noise • Evaluate high noise operations to determine if hearing protective devices should be worn. • Hearing protection with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs) will be worn during high noise operations. • All equipment will have manufacturer's required mufflers.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: General Site Hazards**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
	e. Temperature Extremes	e. Temperature Extremes • Drink plenty of fluids. • Train personnel of signs/symptoms of heat/cold stress. • Monitor air temperatures when extreme weather conditions are present. • Stay in visual and verbal contact with your buddy. • Controls will be implemented to minimize exposure to temperature extremes including work rest regimens, warm or cool rest areas, protective clothing, and minimize exposure time.
	f. Vehicular Traffic	f. Vehicular Traffic • Spotters will be used when backing up trucks and heavy equipment. • Trucks and heavy equipment will be equipped with back up alarms. • Traffic cones and orange traffic vests will be used when working in areas of traffic, construction vehicles and near roadways. Implement traffic controls such as flag persons, warning devices, etc., as necessary. • Employees will need to pay attention to operations around and adjacent to their work and continually evaluate the need for traffic control measures. .
	g. Overhead Hazards	g. Overhead Hazards • Personnel will be required to wear hard hats that meet ANSI Standard Z89.1 when an overhead hazard exists. • All equipment will be provided with guards, canopies or grills to protect the operator from falling or flying objects. • All overhead hazards will be identified prior to commencing work operations.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: General Site Hazards**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
	h. Eye Injuries	h. Eye Injuries • Safety glasses meeting ANSI Standard Z87 will be worn for all field operations where eye hazards exist. • A portable eye wash station will be located adjacent to work activities.
	i. Sharp Objects/punctures	i. Sharp Objects/punctures • Leather gloves (minimum) or cut resistant work gloves will be worn depending on the material working with. • All hand and power tools will be maintained in a safe condition. When possible, blunt all sharp objects. • First aid kits will be available by the work area.
	j. Fire	j. Fire • Reference Section 11.8. • Only use NFPA-approved fuel cans with a pouring spout or funnel. • Smoking and open flames are not permitted in fueling areas. • A properly rated fire extinguisher will be located in the refueling area and on site trucks. • All gasoline-powered equipment will be grounded and bonded.
	k. Spills	k. Spills • Reference Section 11.12. • Spill and absorbent materials will be readily available. • Contain, control and clean up the spill and affected area (soil, water). Manage and dispose of spill material appropriately. • All waste materials generated will be contained in a seal-able container appropriate for the size of the spill. • Fuel nozzles and hose will be secure in holder after use. • Fuel caps will be secured after fueling operations.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: General Site Hazards**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
	l. Biological Hazards	l. Biological Hazards • Follow and train personnel on the procedures outlined in Section 3.2. • Wear insect repellent and long sleeved shirts as needed. Wear light colored clothing to highlight ticks. • Follow procedures for tick bites. Perform self and buddy checks frequently throughout the day. • Be aware of poisonous plants; poison ivy blocking lotion will be used. • Approach debris, rock piles, and other snake habitats with caution. • If allergic to bees/wasps, ensure an epinephrine (SDS needed on site) kit is readily available and make sure the ESS is informed of the condition.
	m. Hand and Power Tools	m. Hand and Power Tools • Reference Section 3.3.7. • The proper tools will be used for each task. • All tools will be inspected before each use. Damaged tools will be removed from service and tagged (splintered wood bases, missing guards, “mushroom” head). • Tools will be used in accordance with manufacturer’s instructions. • Modifications to tools are prohibited unless approved by the ESS. • Ground Fault Circuit Interrupters (GFCIs) will be used with all electrical power tools.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY**
Activity: General Site Hazards

MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS
	n. Chemicals brought on site	n. Chemicals brought on site • Identify all chemical hazards and receive training (Haz Com-SDS) regarding safe handling and storage of chemicals. • The ESS maintains copies of all SDS for chemicals that are on site. • A portable 15 minute eye wash station will be located by the work area.
	o. Adverse Weather	o. Adverse Weather • Follow the 30-second rule (time between lightning strike and thunder) for shutdown of operations, or as determined by the ESS. Seek shelter in building (preferred) or vehicle. • Immediately suspend operations when lightning is in the immediate vicinity and seek shelter. • Shut down operations when wind speed is greater than 30 mph sustained. Ensure that all debris/materials are secured.
EQUIPMENT USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
1. Appropriate PPE 2. Hand and Power Tools 3. Portable Eyewash 4. First Aid Kits 5. GFCI	1. Inspect all vehicles daily. 2. Inspect all hand and power tools prior to use. 3. Inspect all PPE prior to use. 4. Inspect portable eye washes and First Aid Kits weekly. 5. Inspect Fire Extinguishers weekly. 6. Check and Test GFCI's weekly.	1. All site personnel will read and comply with this HASP. 2. All site personnel will receive site specific training. 3. At least two individuals on-site will have current CPR, First Aid, and Bloodborne pathogen training. 4. Instruct personnel of proper use of fire extinguishers. 5. Personnel will be trained on the proper use of hand and power tools, including the steam cleaner.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Mobilization/Demobilization**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
1. Mobilization/Demobilization	a. Back Injuries and Strains	a. Back Injuries and Strains • Refer to General Site Hazards AHA.
	b. Slips/Trips/Falls	b. Slips/Trips/Falls • Refer to General Site Hazards AHA. • Maintain work areas safe and orderly. Unloading areas should be on even terrain. • Tools and supplies/equipment will be properly stored.
	c. Dropped Objects	c. Dropped Objects • Safety shoes meeting ANSI Standard Z41 will be worn as directed.
	d. Noise	d. Noise • Refer to General Site Hazards AHA.
	e. Temperature Extremes	e. Temperature Extremes • Refer to General Site Hazards AHA.
	f. Vehicular Traffic	f. Vehicular Traffic • Refer to General Site Hazards AHA.
	g. Overhead Hazards	g. Overhead Hazards • Refer to General Site Hazards AHA. • All overhead hazards will be identified prior to commencing work operations.
	h. Eye Injuries	h. Eye Injuries • Refer to General Site Hazards AHA.
	i. Biological Hazards	i. Biological Hazards • Refer to General Site Hazards AHA.
	j. Hand and Power Tools	j. Hand and Power Tools • Refer to General Site Hazards AHA.
	k. Caught In/Between	k. Caught In/Between • Do not allow personnel between a moving object and a stationary object.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Mobilization/Demobilization**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
		• Ensure all personnel within unloading and loading areas are accounted for and out of the way.
	l. Contact with Overhead Utilities	l. Contact with Overhead Utilities • Refer to General Site Hazards AHA. • If equipment is being operated, delivered, or off loaded in an area with overhead utilities, a spotter must be used.
	m. On-site Chemicals	m. On-site Chemicals • Refer to General Site Hazards AHA. • Identify all chemical hazards and receive training (Haz Com-SDS) regarding safe handling and storage of chemicals. • The ESS maintains copies of all SDS for chemicals that are on site.
EQUIPMENT USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
1. Appropriate PPE 2. Hand and Power Tools 3. Portable Eyewash 4. First Aid Kits 5. GFCI	1. Inspect all hand and power tools prior to use. 2. Inspect all PPE prior to use. 3. Inspect portable eye washes and First Aid Kits weekly. 4. Inspect Fire Extinguishers weekly. 5. Check and Test GFCI's weekly.	1. All site personnel will read and comply with this HASP. 2. All site personnel will receive site specific training. 3. At least two individuals on-site will have current CPR, First Aid, and Bloodborne pathogen training. 4. Instruct personnel of proper use of fire extinguishers. 5. Personnel will be trained on the proper use of hand and power tools, including the steam cleaner.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Groundwater Sampling**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
1. Sample handling.	a. Breaking sample containers.	• Use caution when handling samples. • Use appropriate PPE as listed in Table 5-1. • Samples to be placed in transportation container with adequate packing material.
2. Collect groundwater samples	a. Exposure to contaminants and preservatives	• Practice contamination avoidance, stay upwind where possible. • Conduct real-time air monitoring. • Follow proper decontamination procedures. • Wash hands/face before eating, drinking or smoking. • Wear proper PPE per Table 5-1.
3. Decontamination of Equipment	a. Exposure to contaminants	• Wear appropriate PPE per Table 5-1. • Use shielding as necessary.
4. IDW Characterization	a. Chemical	• Wear appropriate PPE per Table 5-1; • Perform air monitoring per Table 6-1; • Practice contamination avoidance; • Follow proper decontamination procedures; and • Wash hands/face before eating, drinking or smoking.
	b. Temperature extremes	• Drink plenty of fluids: • Train personnel of signs/symptoms of heat stress; • Monitor air temperatures when extreme weather conditions are present; • Stay in visual and verbal contact with your buddy; and • Use Temperature Extremes program.
	c. Splashing	• Wear safety glasses; and • Wear safety goggles for operations where splash potential is high.
	d. Manual lifting/ material handling	• Instruct personnel on proper lifting techniques; • Use proper lifting techniques; and • Team lifting will be used for heavy loads or use mechanical lifting

Project: Phase II ESA, SBMT		**Location: Brooklyn, NY**
Activity: Groundwater Sampling		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
		devices. • For loads greater than 50 pounds, use two people to lift; however this limit may be lower depending on stature and age (i.e., fitness level), per ESS.
	e. Biological hazards	• Be alert to the presence of biological hazards; • Wear insect repellent; • Follow procedures for tick bites; • ESS should be aware of on-site personnel with allergic reactions to insect bites and stings.
EQUIPMENT USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
1. Appropriate PPE 2. Air Monitoring Instrument 3. Bladder Pump 4. Portable Eyewash 5. First Aid Kits	1. Inspect all vehicles daily. 2. Inspect all sampling equipment prior to use. 3. Inspect/calibrate air monitoring instrument daily 4. Inspect all PPE prior to use. 5. Inspect portable eye washes and First Aid Kits weekly. 6. Inspect Fire Extinguishers weekly.	1. All site personnel will read and comply with this HASP. 2. All site personnel will receive site specific training. 3. Qualified operators will be used for air monitoring instrument operation. 4. At least two individuals on-site will have current CPR, First Aid, and Bloodborne pathogen training. 5. Instruct personnel of proper use of fire extinguishers. 6. Personnel will be trained on the proper use of hand and power tools, including the steam cleaner.

Project: Phase II ESA, SBMT		**Location: Brooklyn, NY**
Activity: Site Inspections		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
1. Engineering Control (non-intrusive) 2. Utility Clearance 3. Surveying	a. Slips/Trips/Falls	• Refer to General Site Hazards AHA.
	b. Hand Tools	• Refer to General Site Hazards AHA.
	c. Underground utilities	• Use Dig Safely NY (811) • All boring and soil vapor locations will be cleared by a geophysical subcontractor • All borings will be hand cleared to a depth of 5 feet
	d. Biological Hazards	• Refer to General Site Hazards AHA.
	e. Adverse Weather	• Refer to General Site Hazards AHA.
EQUIPMENT USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
1. Appropriate PPE 2. First Aid Kits	1. Inspect all vehicles daily. 2. Inspect all PPE prior to use. 3. Inspect First Aid Kits weekly.	1. All site personnel will read and comply with this HASP. 2. All site personnel will receive site specific training. 3. At least two individuals on-site will have current CPR, First Aid, and Bloodborne pathogen training. 4. Personnel will be trained on the proper use of hand tools.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Soil Boring/Hydropunch**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
1. Soil Boring Installation using Geoprobe 2. Groundwater grab sample via Hydropunch	a. Back Injuries	a. Back Injuries • Reference General Site Hazards AHA. • Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	b. Slips/Trips/Falls	b. Slips/Trips/Falls • Reference General Site Hazards AHA.
	c. Eye Injuries	c. Eye Injuries • Reference General Site Hazards AHA.
	d. Pinch/Cut/Smash	d. Pinch/Cut/Smash • Leather gloves (minimum) or cut resistant work gloves will be worn depending on the material working with. • All hand tools will be maintained in a safe condition. When possible, blunt all sharp objects.
	e. Hand Tools	e. Hand Tools • Reference General Site Hazards AHA. • Keep all tools clean and in good repair.
	f. Exposure to contaminants	f. Exposure to contaminants • Wear appropriate PPE per Table 5-1. • Perform air monitoring per Table 6-1. • Practice contamination avoidance – stay upwind when possible. • Follow proper decontamination procedures. • Wash hands/face before eating, drinking or smoking.
	g. Chemicals brought on site	g. Chemicals brought on site • Reference EHS Program EHS 4-2 and General Site Hazards.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Soil Boring/Hydropunch**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
		• Identify all chemical hazards and receive training (Haz Com-SDS) regarding safe handling and storage of chemicals (i.e., bentonite). • The ESS maintains copies of all SDS for chemicals that are on site. • A portable 15 minute eye wash station will be located by the work area.
	h. Noise	h. Noise • Refer to General Site Hazards AHA. • Hearing protection with a noise reduction rating capable of maintaining personal exposure below 85 dBA (ear muffs or plugs) will be worn during high noise operations. A noise meter will be utilized to determine noise levels or use rule of thumb: Wear hearing protection when a normal conversation level cannot be discerned without difficulty at a distance of 3 feet.
	i. Overhead Hazards	i. Overhead Hazards • Reference General Site Hazards. • Personnel will be required to wear hard hats that meet ANSI Standard Z89.1. • Maintain a minimum of 10-foot clearance from all overhead electric lines. • For voltages above 50kV the clearance shall be increased 4 inches for every 10kV over that voltage.
	j. Drilling Activities	j. Drilling Activities • Prior to drilling activities, perform adequate site clearing and leveling to accommodate equipment and supplies and provide a safe working area. Boring shall not be commenced when tree limbs, unstable ground or site obstructions cause unsafe tool handling conditions.

Project: Phase II ESA, SBMT **Activity: Soil Boring/Hydropunch**		**Location: Brooklyn, NY**
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
		• Place casing at a safe location on the ground or secure them to prevent movement when not in use. • Keep all controls, control linkages, warning and operation lights and lenses free of oil, grease and/or ice. • Shut down the drill rig head to make repairs or adjustments. Take precautions to prevent accidental starting of an engine during maintenance by locking, removing or tagging the ignition key. • Check the emergency switch daily. Ensure that its location is known to all drill rig personnel. • When breaking tool joints on the ground, position your hands so that your fingers will not be smashed between the wrench handle and the ground, should the wrench slip or the joint suddenly let go. • Perform work area monitoring in borehole & breathing zone, per this HASP – see Work Area Monitoring section. • All unattended boreholes must be adequately covered or otherwise protected to prevent drill rig personnel, site visitors, or animals from stepping or falling into the hole. All open boreholes shall be covered, protected or backfilled adequately and according to local or state regulations on completion of the drilling project. • "Horsing around" within the vicinity of the drill rig and tool and supply storage areas is not allowed, even when the drill rig is shut down. • Terminate soil boring operations during an electrical storm and move the entire crew away from the drill rig. • Do not attempt to exceed manufacturer's ratings of speed, force, torque, pressure, flow, etc. Only use the drill rig and tools for the purposes which they are intended and designed.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Soil Boring/Hydropunch**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
		• Alterations to a drill rig or tools shall only be made by qualified personnel and only after consultation with the manufacturer.
	k. Struck By/Against	k. Struck By/Against • Personnel will understand and review hand signals. • When using a hammer wear safety glasses and require all others around you to wear safety glasses. • Throwing or dropping tools shall not be permitted. All tools shall be carefully passed by hand between personnel or a hoist line shall be used. • Neatly stack casing and similar tools on racks or sills to prevent spreading, rolling or sliding. • All machines will be equipped with backup alarms. • Do not allow personnel between a moving object and a stationary object. • Ensure all personnel within unloading and loading areas are accounted for and out of the way.
	l. Underground Hazards	l. Underground Hazards • One Call • Geophysical Survey
EQUIPMENT USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
1. Work area monitoring equipment 2. Appropriate PPE 3. Hand Tools 4. First Aid Kits 5. Portable Eyewash	1. Inspect and calibrate work area monitoring instrument daily before and after use. 2. Inspect all hand tools prior to use. 3. Inspect all PPE prior to use. 4. Inspect portable eye washes and First Aid Kits weekly.	1. All site personnel will read and comply with this HASP. 2. Only trained personnel will conduct work area monitoring activities in accordance with this HASP. 3. All site personnel will receive site specific training. 4. Qualified operators will be used for drill rig and all other equipment 5. Personnel will be trained on the proper use of hand tools.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Soil Sampling and Soil Vapor Sampling Activities**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
1. Soil and soil vapor Sampling	a. Back Injuries	a. Back Injuries • Reference General Site Hazards AHA. • Site personnel will be instructed on proper lifting techniques; mechanical devices should be used to reduce manual handling of materials; team lifting should be utilized if mechanical devices are not available.
	b. Slips/Trips/Falls	b. Slips/Trips/Falls • Reference General Site Hazards AHA.
	c. Eye Injuries	c. Eye Injuries • Reference General Site Hazards AHA.
	d. Pinch/Cut/Smash	d. Pinch/Cut/Smash • Leather gloves (minimum) or cut resistant work gloves will be worn depending on the material working with. • All hand tools will be maintained in a safe condition. When possible, blunt all sharp objects. • First aid kits will be available by the work area.
	e. Hand Tools	e. Hand Tools • Reference General Site Hazards AHA. • Keep all tools clean and in good repair.
	f. Exposure to contaminants	f. Exposure to contaminants • Wear appropriate PPE per Table 5-1. • Perform air monitoring per Table 6-1. • Practice contamination avoidance, stay upwind when possible.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY** **Activity: Soil Sampling and Soil Vapor Sampling Activities**		
MAJOR STEPS	**POTENTIAL HAZARDS**	**PROTECTIVE MEASURES/CONTROLS**
		• Follow proper decontamination procedures. • Wash hands/face before eating, drinking or smoking.
	g. Chemicals brought on site	g. Chemicals brought on site • Reference EHS Program EHS 4-2 and General Site Hazards. • Identify all chemical hazards and receive training (Haz Com-SDS) regarding safe handling and storage of chemicals (i.e., bentonite). • The ESS maintains copies of all SDS for chemicals that are on site.
	h. Overhead Hazards	h. Overhead Hazards • All personnel will wear hard hats meeting ANSI Standard Z89.1.
EQUIPMENT USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
1. Work area monitoring equipment 2. Appropriate PPE 3. Hand Tools 4. First Aid Kits 5. Portable Eyewash	1. Inspect & calibrate work area monitoring instrument daily before & after use. 2. Inspect all hand tools prior to use. 3. Inspect all PPE prior to use. 4. Inspect portable eye washes and First Aid Kits weekly.	1. All site personnel will read and comply with this HASP. 2. Only trained personnel will conduct work area monitoring activities in accordance with this HASP. 3. All site personnel will receive site specific training. 4. Personnel will be trained on the proper use of hand tools.

Project: Phase II ESA, SBMT **Location: Brooklyn, NY**

Activity: COVID-19 Precautions for Field Activities

MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS
1. Pre-field activity preparations. Ensure AHA is included or referenced in IPP/EHS Plan.	1a. Employee who has been in close contact with anybody who has tested positive to COVID-19 in the past 5 days and are NOT up-to-date on COVID-19 vaccinations.	• Notify your supervisor if this situation applies to you. • Stay home and quarantine for at least 5 days. If multiple people in a household test positive for COVID, this quarantine lasts until 5 days AFTER the end of isolation for the most recently infected person. Close contact is defined as cohabitating with somebody in a shared living space (roommates, children, spouses, partners, parents, etc.) or somebody you've been within 6 ft of for more than 15 mins. • Get tested at least 5 days after contact. • If you develop symptoms, get tested immediately and isolate until you receive the test results. If you test positive, follow isolation guidelines. • For 10 days after your last close contact with someone with COVID-19, watch for fever (100.4◦F or greater), cough, shortness of breath, or other COVID-19 symptoms. • Avoid travel until Day 10. • Wear a well-fitted mask for 10 full days any time you are around others inside your home or in public. Do not go to places where you are unable to wear a mask.
	1b. Employee who has been in close contact with anybody who has tested positive to COVID-19 in the past 5 days and ARE up-to-date on COVID-19 vaccinations.	• Notify your supervisor if this situation applies to you. • Get tested at least 5 days after contact. • If you develop symptoms, get tested immediately and isolate until you receive the test results. If you test positive, follow isolation guidelines. • For 10 days after your last close contact with someone with COVID-19, watch for fever (100.4◦F or greater), cough, shortness of breath, or other COVID-19 symptoms. • Avoid travel until Day 10. • Wear a well-fitted mask for 10 full days any time you are around others inside your home or in public. Do not go to places where you are unable to wear a mask.
	1b. Employee who is experiencing flu-like symptoms or symptoms of COVID-19 prior to the start of field activities.	• Notify your supervisor if this situation applies to you. • Get tested and wait for test results. If positive, follow guidelines above based on vaccination status. • If the test is negative, but flu or cold-like symptoms persist, contact your PM. Depending on the circumstances of the work, you may need to wait until symptoms resolve further or wait a few days and get tested again.
	1c. All staff that are going into the field.	• Check yourself for COVID-19 symptoms or fever before travelling to the job site or reporting to work each morning. • Monitor alerts and communications from the CDC, local public health sources such as your state health department, and Tetra Tech CES Management to help prevent contracting illness in areas with expanding confirmed cases. **Notify your supervisor if the community you live in is categorized as having** a "High" level of COVID 19 spread.

MAJOR STEPS	POTENTIAL HAZARDS	PROTECTIVE MEASURES/CONTROLS
2. Deployment	Travelling by air.	• Practice social distancing while in the airport terminals and around other travelers and wear a mask at all times indoors including while on airplanes.
3. Conducting field activities.	3a. Daily activities.	• In addition to standard first aid supplies and Personal Protective Equipment, employees are required to have the following items on hand prior to field activities. These items should include, but are not limited to: o Tissues o Soap and water (preferred over hand sanitizers) o Hand sanitizer (that contain 60-95% alcohol) o Disposable, Masks (multi-layers of non-woven material plus nose wire) or a cloth mask made of tightly woven, breathable fabric that blocks light when held up to a light source and a nose wire. • During the daily tailgate meeting or other meetings with the team including subcontractors o Field Task Lead should review any new CDC information. o Field Task Lead should verify that each employee has conducted a self-assessment prior to arriving on the job site. • Shaking hands with your colleagues, clients or members of the public is discouraged.
	3d. Employee who experiences flu-like symptoms or symptoms of COVID-19 while working in the field.	• Notify Field Task Lead and Project Manager right away. • The Field Task Lead or Project Manager shall immediately notify their Operations Manager. • Stay in their hotel room until you receive further instruction from your Field Lead, Project Manager or Supervisor. • All potential cases should be kept as confidential. • Follow CDC recommended procedures to monitor your condition and contact a local health care provider.

EQUIPMENT USAGE

Equipment to be Used	Training Requirements	Inspection Requirements
1. COVID-19 related supplies	In addition to standard first aid supplies and Personal Protective Equipment, employees are required to have the following items on hand prior to project related domestic travel. These items should include, but are not limited to the following: • Reusable thermometer with alcohol wipes or a non-contract thermometer • Tissues • Hand sanitizer (that contain 60-95% alcohol) • Soap and water if feasible. • Face covering (multiple items to allow regular washing or an ample supply of disposable masks)	Thermometer: Inspect and ensure proper operation prior to each use Make sure there are adequate supplies of cleaning and disinfecting supplies.

Abbreviations and Acronyms:

AHA – Activity Hazard Analysis
PPE – Personal Protective Equipment

APPENDIX C

SBMT RALLY POINT and PREFERRED EVACUATION ROUTES

APPENDIX D

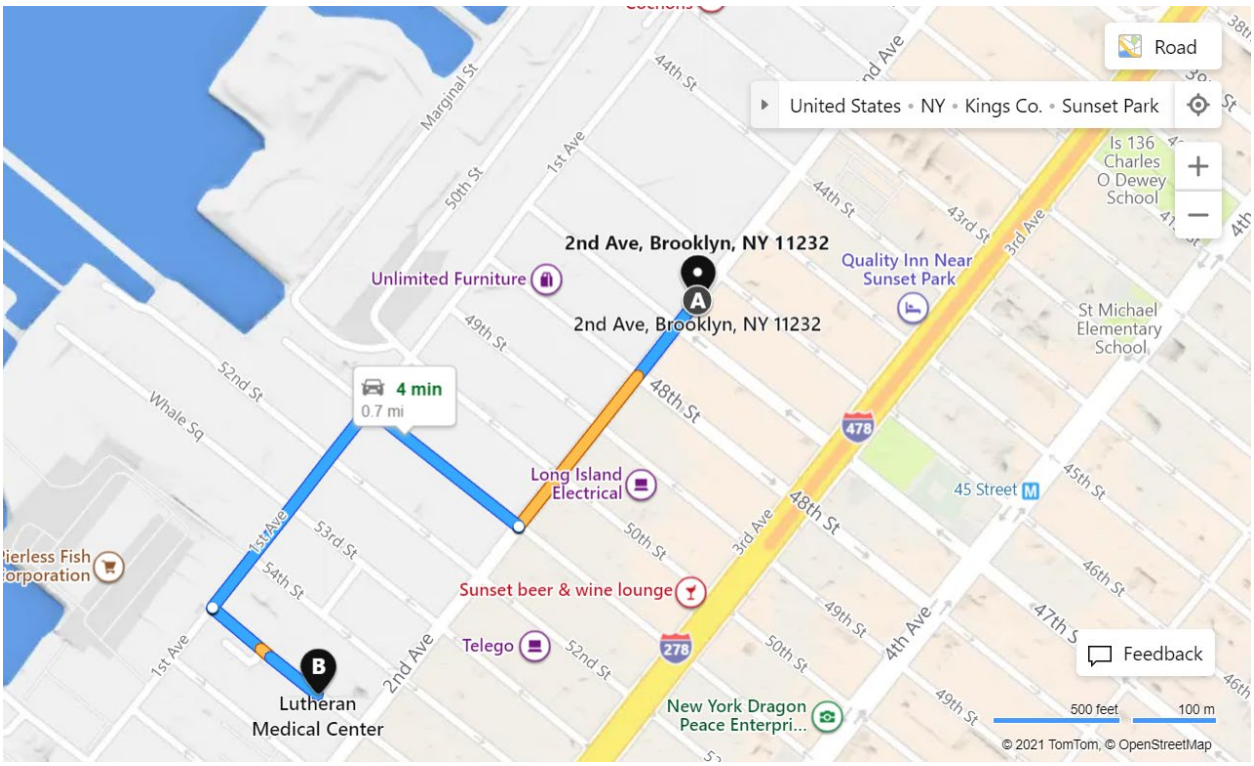
HOSPITAL AND WORK CARE FACILITY ROUTE MAP

EMERGENCY AND NON-EMERGENCY FACILITY – For Emergency and NON-Emergency Injuries
Travel from 2nd Avenue, Brooklyn, NY 11232

NYU Langone Hospital, formerly known as NYU Lutheran Medical Center
150 55th Street
Brooklyn, NY 11220

Total Estimated Time: 4 minutes **Total Distance:** 0.7 mile

1: Head SOUTHWEST on 2nd AVENUE toward 47th STREET	(0.2 mi)
2: Turn RIGHT onto 51st STREET	(0.1 mi)
3: Turn LEFT onto 1st AVENUE	(0.2 mi)
4: Turn LEFT onto 55th STREET (Private Road)	(0.1 mi)
5: Arrive at 150 55th STREET on the right	



APPENDIX E

SAFETY DATA SHEETS

Appendix B – Quality Assurance Project Plan

South Brooklyn Marine Terminal
Quality Assurance Project Plan

Portions of Lots 1, 130, 136, 137, and 155, Block 662
2nd Avenue
Brooklyn, New York 11232

DEC Site No. C224360
Revision 0
November 16, 2022

PREPARED FOR

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QUALITY ASSURANCE PROJECT PLAN

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LIST OF ATTACHMENTS

1.0 GENERAL

Tetra Tech, Inc. (Tetra Tech), on behalf of SBMT Asset LLC (SBMT Asset), has prepared this Quality Assurance Project Plan (QAPP) for portions of the South Brooklyn Marine Terminal (SBMT) Site located in Brooklyn, New York (the "Site"; Figure 1). The Site will be used for two separate projects: the Empire Wind 1 offshore wind project (EW1 Project), as the location for the submarine export cable landfall and onshore substation, and the SBMT Port Infrastructure Improvement Project, which will allow SBMT to serve as a staging and operations-and-maintenance base for the offshore wind industry.

The RI data will be used to further characterize the subsurface conditions on-site and evaluate the need for future remedial measures. The project includes soil borings and monitoring well installation, groundwater, and soil sampling, and preparation of the Remedial Investigation Report.

This QAPP for the SBMT site has been prepared to specify procedures that will provide data of known, documented quality, and which will be legally defensible, should the need exist. To the extent discrepancies exist between this QAPP and the Remedial Investigation Work Plan, the Work Plan will take precedence.

Implementation of the field activities will begin immediately following approval of the QAPP by the project stakeholders, pending any short delays due to inclement weather.

2.0 PROJECT AND SITE DESCRIPTION

The Site is irregular in shape, and is bounded by 2nd Avenue to the southeast, 39th Street to the southwest, a recycling facility and 29th Street to the northeast and the Gowanus Bay to the northwest (Figure 1). The total Site area includes an approximately 73.68-acre tract of land within portions of Lots 1, 130, 136, 137, and 155 of Block 662. The Site is largely vacant and primarily consists of asphalt and concrete pavement, existing above-grade structures, railway spurs, and bulkheads. There are seven existing structures located on the property, including the J1 Shed, J2 Shed, N Shed, Graffiti Building, two temporary structures near 650 2nd Avenue, and the Tower Building located at 632 2nd Avenue. The Site is surrounded by an approximately eight-foot-tall chain-link fence, and access is restricted to the entrance near the northwest terminus of 39th Street with a security guard present. The topography at the Site is relatively flat and ground elevations vary between 2 feet to 10 feet above mean sea level (ASML).

As early as 1888, the Site was undeveloped and consisted of open waters. Between 1888 and 1922, the Site elevation was progressively raised with fill to construct a series of piers formerly known as the City of New York Piers. Based on aerial imagery, the site has been in its current condition since at least 2011. Additional historical information for the site is included in the Phase 1 Environmental Site Assessment prepared by AECOM in May 2018.

2.1 Site Geology and Hydrology

The Site is situated within the glaciated Coastal Plain physiographic province of New York State. Limited public data is available regarding to the depth to bedrock within the project area. According to the Geology and Engineering Geology of the New York Metropolitan Area, Field Trip Guidebook T361 (Baskerville 1989) and the Geologic Map of New York City, SBMT is underlain by the Cambro-Ordovician age Hartland Formation. The Hartland Formation is generally comprised of gneiss and belongs to the Pelham Bay Member. Surficial deposits in this region of New York are also mapped as glacial till. Based on a review of historic aerial imagery, low-lying portions of the site have been raised using fill materials as early as 1888 (AECOM 2018).

According to a review of the Natural Resources Conservation Service (NRCS) Web Soil Survey, the majority of the Site is mapped within the Urban land, reclaimed substratum, 0-3 percent slopes map unit. The typical soil profile for this map unit includes 0 to 15 inches of cemented material, and up to 15 to 79 inches of gravelly sandy loam. A small portion of the Site is mapped within the Urban land, till substratum, 0 to 3 percent slopes map unit. The typical soil profile for this map unit also includes cemented material and gravelly sandy loam.

A subsurface exploration program was completed by AECOM at SBMT between December 2017 and February 2018 to characterize the geotechnical conditions. The 2021 Phase II ESA conducted by Tetra Tech supported the AECOM observations. The site is generally underlain by fill consisting of fine to coarse sands with varying amounts of gravel and silt, as well as brick, wood, gravel etc. within the upper 6-8 feet. Shallow layers of fine to coarse gravel with sand and silt, approximately

eight to eleven feet thick, were observed in three borings. Deeper strata containing clay, sand, and silt, approximately 15 to 20 feet thick, were observed at depths between 40 and 102 feet BGS.

During the Phase II ESA performed by Tetra Tech in December 2021, groundwater depths varied across the Site, but were generally observed to be approximately eight to ten feet BGS. The groundwater flow direction has not been investigated but is assumed to follow the general topography of the Site and flow northwest towards Gowanus Bay.

2.2 Previous Investigations

Based on a review of prior reports for the Site, environmental investigations have been completed for the SBMT since at least October 1997. In March 1998, two 550-gallon gasoline underground storage tanks (USTs), four 4,000-gallon gasoline USTs, one 4,000-gallon diesel UST, one 550-gallon waste oil UST, one 1,000-gallon above-ground storage tank (AST) of unknown contents, and one 550-gallon fuel AST were removed from the property. Since impacted soils were detected through post-excavation sampling around the tanks and associated pumps, two spill cases (No. 97-14188 and 97-14190) were opened by NYSDEC on March 23, 1998. No additional USTs were located during a 1998 geophysical investigation performed at eight portions of the Site following removal of the tanks (TRC 2004). Impacted soils surrounding the former UST area were excavated and transported off-Site for disposal. 13 groundwater monitoring wells were installed around the former tank area and quarterly groundwater sampling was completed by URS Corporation (URS) for various wells between August 2003 and March 2005. Once groundwater contaminant concentrations were measured below the NYSDEC Groundwater Quality Criteria, a request for spill closure was submitted and approved for both cases in May 2005.

An April 2004 investigation by TRC included the advancement of 12 soil borings throughout the Site that revealed the presence of petroleum-related volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOC)s, and metals in subsurface soils between 0 and 10.5 feet BGS. It was suspected that four former 160,000-gallon ASTs existed in in the location of the “N Shed” along the 39th Street Pier. Based on a review of historic aerial photographs, it was estimated that these tanks were active between 1940 and 1953. However, information regarding the decommissioning of the tanks and any impacted soil removal was not available (AECOM 2018). Petroleum-related impacts were observed in four shallow and two subsurface soil samples collected from four borings in the vicinity of the former ASTs (TRC 2004).

A Phase I Environmental Site Assessment was performed by AECOM for the Site in May 2018. AECOM documented that due to the potential for orphan USTs and presence historic urban fill, subsurface contamination may exist at the SBMT. A brass cap within a concrete pad was observed behind the two temporary structures associated with the auto maintenance facility near 37th Street and Second Avenue. The Phase I report also recognized the history of reported spills and removal of the former USTs in 1999.

AECOM also completed a Phase II Limited Site Investigation at SBMT in October 2018 that included the advancement of 15 soil borings to a maximum depth of 20 feet, collection of groundwater grab samples from eight borings, and an inspection of an underground vault located near the New York Department of Transportation (DOT) building in the northeast portion of the Site. Elevated SVOCs concentrations were detected above unrestricted, residential, and commercial SCOs in eight borings at the Site, but primarily in the location of the former ASTs within the "N Shed". PCBs were also detected above the commercial SCOs in the vicinity of the DOT building. No VOCs were detected in any soil samples above the unrestricted SCO. SVOCs above the New York Technical and Operational Guidance Series (TOGS) 1.1.1 standards were detected in only one groundwater sample from a boring near the 39th Street parking lot.

A subsurface investigation was completed by TRC in July 2019 throughout the Site that included a geophysical survey, advancement of 20 soil borings, installation of eight temporary wells, and installation of eight soil vapor sample locations. The geophysical survey identified an additional UST in the southwestern portion of the Site near 39th Street. Information regarding the four former 160,000-gallon ASTs was not provided in this investigation report. According to the TRC Phase II Investigation Report, the following contaminants were identified for on-Site soils:

- Select VOCs were detected over the Unrestricted Use SCO and Commissioner's Policy Table 2 and/or Table 3 SCLs, but below the Restricted Residential Use, Restricted Commercial Use, and Restricted Industrial Use SCOs;
- Select SVOCs and metals were detected above the Unrestricted Use, Restricted Residential, Restricted Commercial, and Restricted Industrial SCOs;
- Total PCBs were detected in one sample at a concentration above the Unrestricted Use SCO, but below the Restricted Residential Use, Restricted Commercial Use, and Restricted Industrial Use SCOs; and,
- Select pesticides were detected over the Unrestricted Use SCOs but below the Restricted Residential Use, Restricted Commercial Use, and Restricted Industrial Use SCOs.
- Impacts to adjacent subsurface materials were not observed downgradient of the UST.

A supplemental Phase II ESA was completed by Tetra Tech in December 2021 that included a geophysical survey, advancement of 40 soil borings to a depth of approximately 10 feet BGS, installation of 11 temporary monitoring wells to depths between 6 and 10 feet BGS and collection of groundwater samples, installation of 13 temporary soil vapor points and collection of 13 soil vapor samples below ground cover, collection of one ambient air sample from the Site and laboratory analyses for parameters of environmental concern by laboratory certified under the New York Environmental Laboratory Approval Program (ELAP).

The analytical results for soil samples were compared to the NYSDEC Industrial Use SCO and produced the following exceedances:

- Benzo(a)pyrene was detected in 33 of 42 samples, ranging from 22.9 to 9,330 ug/kg, and exceeded the NYSDEC Industrial Use SCO in eight (8) samples.
- Dibenzo(a,h)anthracene was detected in 24 of 42 samples, ranging from 19.2 to 1,530 ug/kg, and exceeded the NYSDEC Industrial Use SCO in one (1) sample.

The analytical results for groundwater samples were compared to the NYSDEC Ambient Water Quality Stands and Guidance Values for groundwater (GA) and revealed the following exceedances:

- Benzo(a)anthracene was detected in 2 of 12 samples, ranging from 0.47 to 0.76 ug/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.
- Benzo(b)fluoranthene was detected in 2 of 12 samples, ranging from 0.61 to 0.9 ug/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.
- Benzo(k)fluoranthene was detected in 2 of 12 samples, ranging from 0.21 to 0.38 ug/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.
- Chrysene was detected in 2 of 12 samples, ranging from 0.37 to 0.64 ug/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in both samples.
- Indeno(1,2,3-cd)Pyrene was detected in 3 of 12 samples, ranging from 0.57 to 1.1 ug/L, and exceeded its NYSDEC Ambient Water Quality Standards and Guidance Values in all three (3) samples.
- Antimony was detected in one sample, at a concentration of 6.2 ug/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values.
- Arsenic was detected in 9 of 11 samples, ranging from 3.1 to 66.6 ug/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one location.
- Beryllium was detected in 5 of 11 samples, ranging from 1.1 to 7.1 ug/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one location.
- Chromium was detected in 4 of 11 samples, ranging from 11.7 to 140 ug/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one location.
- Manganese was detected in all 11 samples, ranging from 20.5 to 10,700 ug/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at six (6) locations.
- Nickel was detected in 5 of 11 samples, ranging from 11.2 to 206 ug/L, exceeding its NYSDEC Ambient Water Quality Standards and Guidance Values at one location.

A total of 68 VOCs were analyzed for TO-15 suite parameters. Of the 68 VOCs analyzed, 46 were detected at 13 of the soil vapor locations. Below is a summary of the VOCs that were detected above ambient air concentrations:

- Benzene was detected at concentrations ranging from 0.7 to 45.4 ug/m3,
- Cyclohexane was detected at concentrations ranging from 0.27 to 372 ug/m3,
- Ethylbenzene was detected at concentrations ranging from 0.42 to 2.9 ug/m3,
- Heptane was detected at concentrations ranging from 0.49 to 422 ug/m3,
- Hexane was detected at concentrations ranging from 0.49 to 206 ug/m3,
- Methyl ethyl ketone was detected at concentrations ranging from 0.41 to 121 ug/m3,
- Toluene was detected at concentrations ranging from 1.5 to 51.6 ug/m3, and
- Xylenes (total) was detected at concentrations ranging from 0.91 to 136 ug/m3.

One ambient air sample was collected as part of the sampling event. There were 17 VOCs that were detected in the ambient air sample.

3.0 PROJECT ORGANIZATION AND PERSONNEL RESPONSIBILITIES

An organization structure has been developed to identify the roles and responsibilities of the various personnel involved with the SBMT site. The team will consist of the following personnel, with a description of their responsibilities:

For the purpose of quality control (QC), Tetra Tech's Project Manager (PM) will be responsible for review of data upon receipt from the analytical laboratory. The PM will assure that data usability screening is performed by trained and experienced data reviewers using the applicable criteria specified in the NYSDEC 2005 Analytical Services Protocol (ASP). For the purposes of this document, all references to ASP indicate the 2005 NYSDEC Analytical Services Protocol. The specific requirements for data usability screening are given in Section 9.3. The PM will be responsible for ensuring that all analytical data are in conformance with requirements of this QAPP.

The Project Quality Assurance Manager (PQAM) is accountable for all QA activities, including oversight of subcontracted laboratories, verification of corrective actions, and supervision of data quality evaluation activities, including the validation and reporting of the analytical data.

The Field Operations Lead (FOL) will be responsible for the management and supervision of the field investigation program, providing consultation and decision-making on day-to-day issues relating to the sampling activities. The FOL oversees the sampling to determine that operations are consistent with plans and procedures, and that the data acquired meets the analytical and data quality needs. When necessary, the FOL documents any deviations from the plans and procedures for approval by the PM prior to implementation.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

Table 3.1 below provides the names of key project personnel. The resumes for these personnel are included as Attachment 3 to this QAPP**.**

Table 3.1 – Key Project Personnel

Project Personnel Title	Company	Personnel Name	Contact Email
Project Manager	Tetra Tech	Robert Cantagallo, CHMM	Robert.Cantagallo@tetratech.com
Project Quality Assurance Manager	Tetra Tech	Lauren McHugh	Lauren.McHugh@tetratech.com
Field Operations Lead	Tetra Tech	Alex Valli	Alex.Valli@tetratech.com
Third Party Validator	Tetra Tech	Angel Guzman	Angel.guzman@tetratech.com

4.0 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA

The overall quality assurance (QA) objective for the project is to develop and implement procedures which will provide data of known, documented quality. Field and laboratory quality assurance/quality control (QA/QC) requirements defined in the NYSDEC ASP and other applicable guidelines ensure acceptable levels of data quality will be maintained throughout the sampling and analysis program.

The QA/QC objectives for all measurement data include precision, accuracy, representativeness, completeness, and comparability. The samples to be collected (type and frequency of collection) are specified in the Remedial Investigation Work Plan.

4.1 Precision

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value (USEPA, 1987). Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), and relative range are also common. For this project, precision will be evaluated by recording duplicate measurements of the same parameter on similar sample aliquots (i.e., field duplicate samples) under the same conditions, and calculating the relative percent difference (RPD) between the values. The formula for calculating RPD is presented in Section 13.2.

Measurement data for this project will include field data as well as laboratory analytical data. Laboratory precision will be performed according to the requirements described in the associated analytical methods (eg., laboratory duplicate samples). The field measurement data may include pH, temperature, conductivity, organic vapor readings, water level measurements, and turbidity. The objective for precision of field data collection methods is to take duplicate (minimum of 2 for every 20 samples) measurements for field parameters to determine the reproducibility of the measurements. Field duplicates will be collected as discussed in Section 5.3 and RPDs will be calculated to determine the precision of field sampling methods.

For the pH meter, precision will be tested by multiple readings in the medium of concern. Consecutive readings should agree within 0.1 pH units after the instrument has been field calibrated with standard buffers before each day's use. The thermometer will be visually inspected prior to each use to ensure its condition is satisfactory. Consecutive measurements of a given sample should agree to within 1□Celsius. After calibration, the conductivity meter will be tested for precision at ± 1% of full-scale, depending on the meter/scale. The organic vapors will be measured using a Photovac Microtip (or equivalent) photoionization detector (PID). Daily background and upwind readings of drilling and sampling activities will be measured prior to commencing work and at periodic intervals throughout each day's activities. The natural variation/fluctuation in measurements at background or upwind locations will be used for baseline background values, and the variability will be noted. Water level indicator readings will be precise to within 0.01 feet for duplicate measurements, or additional water level measurements will be collected to determine whether the difference is due to operator or instrument error. Turbidity measurements will be calibrated to a

precision of ± 2% nephelometric turbidity units (NTUs).

4.2 Accuracy

Accuracy is a measure of the difference between a measured value and the "true" or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material and is expressed as the percent of the known quantity, which is recovered, or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes that are close to the detection limits are less accurate because they may be affected by such factors as instrument "noise." Higher concentrations will not be as affected by the instrument or other variables and thus will be more accurate.

The accuracy of laboratory-measured data will be evaluated by determining the percent recovery of both matrix and blank spike samples as described in Section 13.1. For the measurement of organics by gas chromatography (GC) or GC/mass spectroscopy (MS), the recovery of a surrogate spiked into each sample, blank, and standard will also be used to assess accuracy.

The objective for accuracy of the field measurements is to achieve and maintain factory equipment specifications for the equipment. Field measurements cannot be assessed for accuracy by spiking the medium with the analytical parameter and measuring the increase in response; therefore, these instruments can only be assessed for accuracy by the response to a known sample (such as a calibration standard) used to standardize them. The pH meter, conductivity meter, and turbidity meter are calibrated with solutions traceable to the National Institute of Standards and Technology (NIST, formerly the National Bureau of Standards).

All volatile organic detectors (such as the PID) will be calibrated to an appropriate standard daily prior to use.

4.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is most concerned with the proper design of the sampling program. Samples must be representative of the environmental media being sampled. Selection of sample locations and sampling procedures will incorporate consideration of obtaining the most representative sample possible.

Field and laboratory procedures will be performed in such a manner as to ensure, to the degree that is technically possible, that the data derived represents the in-place quality of the material sampled. Every effort will be made to ensure chemical compounds will not be introduced into the sample via sample containers, handling, or analysis. Decontamination of sampling devices and digging equipment will be performed between samples. Laboratory sample containers will be thoroughly

cleaned in accordance with procedures outlined in Section 5.2. Analysis of field blanks, trip blanks and method blanks will also be performed to monitor for potential sample contamination from field and laboratory procedures.

The assessment of representativeness also must consider the degree of heterogeneity in the material from which the samples are collected. Sampling heterogeneity will be evaluated through the analysis of field duplicate samples, coded to ensure the samples are treated and analyzed as separate samples. Field personnel will homogenize the soil samples in the field. The analytical laboratory will make every reasonable effort to assure the samples are adequately homogenized prior to taking aliquots for analysis, so the reported results are representative of the sample received. Many means of homogenization expose the sample to significant risk of contamination or loss through volatilization, and these will be avoided if possible.

Chain-of-custody procedures will be followed to document that contamination of samples has not occurred during container preparation, shipment, and sampling. Details of blank/duplicate and chain-of-custody procedures are presented in Sections 5.3 and 6.1, respectively.

4.4 Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid. The QC objective for completeness is generation of valid data for 100 percent of the analysis requested. Any data deficiencies and their impact on project goals will be evaluated during data validation and discussed in the Data Usability Summary Report (DUSR) (see Section 9.3).

4.5 Comparability

Comparability expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Ensuring traceability of all analytical standards and/or source materials to United States Environmental Protection Agency (USEPA) or NIST;
- Verifying all calibrations with an independently prepared standard from a source other than that used for calibration;
- Using standard reporting units and reporting formats, including the reporting of QC data;
- A usability review of all analytical results, including the use of data qualifiers in all cases where appropriate; and
- The requirement that all qualifier flags be used any time an analytical result is used for any purpose whatsoever.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

5.0 SAMPLING PROCEDURES

5.1 Sampling Program

The objective of the sampling program is to provide current data concerning the presence, nature and extent of contamination of groundwater and soils. Sampling and analysis may include, as identified in the Remedial Investigation Work Plan:

- Groundwater samples
- Subsurface soil samples

Proposed Sampling Locations are found in Figure 2. Detailed sampling procedures are found in the attached sampling SOP Attachment 1.

5.2 Sampling Procedures and Handling

Sample Container Preparation

Sample containers will be properly washed and decontaminated by the factory or laboratory prior to use. All preservatives will be added to containers prior to shipment by the laboratory. The types of containers and preservation techniques are shown in Table 1. Records of the sources of bottles and preservatives will be kept by the analytical laboratory. 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 will be verified in advance to be PFAS-free through laboratory analysis or certification.

Methods of Sampling

At a minimum, sampling procedures will be in accordance with the most recent NYSDEC or USEPA guidelines and/or regulations, as appropriate. Alternate techniques will be utilized when such guidelines and/or regulations are inappropriate or non-existent. Alternate techniques will be implemented only after consultation with NYSDEC, whenever possible. Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice.

Referenced sampling procedures are listed below. All procedures will be the latest in effect as of the date of this QAPP.

- USEPA - 600-4-79-020, "Methods for Chemical Analysis of Water and Wastes"
- USEPA - 540/S-95/504, “Low-Flow (Minimal Drawdown) Ground Water Sampling Procedures”
- NYSDEC – “Technical Guidance for Site Investigation and Remediation, DER-10” May 3, 2010
- NYSDEC – “CP-51 Soil Cleanup Guidance” October 21, 2010
- NYSDEC – “Sampling, Analysis and Assessment of Per-and Polyfluoroalkyl Substances (PFAS), June 2021. Under NYSDEC’s Part 375 Remedial Programs Issued January 17, 2020

Standard Operating Procedures (SOPs) to be used in the field are provided in Attachment 2.

5.3 Quality Assurance Samples

Field Quality Control Samples

To assess field sampling, shipment and storage performance, a trip blank will be collected and submitted to the laboratory for analyses involving:

Trip Blank - A trip blank will be prepared by the laboratory and will consist of 40-ml volatile organic compound (VOC) vials containing distilled, deionized water which accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for which analysis for Target Compound List (TCL) volatile organic compounds (VOCs) is planned. The trip blank will be analyzed for TCL VOCs to assess any contamination introduced as a result of sampling and transport, handling and storage.

The precision of field sampling procedures will be assessed by collecting coded field duplicates and additional volume for matrix spike (MS)/matrix spike duplicates (MSD)/matrix duplicates (MD).

Field Duplicate - To determine the reproducibility and homogeneity of samples, coded field duplicates will be collected. The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise. The frequency of collection of these samples is one per approximately 20 field samples for each matrix (i.e., soil, groundwater), as specified in the Remedial Investigation Work Plan. The criteria for assessing coded field duplicates are given in Section 13.0.

Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate (MS/MSD/MD) – Additional volume will be collected for MS/MSD/MD samples (MSD for organics; MD for inorganics) at a frequency of one per up to 20 field samples sample delivery group (SDG). The reproducibility and homogeneity of the samples can be assessed by determining the RPD for both spike and non-spike compounds as described in Section 13.0. The MS, MSD, and MD samples should be site-specific, unless otherwise authorized by the Tetra Tech Project Manager and/or PQAM after consultation with EQUINOR and NYSDEC personnel whenever possible.

Equipment Blank - One equipment blank per day per site and minimum 1 equipment blank per 20 samples will be collected. The equipment blank will test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This field blank 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

6.0 SAMPLE TRACKING AND CUSTODY

Sample chain-of-custody (COC) will be initiated by the laboratory with selection and preparation of the sample containers. To reduce the chance for error, the number of personnel handling the samples will be minimized. Personnel involved in the COC and transfer of samples will be trained on the purpose and procedures prior to implementation.

6.1 Sample Designation

The method of identification of a sample depends on the type of measurement or analysis performed. When field screening measurements (e.g., PID/FID) are made, data are recorded directly in logbooks or on field investigation forms. Identifying information such as project name, station number, station location, date and time, name of sampler, field observations, remarks, etc. will be recorded.

Each sample collected for off-site laboratory analysis during the field investigation will be specifically designated by Tetra Tech personnel with a unique identification. Each sample will be designated by an alpha-numeric code which will identify the Site, matrix sampled, and sampling event or depth.

Sample locations will be designated first by a Site identifier code ("SBMT" for South Brooklyn Marine Terminal). A letter code (see below) will follow, along with the name and/or number that depicts the specific location. Soil samples will be numbered by the depth in feet at the top and bottom of the sample interval (e.g., the sample collected from 4 to 6 feet bgs would be identified as "0406"). Sampling events will be numbered in sequence beginning with "01." Field, trip, and deionized water blanks will include the letter code corresponding to the appropriate type of equipment and/or portion of the field investigation for which the blank sample was collected and the date of sampling.

Location letter code segments for the field investigation are as follows:

- SB Soil Boring Soil Sample
- SS Surface Soil Sample
- MW Monitoring Well
- GW Groundwater Sample
- SV Soil Vapor Sample
- EB Equipment Blank Sample
- TB Trip Blank Sample
- FD Field Duplicate Sample

For example, the 2 to 4-foot bgs subsurface soil sample obtained at the third direct push boring location will be identified as SBMT-SB03-0204. A groundwater sample collected from monitoring well MW-01 during the first event will be denoted as SBMT-MW01-GW01. A field blank sample collected for the soil sampling portion of the project on December 2, 2022 would be SBMT-SBFB-120222.

All location and identification information for the samples will be recorded in the field sampling logbook and on the appropriate chain of custody (COC) record form for shipment.

6.2 Field Sample Custody

Evidence of sample traceability and integrity will be provided by COC procedures. These procedures document the sample traceability from the selection and preparation of the sample containers by the laboratory, to sample collection, to sample shipment, to laboratory receipt and analysis. A sample will be considered to be in a person's custody if the sample is:

- In a person's possession;
- Maintained in view after possession is accepted and documented;
- Locked and tagged with custody seals so that no one can tamper with it after having been in physical custody; or
- In a secured area which is restricted to authorized personnel.

In situ or on-site monitoring data will be controlled and entered in logbooks designated for this project. These logbooks will be maintained in the Site files by the FOL and PM.

A COC record will accompany the sample from time of collection to receipt by the analytical laboratory. If samples are split and sent to different laboratories, COC records will be sent with each sample. The "remarks" column will be used to record specific considerations associated with sample acquisition such as: sample type, container type, sample preservation methods, and analyses to be performed. Two copies of this record will be prepared in the field. One copy will accompany the samples to the laboratory and will be maintained as a file copy by the laboratory. The second version will be retained by Tetra Tech.

Individual sample containers, provided by the laboratory, will be used for shipping/couriering samples. The shipping containers will be insulated (e.g., coolers), and ice will be used to maintain samples at approximately four degrees Celsius until samples are in the custody of the laboratory. All sample bottles within each shipping container will be individually labeled and controlled.

The field sampler will indicate each individual sample designation/location number in the space provided on the appropriate COC form for each sample collected. The shipping container will then be appropriately packed and closed, and a seal provided by the laboratory affixed to the latch. This seal must be broken to open the container. Tampering may be indicated if the seal is broken before receipt at the laboratory. The laboratory will contact the FOL or Tetra Tech's PM, and the associated samples will not be analyzed, if tampering is apparent.

The FOL will notify the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped, as well as the anticipated date of arrival.

6.3 Laboratory Sample Custody

The laboratory sample program will meet the following criteria:

- The laboratory will designate a sample custodian who is responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
- Upon receipt of samples, the custodian will check the original COC documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian will sign the COC record and record the date and time received.
- Care will be exercised to annotate any labeling or descriptive errors. In the event of any discrepancy in documentation, the laboratory will immediately contact the Tetra Tech PM and/or PQAM as part of the corrective action process. A qualitative assessment of each sample container will be performed to note any anomalies, such as broken or leaking bottles. That assessment will be recorded as part of the incoming COC procedure.
- The samples will be stored in a secured area at a temperature of approximately four degrees Celsius until analyses are to commence.
- A laboratory tracking record will accompany the sample or sample fraction through final analysis for control.
- A copy of the tracking form will accompany the laboratory report and will become a permanent part of the project records.

6.4 Sample Tracking System

A sample tracking system will be implemented to monitor the status of sampling events and laboratory analysis of samples. Sample numbers, types, analytical parameters, sampling dates, and required due dates for receipt of analytical results will be entered into the system. Tetra Tech's PM will use the tracking system to monitor the project sampling schedules and the status of analytical reports.

A description of the sample tracking system follows:

1. For each day that samples are collected, the FOL or designee will complete a COC form listing all appropriate samples.
2. The FOL or designee will retain the client copy of the COC, and forward the laboratory copy of the COC with the sample shipment.
3. The FOL or designee will fax copies of the completed COC form to the Tetra Tech PM. Tetra Tech's PM or a designated employee will confirm sample shipment with the laboratory and resolve any sample transfer issues.
4. The status of analytical results will be tracked by the Tetra Tech PM or designee using the information provided on the completed COC form. The information will be summarized in a

computerized database, as warranted.

Upon receipt of the analytical results from the laboratory, the Tetra Tech PM or designee will review the data package for completeness and contract compliance. The Tetra Tech PM will then forward the result package to the QA/QC data reviewer for the data usability analysis.

The QA/QC data reviewer will be required to submit a complete set of reviewed data to Tetra Tech's PM within 30 days of receipt of the data package report.

Tetra Tech's PM or a designated representative will maintain day-to-day contact with the laboratory concerning specific samples and analyses directly.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

7.1 Field Instrumentation Calibration

The FOL will be responsible for ensuring that instrumentation are of the proper range, type and accuracy for the test being performed, and that all of the equipment are calibrated at their required frequencies, according to their specific calibration protocols/procedures.

All field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's activities. Exceptions to this requirement will be permitted only for instruments that have fixed calibrations pre-set by the equipment manufacturer. Calibration information will be documented on instrument calibration and maintenance log sheets or in a designated field logbook. The calibration information (log sheet or logbook) will be maintained at the Site during the on-site investigation and, once the field work is completed, will be placed in Tetra Tech's project files. Information to be recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, lot number, expiration date, etc.). All project personnel using measuring equipment or instruments in the field will be trained in the calibration and usage of the equipment and are personally responsible for ensuring the equipment has been properly calibrated prior to its use.

In addition, all field instruments will undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. Verification checks may also be performed at the request of EQUINOR or NYSDEC representatives. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check (i.e., not within specifications), the data will be labeled suspect, the problem documented in the Site logbook, and appropriate corrective action taken.

Any equipment found to be out of calibration will be re-calibrated. When instrumentation is found to be out of calibration or damaged, an evaluation will be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests will be repeated (if possible), using properly calibrated equipment, to acquire replacement data for the measurement in question.

Any instrument consistently found to be out of calibration will be repaired or replaced within 24 hours or field work will be terminated until the malfunctioning equipment is repaired/replaced.

7.2 Laboratory Instrumentation Calibration

Personnel at the laboratory will be responsible for ensuring that analytical instrumentation are of the proper range, type and accuracy for the test being performed, and that all of the equipment are calibrated at their required frequencies, according to specific protocols/procedures.

According to the applicable methodologies and the laboratory SOPs, off-site laboratory equipment will be calibrated using certified/nationally recognized standards. In addition, these methods/procedures specify the appropriate operations to follow during calibration or when any

instrument is found to be out of calibration. Off-site laboratory equipment will be calibrated using certified/nationally recognized standards.

8.0 ANALYTICAL PROCEDURES

All off-site laboratory samples will be analyzed according to the methods provided in Table 2 and Exhibit D of the NYSDEC ASP. QA/QC procedures given in Exhibits E and I of the ASP will be followed. Regardless of the method used, all analytical and extraction holding times must meet the NYSDEC ASP requirements for that analytical group (e.g., volatile analyses have a holding time of seven days, if unpreserved). Holding times will be calculated from verified time of sample receipt at the laboratory. For NYSDEC ASP, samples must be received at the laboratory within 48 hours of sample collection. The analytical laboratory chosen for the project will be certified, and must maintain certification, under the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) for analyses of solid and hazardous waste. The breakdown of investigative samples is detailed in the Remedial Investigation Work Plan. Laboratory analytical methods and quantitation limits are presented in Table 3 of this QAPP. The method detection limits (MDLs) for the analytes will be specified by the laboratory selected for the project based on its most recent MDL studies, and subject to approval by the NYSDEC. The ELAP-approved laboratories currently being considered include SGS North America, Eurofins, and Chemtech. The NYSDEC project manager will be informed when a decision has been made.

9.0 DATA REDUCTION, REVIEW, AND REPORTING

The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the ASP.

The laboratory will provide a Category B data deliverable (PDF) and a NYSDEC EQuIS-formatted electronic data deliverable (EDD). The EDD and EQuIS EDD for the project will be prepared for electronic submittal of field sampling and laboratory analytical results, geologic data, and well and locational data, in accordance with NYSDEC policies, guidelines, and formats.

9.1 Chain-of-Custody Records

Completed copies of the COC records accompanying each sample from time of initial bottle preparation to completion of analysis will be attached to the report of analytical testing.

9.2 Data Handling

One electronic version (PDF or other appropriate format) of the complete analytical data report will be provided by the laboratory. The Tetra Tech PM will immediately arrange for electronic filing of the complete package, after the QA/QC data reviewer checks the package to ensure all deliverables have been provided. In addition, an electronic version of the analytical results will be provided by the laboratory in a mutually-agreed upon database format (i.e., an Electronic Database Deliverable, or EDD). The EDD will be used to generate summary tables. These tables will form the foundation of a working database for assessment of the Site contamination condition.

The Tetra Tech PM will maintain close contact with the QA/QC data reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the review has been completed, Tetra Tech's PM will direct the QA/QC data reviewer or designee to finalize the analytical data assessment and update the data summary tables.

The reviewed laboratory data will be reduced into a computerized tabulation which will be suitable for inclusion in site reports and will be designed to facilitate comparison and evaluation of the data. The data tabulations will be sorted by classes of constituents and by sample matrix. Each individual table will present the following information:

- Sample matrix, designations, and locations;
- Sample dates;
- Constituents for which positive results were obtained;
- Reported constituent concentrations in the field and/or trip blanks associated with the samples;
- Constituent concentration units;
- Name and location of laboratory which performed the analyses;
- Data qualifiers provided by the laboratory; and
- Data qualifiers and comments provided by the QA/QC data reviewer, if any.

9.3 Data Usability Review

Data review is a basic step in the control and processing of the project data generated by the laboratory. The data review process will consist of a systematic assessment of the analytical results and QC documentation, and will be performed in accordance with NYSDEC guidelines. The parameters to be evaluated in reference to compliance with the analytical method protocols include all sample COC forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. If available, the field sampling notes should also be reviewed and any QC problems should be evaluated as to their effect on the usability of the sample data. All off-site laboratory data will undergo data review, unless otherwise stated in the Remedial Investigation Work Plan. On the basis of this review, the QA/QC data reviewer will make judgments and express concerns and comments on the quality and limitations of specific data, as well as on the validity of the overall data package. The QA/QC data reviewer will prepare documentation of his or her review and conclusions in a DUSR.

The DUSR will describe the samples and analysis parameters reviewed. Data deficiencies, analytical method protocol deviations and QC problems will be described and their effect on the data will be discussed in the DUSR. In addition, the DUSR will identify data gaps caused by non-compliant or rejected data and will indicate what steps have been or will be taken to fill these gaps. Resampling/reanalysis recommendations, if applicable, will be made. Data qualifications are documented for each sample analyte following the NYSDEC ASP guidelines. The results of the data assessment screening (e.g., missed holding times or data rejected due to blank contamination) will be incorporated into the data summary tables used in Remedial Investigation reports (see Section 9.2).

The QA/QC data reviewer will inform the Tetra Tech PM of data quality and limitations and assist the PM in interacting with the laboratory to correct data omissions and deficiencies. The laboratory may be required to rerun or resubmit data depending on the extent of the deficiencies, and their importance in meeting the data quality objectives within the overall context of the project.

This work will be performed by trained and experienced QA/QC data reviewers who meet the NYSDEC approval criteria. The Environmental Scientist preparing the DUSR must submit (or have previously submitted) a resume to the NYSDEC Quality Assurance Unit documenting relevant experience in environmental sampling, analysis and data review methods, and documentation of a bachelor’s degree in Natural Science or Engineering.

10.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

10.1 Quality Assurance Batching

Each set of samples will be analyzed concurrently with calibration standards, method blanks, MS, MSD or MD, and QC check samples (if required by the protocol). The MS/MSD/MD samples will be designated by the field personnel. If no MS/MSD/MD samples have been designated, the laboratory must contact Tetra Tech's PQAM or PM for corrective action.

10.2 Organic Standards and Surrogates

All standard and surrogate compounds are checked by the methods of MS for correct identification and GC for degree of purity and concentration. When the compounds pass the identity and purity tests, they are certified for use in standard and surrogate solutions. Concentrations of the solutions are checked for accuracy before release for laboratory use. Standard solutions are replaced monthly or earlier based upon data indicating deterioration.

10.3 Laboratory Quality Control Samples

QC samples may include the following, depending on analytical method:

Method Blanks/Preparation Blanks - Analyses for organic compounds (method blank) and inorganics (preparation blank) include a blank analysis of the laboratory reagent water. The blank is analyzed with each set of samples or more often as required to verify that contamination has not occurred during the analytical process. The concentration of target compounds in the blanks must be less than or equal to the quantitation limits specified in Table 3 for the selected method of analysis.

Matrix Spike/Matrix Spike Duplicate Analysis - This analysis is used to determine the effects of matrix interference on analytical results. Spikes of analytes are added to aliquots of sample matrix in the manner specified in the ASP. Selected samples are spiked to determine accuracy as a percent recovery of the analyte from the sample matrix and precision as RPD between the MS and MSD samples. The MSD is prepared in the same manner as the MS sample.

Analytical Replicate/Matrix Replicate Samples - Replicate samples are aliquots of a single sample that are split on arrival at the laboratory, or upon analysis (i.e., laboratory duplicates). Significant differences between two replicates, split in a controlled laboratory environment, will result in flagging the affected analytical results.

Surrogate Spike Analyses - Surrogate spike analyses are used to determine the efficiency of recovery of organic analytes in the sample preparations and analyses. Calculated percentage recovery of the spike is used as a measure of the accuracy of the total analytical method.

Laboratory Control Sample/Spike Blank - For each method which requires a laboratory control sample (LCS) or spike blank, a LCS/spike blank will be prepared with each quality control batch and analyzed according to criteria specified in the ASP. These samples support an assessment of the ability of the analytical procedure to generate a correct result without matrix effects or interference affecting the analysis.

11.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

QA audits may be performed by the PQAM or personnel designated by the PQAM. The PQAM and his or her designees function as an independent body and report directly to Tetra Tech's quality assurance management. The PQAM may plan, schedule, and approve system and performance audits based upon Tetra Tech procedures customized to the project requirements. These audits may be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). At times, the PQAM may request additional personnel with specific expertise from the company and/or project groups to assist in conducting performance audits.

Formal audits encompass documented activities performed by qualified lead auditors following a written procedure or checklists, to objectively verify that QA requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by lead auditors after gathering and evaluating all resultant data. Items, activities, and documents determined by lead auditors to be in noncompliance will be identified at exit interviews conducted with the involved management. Noncompliances will be logged, documented, and controlled through audit findings which are attached to and are a part of the integral audit report. These audit finding forms will then be directed to management to satisfactorily resolve the noncompliance in a specified and timely manner. All audit checklists, audit reports, audit findings, and acceptable resolutions must be approved by the PQAM prior to issue. QA verification of acceptable resolutions will be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the PQAM will close out the audit report and findings.

It is the Tetra Tech PM's overall responsibility to verify that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to Tetra Tech's PM within 15 days of completion of the audit. Serious deficiencies must be reported to the Tetra Tech PM within 24 hours.

Serious deficiencies identified during an audit will be reported to National Grid and NYSDEC as part of the DUSR or investigation reports.

11.1 System Audits

System audits, performed by the PQAM or designated auditors, may encompass evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory QC procedures and associated documentation may be audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Tetra Tech PM requests the PQAM to perform unscheduled audits, these activities will be instituted.

11.2 Performance Audits

In accordance with the requirements for NYSDOH ELAP CLP certification, the laboratory will participate in all performance evaluation testing.

Also, one field audit may be performed by the PQAM or designated auditor during collection of the field samples to verify that field personnel are following established sampling procedures. Performance of a field audit will be based on the type of investigation activities being performed, the length of the field project, and any available information concerning prior inspections of the project or sampling team.

12.0 PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

12.1 Preventive Maintenance Procedures

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators. A repair/maintenance logbook will be kept for each piece of equipment/instrument, as applicable, and this log will be available on-site during field activities and, at the completion of the investigation, be placed in the project files. Entries include the date of service, type of problem encountered, corrective action taken, and initials and affiliation of the person providing the service.

Laboratory analytical instruments will be serviced at intervals recommended by the manufacturer. Instrument use logbooks will be monitored by the analysts to detect any degradation of instrument performance. Changes in response factors or sensitivity are used as indications of potential problems. These are brought to the attention of the laboratory supervisor and preventive maintenance or service is scheduled to minimize down time. Back-up instrumentation and an inventory of critical spare parts are maintained to minimize delays in completion of analyses.

Use of equipment in need of repair will not be allowed in the field or laboratory, and work will be terminated until the malfunction is repaired or the instrument replaced.

12.2 Schedules

Written procedures, where applicable, will identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools, gauges, etc. will be performed only by qualified personnel.

12.3 Records

Logs will be established to record and control maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced will be reviewed, maintained, and filed by the operators at the laboratories and by the data and sample control personnel when and if equipment, instruments, tools, and gauges are used at the sites. Tetra Tech’s PM or the PQAM may audit these records to verify complete adherence to these procedures.

12.4 Spare Parts

Where appropriate, a list of critical spare parts will be identified by the operator in consultation with the equipment manufacturer. These spare parts will be stored for availability and use in order to reduce the downtime. In lieu of maintaining an inventory of spare parts, a service contract for rapid instrument repair or backup instruments will be available.

13.0 ASSESSMENT PROCEDURES FOR DATA ACCEPTABILITY

Procedures used to assess data precision and accuracy will be in accordance with the appropriate laboratory method, and as periodically updated.

13.1 Accuracy

The percent recovery is calculated as below:

$$\% = \frac{Ss - So}{S} \times 100$$

So = The original value, i.e.; the value obtained by analyzing the sample

S = Concentration of the spike added to the sample

Ss = Value obtained by analyzing the sample with the spike added

% = Percent Recovery

13.2 Precision

The relative percent difference (RPD) is calculated as below:

$$RPD = \frac{|V1 - V2|}{0.5\ (V1 + V2)} \times 100$$

V1, V2 = The two values obtained by analyzing the duplicate samples

RPDs can only be calculated when the two samples (the original and the duplicate) both contain detectable concentrations of the analyte. If an analyte is considered not detected at the quantitation limit, then a RPD cannot be calculated.

13.3 Completeness

Completeness is the measure of the amount of valid data obtained from a measurement system compared to the total amount expected to be obtained under ideal conditions. A target of 100 percent completeness, calculated for each analysis method, has been established as the overall project objective.

$$PC = \frac{NA}{NI} \times 100$$

where:

PC = Percent completeness
NA = Actual number of valid analytical results obtained
NI = Theoretical number of results obtainable under ideal conditions

14.0 CORRECTIVE ACTION

The following procedures have been established to assure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

When a significant condition adverse to quality is noted on-site, at the laboratory, or at a subcontractor location, the cause of the condition will be determined, and corrective action taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the FOL, Tetra Tech PM, and involved subcontractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action. All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

At a minimum, corrective actions may be initiated:

- When predetermined acceptance standards are not attained
- When procedures or data are determined deficient
- When equipment or instrumentation is found faulty
- When samples and test results are questionably traceable
- When QA requirements have been violated
- When designated approvals have been circumvented
- As a result of system and performance audits
- As a result of a management assessment
- As a result of laboratory/inter-field comparison studies
- As required by National Grid
- As required by NYSDEC ASP, 2005

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities.

During the field investigation, any changes to the program outlined in the Remedial Investigation Work Plan and this QAPP must be documented on a Field Change Request (FCR) form (Attachment 1). FCRs will be numbered serially, starting with the number “01.” A copy of the FCR must be maintained at the Site during the investigation and in the project management files. All FCRs will be documented in the daily reports. Any significant field changes will be reported to the DEC Project Manager for their approval. All project personnel may identify a noncompliance; however, the FOL is responsible for documenting, numbering, logging, and verifying the closeout

action. It is the Tetra Tech PM's responsibility to verify all recommended corrective actions are produced, accepted, and received in a timely manner.

Work may be audited at Tetra Tech's office, site, laboratory, and subcontractor locations by the PQAM and/or designated auditor. Items, activities, or documents ascertained to be in noncompliance with QA requirements will be documented and corrective actions mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the PQAM (Section 11.0).

15.0 QUALITY ASSURANCE REPORTS

QA reports to management may consist of the reports on audits, FCRs, a final QA report on field sampling activities, and the DUSRs.

At the end of the project, the PQAM may submit a lesson learned report to the Tetra Tech PM which will discuss the QA activities. That report may include discussions of any conditions adverse or potentially adverse to quality, such as responses to the findings of any field or laboratory audits; any field, laboratory, or sample conditions which necessitated a departure from the methods or procedures specified in this QAPP; field sampling errors; and any missed holding times or problems with laboratory QC acceptance criteria, and the associated corrective actions undertaken. This report will not preclude immediate notification to project management of such problems when timely notice can reduce the loss or potential loss of quality, time, effort, or expense.

These reports, if prepared, will be reviewed by the Tetra Tech PM for completeness and the appropriateness of any corrective actions, and they will be retained in the project files.

In the final investigative report, laboratory and field QC data will be presented, including a summary of QA activities and any problems and/or comments associated with the analytical and sampling effort. Any corrective actions taken in the field, results of any audits, and any modifications to laboratory protocols will be discussed.

16.0 REFERENCES

New York State Department of Environmental Conservation – "Technical Guidance for Site Investigation and Remediation, DER-10". May 3, 2010

New York State Department of Environmental Conservation – "CP-51 Soil Cleanup Guidance" October 21, 2010

New York State Department of Environmental Conservation. Sampling, Analysis, and Assessment of Per-and Polyfluoroalkyl substances (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued June 2021.

United States Environmental Protection Agency. Methods for Chemical Analysis of Water and Wastes. EPA 600-4-79-020. March 1983.

United States Environmental Protection Agency. Data Quality Objectives for Remedial Response Activities. EPA 540/G-87/003. March 1987.

TABLE 1
SAMPLE CONTAINERIZATION

Analysis	Bottle Type	Preservation [1]	Holding Time[2]
Aqueous Samples			
Volatile Organics	40 ml glass vial with Teflon-lined septa	HCl to pH < 2	10 days
Semi-Volatile Organics	1000 ml amber glass	Cool to 4°C	5 days for extraction; 40 days for analysis
Pesticides	1000 ml amber glass	Cool to 4°C	5 days for extraction; 40 days for analysis
PCBs	1000 ml amber glass	Cool to 4°C	5 days for extraction; 40 days for analysis
Total Metals	1000 ml polyethene	HNO_3 to pH < 2	Metals - 6 months Mercury - 26 days
PFAS	1000 high density polyethylene (HDPE)	Cool to 4°C	14 days for extraction; 28 days for analysis
Soil Samples			
Volatile Organics	Small coring device or wide-mouth glass w/ teflon-lined septa [3]	Cool to 4°C	7 days
Semi-Volatile Organics	Wide-mouth glass w/ teflon cap [3]	Cool to 4°C	5 days for extraction; 40 days for analysis
PCBs	Wide mouth glass w/ teflon cap [3]	Cool to 4°C	5 days for extraction; 40 days for analysis
PCBs	Wide mouth glass w/ teflon cap [3]	Cool to 4°C	5 days for extraction; 40 days for analysis
Metals	Wide mouth glass w/ teflon cap [3]	Cool to 4°C	Metals - 6 months Mercury - 26 days
Total Organic Carbon	Wide mouth glass w/ teflon cap [3]	Cool to 4°C	12 days
PFAS	1000 high density polyethylene (HDPE)	Cool to 4°C	14 days for extraction; 28 days for analysis

NOTES

1. All samples to be preserved in ice at 4°C during collection and transport.
2. Days from verified time of sample receipt (VTSR) by the laboratory.
3. Sized appropriately for the analytical method.
4. If the information provided in this table differs from the most recent version of the RIWP (2022), the RIWP requirements will take precedence. In addition, if site-specific requirements dictate a change in containerization requirements, the Remedial Investigation Work Plan (which will include this information) will take precedence.

TABLE 2
LABORATORY ANALYSIS PROGRAM

Matrix	Parameter [1]	Analytical Method [2]	Primary Samples	TB[5]	EB [5]	MS/ MSD	FD
Water	VOCs	Method 8260	10	1	1	1	1
	SVOCs	Method 8270	10	--	1	1	1
	Pesticides	Method 8081	10	--	1	1	1
	PCBs	Method 8082	10	--	1	1	1
	Total Metals	Method 6010/7470	10	--	1	1	1
	PFAS	Method 1633[4]	10	--	1	1	1
Soil	VOCs	Method 8260	94	5	0	5	5
	SVOCs	Method 8270	94	--	0	5	5
	Pesticides	Method 8081	25	--	0	2	2
	PCBs	Method 8082	94	--	0	5	5
	Metals	Method 6010/7471	94	--	0	5	5
	TOC	Method 9060A	94	--	0	5	5
	PFAS	Method 1633[4]	94	--	0	5	5
Soil Vapor	VOCs	Method TO-15	8	--	--	--	1

NOTES

1. Abbreviations: VOCs = Volatile organic compounds; SVOCs = Semi-volatile organic compounds; PCBs = Polychlorinated Biphenyls; PFAS = Per- and polyfluoroalkyl substances; TOC = Total Organic Carbon; TB = Trip Blank; EB = Equipment Blank; MS/MSD = Matrix Spike/Matrix Spike Duplicate; FD = Field Duplicate
2. NYSDEC Analytical Services Protocol, 2005, Category B deliverables.
   Analyses must meet NYSDEC ASP holding time specified for Methods in Exhibit I Part II.
3. If the information provided in this table differs from the most recent version of the ASP (2005), the ASP requirements will take precedence. In addition, if site-specific requirements dictate a change in analytical requirements, the Remedial Investigation Work Plan (which will include this information) will take precedence
4. The current NYSDEC Sampling, Analysis, and Assessment of PFAS (June 2021) will be followed for analytical methods and analyte list.
5. Trip blanks and field blanks will be collected 1 per 20 primary samples per sampling day.

TABLE 3
TARGET ANALYTES AND PRACTICAL QUANTITATION LIMITS[1]

	Practical Quantitation Limit Water Samples (ug/L)	Practical Quantitation Limit Soil Samples (ug/kg)
NYSDEC ASP TCL Volatile Organic Compounds		
Acetone	5	10
Benzene	0.5	10
Bromodichloromethane	0.5	10
Bromoform	0.5	10
Bromomethane	0.5	10
2-Butanone	5	10
Carbon disulfide	0.5	10
Carbon tetrachloride	0.5	10
Chlorobenzene	0.5	10
Chloroethane	0.5	10
Chloroform	0.5	10
Chloromethane	0.5	10
Dibromochloromethane	0.5	10
1,1-Dichloroethane	0.5	10
1,2-Dichloroethane	0.5	10
1,1-Dichloroethene	0.5	10
1,2-Dichloroethene (cis and trans)	0.5	10
1,2-Dichloropropane	0.5	10
cis-1,3-Dichloropropene	0.5	10
trans-1,3-Dichloropropene	0.5	10
Ethylbenzene	0.5	10
2-Hexanone	5	10
4-Methyl-2-pentanone	5	10
Methylene chloride	0.5	10
Styrene	0.5	10
1,1,2,2-Tetrachloroethane	0.5	10
Tetrachloroethene	0.5	10
Toluene	0.5	10
1,1,1-Trichloroethane	0.5	10
1,1,2-Trichloroethane	0.5	10
Trichloroethene	0.5	10
Vinyl chloride	0.5	10
Total Xylenes	0.5	10
NYSDEC ASP TCL – Semi-Volatile Organic Compounds		
Acenaphthene	10	330
Acenaphthylene	10	330
Anthracene	10	330
Benzo(a)anthracene	10	330
Benzo(b)fluoranthene	10	330
Benzo(k)fluoranthene	10	330
Benzo(g,h,i)perylene	10	330
Benzo(a)pyrene	10	330
bis(2-Chloroethoxy)methane	10	330
bis(2-Chloroethyl)ether	10	330
bis(2-ethylhexyl)phthalate	10	330

TABLE 3
TARGET ANALYTES AND PRACTICAL QUANTITATION LIMITS[1]

	Practical Quantitation Limit Water Samples (ug/L)	Practical Quantitation Limit Soil Samples (ug/kg)
4-Bromophenyl phenyl ether	10	330
Butyl benzyl phthalate	10	330
Carbazole	10	330
4-Chloroaniline	10	330
2-Chloronaphthalene	10	330
4-Chlorophenyl phenyl ether	10	330
Chrysene	10	330
Dibenz(a,h)anthracene	10	330
Dibenzofuran	10	330
Di-n-butylphthalate	10	330
1,2-Dichlorobenzene	10	330
1,3-Dichlorobenzene	10	330
1,4-Dichlorobenzene	10	330
3,3'-Dichlorobenzidine	10	330
Diethyl phthalate	10	330
Dimethyl phthalate	10	330
2,4-Dinitrotoluene	10	330
2,6-Dinitrotoluene	10	330
1,4-Dioxane	10	330
Di-n-octylphthalate	10	330
Fluoranthene	10	330
Fluorene	10	330
Hexachlorobenzene	10	330
Hexachlorobutadiene	10	330
Hexachlorocyclopentadiene	10	330
Hexachloroethane	10	330
Indeno(1,2,3-cd)pyrene	10	330
Isophorone	10	330
2-methyl Naphthalene	10	330
Naphthalene	10	330
2-Nitroaniline	25	800
3-Nitroaniline	25	800
4-Nitroaniline	25	800
Nitrobenzene	10	330
N-Nitroso-diphenylamine	10	330
N-Nitroso-dipropylamine	10	330
2,2' Oxybis(1-chloropropane)	10	330
Phenanthrene	10	330
Pyrene	10	330
1,2,4-Trichlorobenzene	10	330
4-Chloro-3-methylphenol	10	330
2-Chlorophenol	10	330
2,4-Dichlorophenol	10	330
2,4-Dimethylphenol	10	330
4,6-Dinitro-2-methylphenol	25	800
2,4-Dinitrophenol	25	800

TABLE 3
TARGET ANALYTES AND PRACTICAL QUANTITATION LIMITS[1]

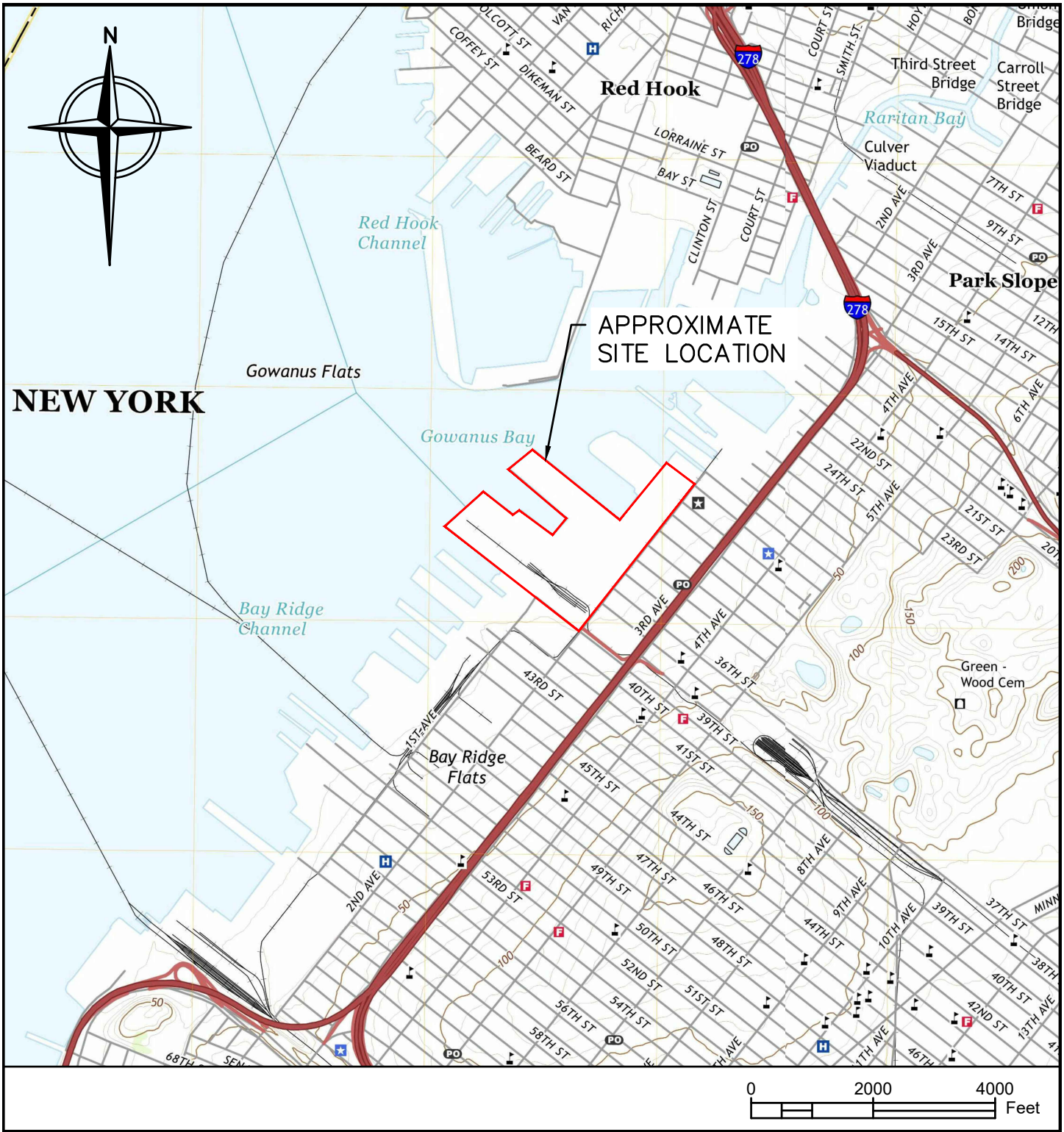
	Practical Quantitation Limit Water Samples (ug/L)	Practical Quantitation Limit Soil Samples (ug/kg)
2-Methylphenol	10	330
4-Methylphenol	10	330
2-Nitrophenol	10	330
4-Nitrophenol	25	800
Pentachlorophenol	25	800
Phenol	10	330
2,4,5-Trichlorophenol	25	800
2,4,6-Trichlorophenol	10	330
NYSDEC ASP TCL PCBs		
Aroclor-1016	1.0	33.0
Aroclor-1221	2.0	67.0
Aroclor-1232	1.0	33.0
Aroclor-1242	1.0	33.0
Aroclor-1248	1.0	33.0
Aroclor-1254	1.0	33.0
Aroclor-1260	1.0	33.0
NYSDEC ASP TAL Metals		
Aluminum	200	20
Antimony	60	6
Arsenic	10	1
Barium	200	20
Beryllium	5	0.5
Cadmium	5	0.5
Calcium	5000	500
Chromium	10	1
Cobalt	50	5
Copper	25	2.5
Iron	100	10
Lead	10	1
Magnesium	5000	500
Manganese	15	1.5
Mercury	0.2	0.1
Nickel	40	4
Potassium	5000	500
Selenium	35	3.5
Silver	10	1
Sodium	5000	500
Thallium	25	2.5
Vanadium	50	5
Zinc	60	6
Total Cyanide	10	60
NYSDEC ASP PFAS (21 compounds)[4]		
Perfluorobutanesulfonic acid (PFBS)	2 ng/L	0.5
Perfluorohexanesulfonic acid (PFHxS)	2 ng/L	0.5
Perfluoroheptanesulfonic acid (PFHpS)	2 ng/L	0.5

TABLE 3
TARGET ANALYTES AND PRACTICAL QUANTITATION LIMITS[1]

	Practical Quantitation Limit Water Samples (ug/L)	Practical Quantitation Limit Soil Samples (ug/kg)
Perfluorooctanesulfonic acid (PFOS)	2 ng/L	0.5
Perfluorodecanesulfuonic acid (PFDS)	2 ng/L	0.5
Perfluorobutanoic acid (PFBA)	2 ng/L	0.5
Perfluoropentanoic acid (PFPeA)	2 ng/L	0.5
Perfluorohexanoic acid (PFHxA)	2 ng/L	0.5
Perfluoroheptanoic acid (PFHpA)	2 ng/L	0.5
Perfluorooctanoic acid (PFOA)	2 ng/L	0.5
Perfluorononanoic acid (PFNA)	2 ng/L	0.5
Perfluorodecanoic acid (PFDA)	2 ng/L	0.5
Perfluoroundecanoic acid (PFUA/PFUdA)	2 ng/L	0.5
Perfluorododecanoic acid (PFDoA)	2 ng/L	0.5
Perfluorotridecanoic acid (PFTriA/PFTrDA)	2 ng/L	0.5
Perfluorotetradecanoic acid (PFTA/PFTeDA)	2 ng/L	0.5
6:2 Fluorotelomer sulfonate (6:2 FTS)	2 ng/L	0.5
8:2 Fluorotelomer sulfonate (8:2 FTS)	2 ng/L	0.5
Perfluroroctanesulfonamide (FOSA)	2 ng/L	0.5
N-methyl perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	2 ng/L	0.5
N-ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	2 ng/L	0.5

NOTES:

1. Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable. Quantitation limits listed for soil are based on wet weight.
2. If the information provided in this table differs from the most recent version of the ASP, the ASP requirements will take precedence. In addition, if site-specific requirements dictate a change in quantitation limits, the site-specific Work Plan will take precedence.
3. These practical quantitation limits are the instrument detection limits obtained in pure water that must be met using the procedure in Exhibit E. The quantitation limits for samples may be considerably higher depending on the sample matrix.
4. The current NYSDEC Sampling, Analysis, and Assessment of PFAS (June 2021) will be followed for analytical methods and analyte list.



TETRA TECH

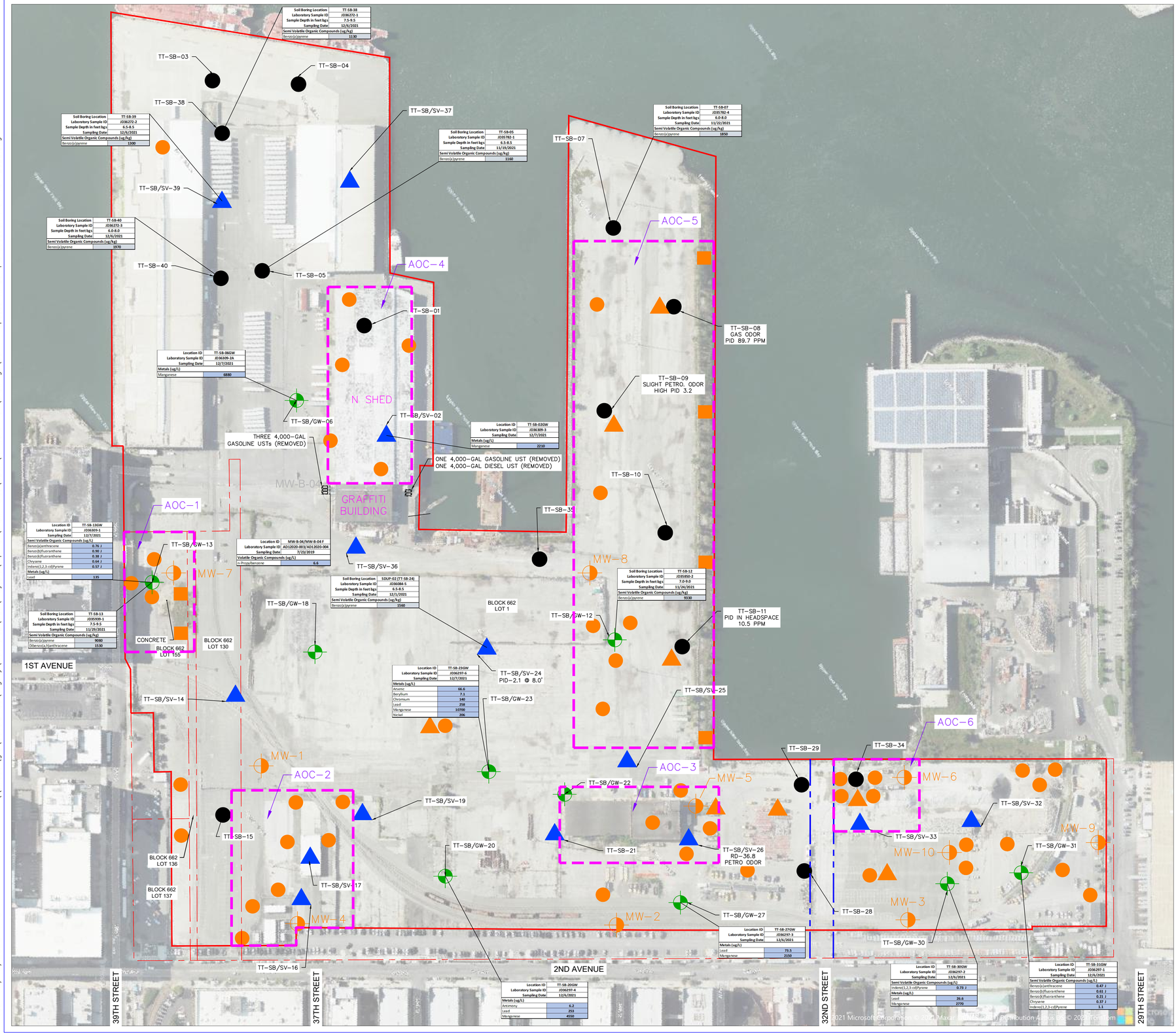
TETRA TECH, INC.
6 CENTURY DRIVE, SUITE 3
PARSIPPANY, NJ 07054
(973) 630-8000

FIGURE 1 - SITE LOCATION MAP

SOUTH BROOKLYN MARINE
TERMINAL
2ND AVENUE
BROOKLYN, NY 11232

SBMT Asset LLC

80 State Street
Albany, NY 12207



Soil Boring Location	TT-SB-38
Laboratory Sample ID	JD36272-1
Sample Depth in feet bgs	7.5-9.5
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1130

Soil Boring Location	TT-SB-39
Laboratory Sample ID	JD36272-2
Sample Depth in feet bgs	6.5-8.5
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1300

Soil Boring Location	TT-SB-05
Laboratory Sample ID	JD35782-1
Sample Depth in feet bgs	6.5-8.5
Sampling Date	11/19/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1160

Soil Boring Location	TT-SB-07
Laboratory Sample ID	JD35782-4
Sample Depth in feet bgs	6.0-8.0
Sampling Date	11/22/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1850

Soil Boring Location	TT-SB-40
Laboratory Sample ID	JD36272-3
Sample Depth in feet bgs	6.0-8.0
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1970

Location ID	TT-SB-06GW
Laboratory Sample ID	JD36309-2A
Sampling Date	12/7/2021
Metals (ug/L)	
Manganese	6880

Location ID	TT-SB-02GW
Laboratory Sample ID	JD36309-3
Sampling Date	12/7/2021
Metals (ug/L)	
Manganese	2210

Location ID	TT-SB-13GW
Laboratory Sample ID	JD36309-1
Sampling Date	12/7/2021
Semi Volatile Organic Compounds (ug/L)	
Benzo(a)anthracene	0.76 J
Benzo(b)fluoranthene	0.90 J
Benzo(k)fluoranthene	0.38 J
Chrysene	0.64 J
Indeno(1,2,3-cd)Pyrene	0.57 J
Metals (ug/L)	
Lead	135

Location ID	MW-B-04/MW-B-04 F
Laboratory Sample ID	AD12020-003/AD12020-004
Sampling Date	7/23/2020
Volatile Organic Compounds (ug/L)	
n-Propylbenzene	6.6

Soil Boring Location	TT-SB-13
Laboratory Sample ID	JD35539-1
Sample Depth in feet bgs	7.5-9.5
Sampling Date	11/25/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	9080
Dibenzo(a,h)anthracene	1530

Soil Boring Location	SOUP-02 (TT-SB-24)
Laboratory Sample ID	JD36084-5
Sample Depth in feet bgs	6.5-8.5
Sampling Date	12/1/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1560

Soil Boring Location	TT-SB-12
Laboratory Sample ID	JD35850-2
Sample Depth in feet bgs	7.0-9.0
Sampling Date	11/24/2021
Semi Volatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	9330

Location ID	TT-SB-23GW
Laboratory Sample ID	JD36297-6
Sampling Date	12/7/2021
Metals (ug/L)	
Arsenic	66.6
Beryllium	7.1
Chromium	140
Lead	258
Manganese	10700
Nickel	206

Location ID	TT-SB-27GW
Laboratory Sample ID	JD36297-3
Sampling Date	12/6/2021
Metals (ug/L)	
Lead	73.5
Manganese	2150

Location ID	TT-SB-20GW
Laboratory Sample ID	JD36297-4
Sampling Date	12/6/2021
Metals (ug/L)	
Antimony	6.2
Lead	253
Manganese	4550

Location ID	TT-SB-30GW
Laboratory Sample ID	JD36297-2
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/L)	
Indeno(1,2,3-cd)Pyrene	0.73 J
Metals (ug/L)	
Lead	26.6
Manganese	2770

Location ID	TT-SB-31GW
Laboratory Sample ID	JD36297-1
Sampling Date	12/6/2021
Semi Volatile Organic Compounds (ug/L)	
Benzo(a)anthracene	0.47 J
Benzo(b)fluoranthene	0.61 J
Benzo(k)fluoranthene	0.21 J
Chrysene	0.37 J
Indeno(1,2,3-cd)Pyrene	1.1

LEGEND

- SOIL BORING AND SOIL SAMPLES
- SOIL BORING AND GROUNDWATER GRAB SAMPLE
- COLLOCATED SOIL BORING AND SOIL VAPOR SAMPLE
- PROPOSED RI SOIL BORINGS
- PROPOSED MONITORING WELL LOCATIONS
- PROPOSED SV LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION
- PROJECT AREA
- PARCEL BOUNDARIES
- NYCDEP STORMWATER EASEMENT
- AOC BOUNDARY

0 120 240 Feet

TETRA TECH

STAMP:

DRAFT
NOT FOR CONSTRUCTION

SOUTH BROOKLYN MARINE TERMINAL
EQUINOR WIND US LLC
2ND AVENUE
BROOKLYN, NY 11232

PROJECT NUMBERS:
194-1247-0003

SHEET TITLE:
PROPOSED REMEDIAL INVESTIGATION SAMPLE LOCATION PLAN

SHEET SIZE:
ARCH "D"
24" X 36" (610 x 914)
0 ½" 1"

NO.	REVISION	DATE	INIT.

DATE: 2/25/2022
DRAWN BY:
ENGINEER:
APPROVED BY:

PROJECT PHASE:
N/A

SCALE:
1" = 120'

SHEET NO.:
FIGURE 2

\\tt-local\gfs\USVolume3\Legacy\tts119fs2\CES\Projects\Equinor\Brownfields\SBMT\RI Work Plan\Drawings\SBMT Proposed RI Sample Location Plan 10142022.dwg
Printed: 10/19/2022 4:13 PM

ATTACHMENT 1
FIELD CHANGE REQUEST FORM

FCR Number: _____

Field Change Request Title: _____

To: _____ **Location:** _____

Date: _____

Description:

_____

_____

Reason for Change:

_____

_____

Recommended Disposition:

_____

_____

Field Operations Lead (or designee) [print name]	Signature	Date

I have reviewed the above change request, and

[ ] approve the modification.

[ ] do not approve the modification.

The above change request has been discussed with National Grid personnel:

[ ] Yes (see below).

[ ] No. The change is minor and does not need EPA concurrence.

Project Manager [print name]	Signature	Date

I have reviewed the above change request, and

[ ] concur with the modification.

[ ] do not concur with the modification.

SBMT Asset LLC Project Manager [print name]	Signature	Date

Distribution:

SBMT Asset LLC Project Manager
Project Manager
PQAM
Field Operations Lead
Project File
Other:

ATTACHMENT 2 – SITE OPERATING PROCEDURES

Site Location and Elevation Survey (SOP #1)

All surveying will be performed by a qualified licensed surveyor. Vertical control will be established to conform with the National Geodetic Vertical Datum (NGVD) of 1988. Establishment of vertical control benchmarks shall be performed to third-order accuracy with a precision of 0.01 foot by utilizing existing benchmarks. Horizontal control will be established based upon New York State Plane Coordinate System (North American Datum (NAD) of 1983). Establishment of horizontal control benchmarks will be performed to third-order accuracy with a precision of 0.1 foot by utilizing existing benchmarks.

During the field investigation, the horizontal location of all sample locations will be surveyed to the nearest 0.1 foot. In addition, the vertical elevation of the ground surface adjacent to each of the sampling locations will be surveyed to the nearest 0.1 foot. The vertical elevation of the outer casing and inner well casing will be surveyed to the nearest 0.01 foot for the monitoring wells. The surveyor will make a black mark or notch on the highest point of the inner casing. Elevations will be recorded at this mark, and all water level measurements will be determined from this point. In addition, general boundaries and other pertinent site features/information essential for completion of the RIR will be surveyed.

Direct Push Subsurface Soil Boring (SOP #2)

1. Using the direct push drill rig, advance a carbon steel core sampler containing a 2 to 4-foot clear acetate sample tube to the desired depth into the soil. Upon removal of the sampler from the borehole, the acetate sample tube will be removed and the ends will be capped to prevent volatilization from the sample. Sample tubes will be marked with the depth interval and the sample orientation.

2. Place acetate sample tubes on clean polyethylene sheeting for inspection/sampling. Each sample tube will be inspected for the presence of groundwater. The tube will be cut lengthwise using a decontaminated utility knife, and the soil will be screened using a PID.

3. Thoroughly describe soils, including approximate recovery (length), USCS and Burmeister classifications, composition, color, moisture, and any impacts noted.

4. Collect samples for laboratory analysis in the following order (as applicable): VOCs, SVOCs, PCBs, metals, and Total Organic Carbon (TOC). Collect the VOC sample immediately upon opening the sample tube, bias to the most impacted area (if no impacts, collect from the middle of the soil interval), using a decontaminated stainless steel spoon, spatula or trowel, and place into a wide-mouth glass jar with a Teflon-lined septa. Homogenize the remaining parameter samples in a stainless steel bowl with a dedicated clean stainless steel spatula prior to sample collection.

    - Collect the TCL VOC sample from the soil using three EnCore® Samplers. An additional aliquot of soil for percent moisture analysis will also be required.

    - Prior to collecting the TCL VOC sample, hold coring body of EnCore® Sampler, and push plunger rod down until small o-ring rests against tabs. This will assure that the plunger moves freely.

    - Depress locking level on EnCore® T-handle. Place coring body - plunger end first - into open end of T-handle, aligning the two (2) slots on the coring body with the two (2) locking pins in the T-handle. Twist coring body clockwise to lock pins in slots. Double check that Sampler is locked in place prior to use.

    - To collect the TCL VOC soil sample, turn T-handle such that “T” is up and coring body is down. This positions plunger bottom flush with the bottom of the coring body; double check that plunger bottom is in position.

- Using T-handle, push EnCore® Sampler into soil until coring body is completely full. When full, the small o-ring will be centered in the T-handle viewing hole.

- Remove Sampler from soil. Wipe any excess soil from the exterior of the coring body.

- Cap coring body while it is still on T-handle. Push cap over flat area of ridge. Push and twist cap to lock in place - cap must be seated over coring body ridges to seal sampler.

- Remove capped EnCore® Sampler by depressing the locking lever on the T-handle while twisting and pulling Sampler from T-handle.

- Lock plunger by rotating extended plunger rod fully counter-clockwise until wings rest firmly against tabs.

- Attach a completed label (provided with the EnCore® Sampler in the bag) to the cap on the coring body container. Place Sampler in zipper bag provided, and seal bag.

- Place initialed custody seal(s) over the top of the closed EnCore® bag, in such a manner that the bag cannot be opened (even partially); two or more custody seals may be needed. **Do not place custody seals directly on the EnCore® Sampler!**

- Attach a completed sample tag to the bag, using tape or other method, provided that the sample tag is securely fastened to the bag and will not become dislodged in transit.

- Repeat for the remaining two EnCore® samplers

5. Complete sample labels for the parameters, and attach them to the outside of the sampling containers.

Direct Push Subsurface Soil Boring (SOP #2)

6. Fill out chain of custody forms. Record sample information in the field notebook.

7. Place the analytical samples in coolers for shipment and cool to 4^{o}C.

Monitoring Well Installation [Cased Overburden Well] (SOP #3)

Drilling protocols to be followed during the program will meet New York State drilling procedural requirements, and were summarized from the NYSDEC DER-10 and other technical guidelines. Rationale for the selection of these locations and depths are presented in the Work Plan. However, the actual location and/or depth of any well is dependent on information obtained during the soil boring installation and during well drilling.

The direct push drilling method will be the preferred method for drilling within overburden to an approximate depth of 12 feet or direct push refusal. If any visual impacts or PID readings above background are encountered during installation, a soil sample will be collected and submitted for analysis in accordance with SOP #2. The monitoring wells will be logged by a geologist during installation.

1. Advance the borehole using direct push drilling techniques (SOP #2), to the desired screening depth (approximately 10 feet bgs).
2. Construct the wells as 2-inch PVC wells with 5-foot slotted screened intervals (0.2 slot screen and a PVC riser) straddling the water table and flush-mount casing.
3. Backfill the annular space to approximately 2 feet above the well screen with Morie No. 1 sand or a filter pack appropriate for the formation. The remaining annular space will be filled to the surface with a bentonite/cement slurry. The ratio of cement to bentonite for grouting will be approximately 94 pounds of cement to every 5 pounds of bentonite.
4. Complete the well following SOP #5.

Monitoring Well Development (SOP #4)

1. All monitoring wells will be developed no sooner than 24 hours and no longer than 2 weeks after completion.

2. Develop the well by using a surge block and a submersible pump (i.e., whale pump, or similar). The surge block will be comprised of a length of narrow diameter PVC with a foam disc or material at one end. The surge block will be raised and lowered across the length of the screen to remove fine particles and deposits which may be clogging the screen for period of at least 5 minutes. The well will then be purged with the submersible pump to remove suspended particles and induce flow into the well to prevent clogging of the sand pack.

3. Continue development until turbidity is less than 50 NTUs. Development will be continued for a minimum of one hour, but for no longer than eight hours without NYSDEC permission. Development water will be properly containerized for disposal.

Monitoring Well Completion (SOP #5)

Each monitoring well installed as part of the field investigation will be completed in accordance with the following procedure:

For flushmount wells,

1. Concrete will be used to fill the space above the bentonite-cement slurry (at approximately 3 feet below grade) to grade. Construct a concrete pad (approximately 2-foot by 2-foot by 8-inch) around the roadway box in such a way as to direct surface runoff from the casing.

2. Place a two-inch plug on the PVC riser and use a lock to secure it in place. The locked cap will be locked to ensure that well access will only be provided during well development, sampling or water level measurement events. All locks will be keyed alike.

Field Parameter Measurement (SOP #6)

Field parameters will be monitored during purging of the monitoring wells utilizing a Horiba® U-52 water quality meter or equivalent. Measurements will be conducted in accordance with the manufacturer's instructions and the following procedure:

1. Calibrate the water quality meter as per manufacturer's instructions.

2. For low flow purging of the monitoring wells:

   X Attach a flow-through cell to the polyethylene tubing. Position the water quality meter probe in the flow-through cell. Begin purging the monitoring well, following SOP #8.

   X After the cell has been "flushed" at least twice, begin monitoring the field parameters, and continue approximately every 3 to 5 minutes during purging. All water quality measurements will be recorded in the appropriate field logbook or on a well purge data sheet.

   X When the indicator parameters have stabilized for three consecutive readings (see Step 12 of SOP #8), the well is considered stabilized and ready for sample collection. Remove the flow-through cell from the tubing.

3. Decontaminate the probe of the water quality meter between wells (SOP #10).

4. Record water quality measurements in the appropriate field logbook, noting well identification, sample date and time, and observations.

Groundwater Level Measurements (SOP #7)

1. Prior to the commencement of measurements, check the electronics of the water level indicator with a jar of water.

2. Slowly lower the probe portion of the water level indicator into the monitoring well. The electronic water level indicator must have ruler markings on the cable in increments of 0.01 foot or less.

3. Suspend lowering the probe when the light and/or buzzer signals contact with the top of water.

4. Carefully measure the groundwater level at the established reference point, normally identified by a mark or notch at one point on the upper edge of the inner well casing.

5. Record the measurement in the field logbook, along with the well identification, date and time, and weather conditions.

6. Decontaminate the water level indicator cable, tape and probe between wells (SOP #10).

Groundwater Sampling [Low Flow Purge Procedure] (SOP #8)

1. Check and record the condition of the well for any damage or evidence of tampering.

2. Remove the well cap.

3. Measure well headspace with a PID and record the reading in the field logbook.

4. Measure the depth to water as stated in SOP #7**,** and record the measurement in the field logbook. Do not measure the depth to the bottom of the well at this time (to avoid disturbing any sediment that may have accumulated); see Step 16.

5. Lay out plastic sheeting and place the monitoring, purging and sampling equipment on the sheeting. To avoid cross-contamination, do not let any downhole equipment touch the ground.

6. Re-check and record the depth to water after approximately 5 minutes at the well location. If the measurement has changed more than 0.01 foot, check and record the measurement again, then begin well purging.

7. Lower the polyethylene tubing to approximately the middle of the screen and/or the best depth based on the stratigraphy of the well. Be careful not to place the tubing less than approximately 2 feet above the bottom of the well as this may cause mobilization of any sediment present in the bottom of the well.

8. Attach and secure the polyethylene tubing to the peristaltic pump with silicone tubing passing through the gear well.

9. Start pumping the well at 0.2 to 0.5 liters per minute.

10. Monitor the water level in the well periodically during pumping - ideally the pump rate should equal the well recharge rate with little or no water level drawdown in the well (drawdown shall be 0.3 foot or less). There should be at least 1 foot of water over the pump intake so there is no risk of the pump suction being broken, or entrapment of air in the sample.

11. Record the pumping rate adjustments and depth(s) to water in the logbook. Pumping rates should, if needed, be reduced to the minimum capabilities of the pump (0.1 to 0.2 liters per minute) to avoid purging the well dry. However, if the recharge rate of the well is very low and the well is purged dry, then wait until the well has recharged to a sufficient level and then collect the appropriate volume of sample.

12. Purge the well at a low flow rate (from 0.2 to 0.5 liters per minute). During purging, monitor the field parameters (temperature, pH, turbidity, specific

conductivity, and DO) approximately every 3 to 5 minutes. A flow-through cell will be used to monitor the field parameters (SOP #6). Begin measuring field parameters after the flow-through cell has been "flushed" with groundwater twice.

13. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings, as follows:

- for pH
- 3 percent for specific conductance
- 10 percent for dissolved oxygen
- 10 percent for turbidity
- 10 mV for Eh

Dissolved oxygen and turbidity usually require the longest time to achieve stabilization.

5. 14. Once the field parameters have stabilized, carefully remove the tubing from the well, fill the appropriate glassware from the end of the tubing. Volatiles and analyses that degrade by aeration must be collected first. Collect samples for laboratory analysis in the following order (as applicable): VOCs, SVOCs, PCBs, metals, and Total Organic Carbon (TOC).

6. Samples for PFAS analysis will be collected as set forth in SOP #SA-1.8

15. The polyethylene tubing can be disposed of after sampling..

16. After sampling is complete, measure the total depth of the well.

17. Close and lock the well.

Decontamination [Drilling Equipment] (SOP #9)

All drilling equipment involved in field sampling activities will be decontaminated prior to and subsequent to sampling. Equipment leaving the site will also be decontaminated.

The drilling equipment will be steam cleaned prior to use, to remove any cutting oils and staged on clean plastic sheeting prior to installation. Pressurized steam will be used to remove all visible excess material from rods, drill bits, the back of the drilling rig, and other parts of the rig which contact rods, drill bits, etc.

Steam cleaning will be conducted on a decontamination pad, which will be constructed on-site for the field investigation.

Decontamination [Field Instrumentation - Probes, Water Quality Meters, etc.] (SOP #10)

Field instrumentation (such as interface probes, water quality meters, etc.) will be decontaminated between sample locations by rinsing with deionized water. If visible contamination still exists on the equipment after the rinse, an Alconox detergent scrub will be added, and the probe thoroughly rinsed again.

Decontamination [Non-disposable Chemical Sampling Equipment] (SOP #11)

Decontamination of non-disposable sampling equipment used to collect samples for chemical analyses (i.e., spoons/trowels, bowls, etc.) will be conducted as described below:

1. Alconox detergent and potable water scrub.

2. Potable water rinse.

3. Air dry.

4. Wrap or cover exposed ends of equipment with aluminum foil for transport and handling.

Robert Cantagallo, CHMM
Program Manager/Senior Project Manager

EXPERIENCE SUMMARY

Mr. Cantagallo has more than 30 years of experience in the environmental field. He has held multiple positions for commercial and federal clients, from Field Scientist and Field Operations Lead to Program and Project Manager, on projects ranging from Phase I ESAs and Remedial Investigations to Feasibility Studies, Remedial Design and Remedial Oversight. His significant project experience has included MGP projects, groundwater plume investigation and remediation, and long-term compliance and monitoring. Mr. Cantagallo has managed projects for utility clients, the USEPA, the USACE industrial clients and private developers. various RI/FS and SI field tasks including site health and safety management, sample management, and site management; and serving as a community relations liaison on a multi-site, high-visibility project.

Mr. Cantagallo has been responsible for projects at a dozen National Grid former MGP sites as a client lead for tasks ranging from remedial investigation activities to IRMs, feasibility studies, and remedial design. In addition, Mr. Cantagallo is responsible for managing the schedule and budget and overall technical execution as the Project Manager of National Grid projects at the Troy (Smith Avenue), Watervliet (5th Avenue), and the Ingall's Avenue former MGP sites.

CORPORATE PROJECT EXPERIENCE

Project Manager, September 2021–Present
Equinor, Brownfield Cleanup Program for Empire Wind 1 and 2, Multiple locations, New York
Project manager for New York State Brownfield Cleanup Program (BCP) applications submittal and compliance for multiple properties in New York State. These properties will be used to facilitate on-shore grid connections and serve as operations and maintenance facilities for the Empire Wind 1 & 2 projects off the southern shore of Long island. Responsible for managing the schedule and budget and supervising overall technical execution for pre-application investigations, BCP application preparation and submittal, and implementation of requirements under the Brownfield Cleanup Agreement (BCA).

Subject Matter Expert, October 2016–Present
UGI MGP Program, Multiple Sites
Provide technical expertise on multiple MGP projects being performed by Tetra Tech under UGI's consent order with the Pennsylvania Department of Environmental Protection. Responsibilities include client relations, planning of investigation work, and technical instruction and advice to the Tetra Tech Project Managers and Field staff.

Project Manager, January 2018–February 2021
PPG, Walton's Farm Site, Delran, NJ
Project Manager responsible for managing the schedule and budget and supervising overall technical execution of the Remediation and Investigation activities for this site in a residential area along Rancocas Creek. Managed

EDUCATION

MA, Biology, William Paterson University, 1998

BS, Biology, William Paterson University, 1990

AREA OF EXPERTISE

Program/Project Management

Biological Sciences

Chemical Sciences

Geological Sciences

Site Assessment

Remediation

REGISTRATIONS/ CERTIFICATIONS

Certified Hazardous Materials Manager, Number 15713, Earned 6/27/11

TRAINING

40-Hour OSHA Hazardous Waste Health and Safety Training; NUS Corporation; 1990

8-Hour OSHA Hazardous Waste Health and Safety Management/Supervisor Training; Tetra Tech EC, Inc.; 1995

8-Hour OSHA Hazardous Waste Health and Safety Refresher Course, Current; Tetra Tech, Inc.

DOT Training, Current; Tetra Tech, Inc.

YEARS OF EXPERIENCE

30+

YEARS WITHIN FIRM

27

the oversight of soil excavation activities, Remedial Investigation of groundwater at the Site, and the Remedial Investigation of sediment. Responsible for development of the Remedial Investigation Report, Feasibility Study, and Remedial Action Work Plan for remediation of impacted sediments at the Site.

Program Manager, 2001–April 2020
Helix Ravenswood LLC, Ravenswood Generating Facility, Long Island City, NY
Responsible for providing environmental consulting, investigative, permitting, compliance and reporting services to the owner of the Ravenswood Generating Station and Gas Turbine Facility (Ravenswood Site), an active power generating facility comprising both a generating station (GS) and a gas turbine (GT) facility. Project Manager for environmental consulting services at this facility for over 17 years for four different facility owners. Currently, the Ravenswood Site is owned by LS Power and operated by EthosEnergy. Former owners have included the Consolidated Edison Company of New York, Inc. (Con Edison), Keyspan Energy Corporation (Keyspan, subsequently National Grid), and TransCanada Corporation. The 32-acre Ravenswood Site is located in a heavily urbanized area of Long Island City, Queens, New York along the East River. Responsible for managing the schedule and budget and supervising overall technical execution of activities at this facility, including spill closure, remedial investigation, permit compliance and monitoring, and negotiation with regulatory agencies. Tasks have included in-situ waste classification, health & safety oversight, and work area and perimeter air monitoring program during a partial remediation of a former MGP and subsequent construction of a combined cycle power unit.

Project Manager, June 2020–July 2020
Innergex, Evaluation of Potential Battery Energy Storage Sites, New York State
Project Manager for the evaluation of four locations in New York State for proposed battery storage facilities. Tasks included documentation of existing conditions and identifying relevant site features which could place constraints on development of the projects. Reviewed available documentation regarding permits and approvals for each of the four project sites, and identified local, state and federal issues or permit/approval considerations and data gaps and prepared a permit review matrix for each project site.

Tetra Tech also provided information regarding the requirements and process for obtaining transmission line crossing agreements., as well as the potential for public objection and other considerations.

Program Manager, January 2004–March 2020
National Grid/KeySpan, Multiple Sites, NY
Responsible for client relations and supervising technical execution of multiple projects for National Grid, at a total value of over $3M. These projects, all former MGP or gas holder sites, are located throughout New York State, including Long Island, Queens, and Brooklyn. Tasks for these projects include Site Characterization, Remedial Investigation, LNAPL and DNAPL delineation, Feasibility Studies, Remedial Design, and Remedial Actions. Mr. Cantagallo has coordinated investigation, design, and remedial activities with multiple parties, including the client, State regulators, the public, and the USACE; has made numerous presentations to regulators and the community regarding project activities; and successfully negotiated with regulators on behalf of the client. KeySpan was acquired by National Grid in 2008, and Mr. Cantagallo continued as the Program Manager for the former KeySpan sites.

Project Manager, 2009–March 2020
National Grid, Peoples Works Former MGP Site, Brooklyn, NY
Project Manager responsible for managing the schedule and budget and supervising overall technical execution of the Site Characterization activities for this site located on the Wallabout Channel. Investigation tasks included surface and subsurface soil sampling, soil boring advancement and monitoring well installation, test pit excavation, sediment core collection and sampling, and groundwater sampling. Sediment core collection was conducted in the Wallabout Channel and the East River to evaluate presence/absence of MGP-related impacts. Sonic drilling methods were used to collect cores from a barge mounted rig. Several of the sample locations were around a ferry terminal, which necessitated coordination with the ferry schedule to avoid disruption of this service.

Project Manager and Regulatory Liaison, December 2015–December 2018
KDC, Kolmar Labs, Port Jervis, NY
Field coordinator and technical lead for the investigation and mitigation of a petroleum and chlorinated solvent plume in soil vapor at an operating manufacturing facility in New York State. The primary site contaminants include chlorinated VOCs such as trichloroethene and tetrachloroethene and non-targeted petroleum related

VOCs. Coordinated Tetra Tech field oversight and subcontractors for a Phase II ESI, installation of a soil vapor depressurization system within several buildings at the facility, and a real-time air quality monitoring system. Work was done primarily on weekends on overnight to avoid disruption of activities at this active manufacturing facility. Coordinated with Kolmar management to facilitate those activities necessary during normal working hours.

Project Manager, August 2015–June 2019
Consolidated Edison Company of New York, Inc., Newtown Substation, Brooklyn, NY
Project manager for quarterly groundwater monitoring and reporting to NYSDEC and NAPL recovery at this Con Edison Substation. Ground water monitoring and LNAPL are being conducted as part of a post-remedial program to ensure functionality of a funnel and gate system.

Project Manager, August 2017–June 2019
Consolidated Edison Company of New York, Inc., Former Maspeth Substation, Queens, NY
Project manager for sampling and monitoring of PCB-impacted monitoring wells at the location of a former Con Edison Substation. Implementation of a post-remedial monitoring program and development of NAPL recovery strategies.

TETRA TECH

Alexander Valli, PG
Senior Geoscientist

EXPERIENCE SUMMARY

Alex Valli is a professional geologist with 18 years of experience as an environmental geologist. He has provided environmental and geotechnical services for a variety of clientele, including federal, state and local government agencies, commercial and industrial corporations, residential developers, and energy services companies.

He has project management responsibilities including field supervision of subcontractors and field personnel; construction oversight; hazardous waste management; sample collection; geologic and environmental data interpretation and interacting with stakeholders. He is familiar with a variety of regulatory and technical guidance documents and has experience assessing the fate and transport of petroleum, chlorinated solvents, PCBs, PAHs, metals, and MGP-related contaminates.

He has experience collecting/logging rock, soil, sediment, water and air samples for chemical and geotechnical analysis. He has collected groundwater and surface water samples by various forms of low-flow in-line sampling procedures and high-yield groundwater techniques. He has conducted groundwater sampling using the flute liner and other multi-port systems; soil sampling through hand auger, GeoProbe®, hollow-stem auger, mud rotary, NX and NQ rock core, vibracore and sonic devices, air rotary, cable-tool drilling methods, bedrock coring and split-spoon methods; and collected air samples for IEH and vapor intrusion analysis. He has classified soils via the Unified Soil Classification System and Modified Burmister methods.

CORPORATE PROJECT EXPERIENCE

Field Operations Lead, August 2021–January 2022
Newport News Nuclear BWXT (N3B), Installation of Reginal Aquifer Well R-71 and R-72, Los Alamos Nuclear Laboratory. Los Alamos, NM

Provided onsite field support for the installation of 1,320- and 1,370-foot-deep wells constructed with dual screens to monitor groundwater quality beneath the facility. Provided geologic support and construction oversight for the drill crews. Ensured work was done safely, assisted in waste management and sampling to support drilling operations. While in the field, ensured work was conducted within a heavily regulated environment, providing subcontractor oversight and technical coordination of work plans and Accident Prvention Plan / Site Health and Safety Plan (APP/SHSP) and Activity Hazard Analyses (AHAs).

Field Operations Lead/Project Geologist/Project Health & Safety Officer, November 2021–March 2022
Equinor, Various Sites – Phase II Site Investigations, NY

As field operations leader, responsible for supervising company personnel and managing the investigation activities to characterize the physical and chemical properties of soil, groundwater and soil vapor from multiple sites. The investigations included soil sampling with hand-augers and direct-push (GeoProbe) technology. Groundwater was collected using low-flow sampling procedures. Logged cores using Unified Soil Classification System (USCS)

EDUCATION

BS, Geology, Syracuse University, 1997

AREA OF EXPERTISE

Environmental Geology

Industrial and Hazardous Site Investigations

Soil, Rock, Air and Water Sampling

REGISTRATIONS/ CERTIFICATIONS

NJDEP Subsurface Evaluator Certification, Number 332269, Earned 1/1/08

Professional Geologist, TN, Number 5580, Earned 1/19/09

Professional Geologist, NY, Number 461-1, Earned 11/13/17

Professional Geologist, AL, Number 1549, Earned 10/18/19

NJDEP UST Closure Certification, Number 332269, Earned 1/1/07

TRAINING

USACE, 40-Hour EM385-1-1, 2020

40-Hour OSHA Hazardous Waste Health and Safety Training; 2004

8-hour OSHA Hazardous Waste Health and Safety Supervisor; 2005

Additional training at end

OFFICE

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YEARS OF EXPERIENCE

18

YEARS WITHIN FIRM

14

criteria, and sampling and analyses of soil/water and soil vapor were compared to New York Department of Environmental Conservation (NYDEC) state guidelines/criteria and Brownfield Cleanup Programs criteria.

Field Operations Lead/Project Geologist/Project Health & Safety Officer, November 2020–May 2021
D.R. Horton, Various Sites – Phase II Site Investigations, MD, DE, PA, NJ

As field operations leader, responsible for supervising company personnel and managing the investigation activities to characterize the physical and chemical properties of soil and groundwater from multiple sites. The investigations included soil sampling with hand-augers and direct-push (GeoProbe) technology. Groundwater was collected using check valve samplers. Logged cores using USCS criteria, and sampling and analyses of sediment and compared to state guidelines/criteria

Field Operations Lead/Project Geologist/Project Health & Safety Officer, June 2020–Present
Lanxess, Perth Amboy and Fords Sites, Perth Amboy and Fords, NJ

Field lead in performing a multitude of projects including Site characterizations and investigations. Responsibilities included subsurface investigations including installing soil borings and monitoring wells using GeoProbe and air-knife/vacu-systems technologies to collect soil and groundwater, sample management, and instrument decontamination, equipment maintenance and calibration. Completed Conceptual Site Model (CSMs) of each site including cross-sections.

Field Operations Lead/Project Geologist/Project Health & Safety Officer, October 2019–Sept 2020
Oldcastle Building Envelope – Remediation Activities for Cesspools/Drywells and Wastewater Sampling, Hauppauge, Suffolk County, NY

As field operations leader, responsible for supervising company personnel and subcontractors and managing the investigation activities to characterize the physical and chemical properties of material from cesspools/drywell structures and sampling of wastewater processes. The remediation activities are required by the Suffolk County Department of Health (SCDHS) for renewing New York State Department of Environmental Conservation (NYSDEC) Pollutant Discharge and Elimination System (SPDES) permit for wastewater discharges from industrial activities.

Field Operations Lead/Project Geologist/Project Health & Safety Officer, August 2016–Present
Glenn Springs Holdings, Inc. (GSH), Lower 8.3 Miles of the Lower Passaic River OU 2 of the Diamond Alkali Superfund Site, Newark, NJ

As field operations leader and site safety officer, responsible for supervising company personnel and subcontractors and managing the investigation activities to investigate for pre-design/design investigations to implement the remedial action. Pre-design/design activities include geophysical, bathymetric, shoreline and debris surveys, a utility survey, sediment core collection and chemical, geotechnical and waste analysis, pore-water and water column sampling, dredge elutriate testing, bulkhead and shoreline evaluation, fish and habitat studies and a cultural resource survey. He is serving as project health and safety supervisor ensuring that personnel and subcontractors complied with health and safety protocol without incident. He also served as project geologist responsible for performing and managing sediment core sampling and logging via a sonic rig, check valve, piston and vibracore sampling. Performed management of samples and sample data

Field Operations Lead/Project Geologist/Project Health & Safety Officer, June 2016–August 2018
Chemical Insecticide Corporation/Superfund Site, Groundwater Investigation, Edison, NY

As field operations leader, responsible for supervising company personnel and subcontractors and managing the investigation activities to characterize and model the groundwater system. The scope of work covers logging, sampling and analyses of soils/and bedrock encountered at the site. Well installation/drilling in bedrock was completed using a mud-rotary rig with a wire-line NX core setup and a sonic drilling rig. Groundwater sampling for monitored natural attenuation (MNA) parameters. Annual monitoring includes the sampling of both overburden and bedrock wells representative of background conditions, horizontal and vertical plume boundaries, the center of the plume and sentinel wells along the established perimeter. Performed management of samples and sample data.

Field Operations Lead/Project Geologist/Project Health & Safety Officer, March 2016–June 2017
Drew University, Remedial Investigation, Madison, NJ

As field operations leader, responsible for supervising company personnel and subcontractors and managing the site characterization investigation activities which include installing soil borings using GeoProbe drilling

technologies to collect soil and groundwater samples in the vicinity of former UST excavation and collect soil samples from Lead impacted area at Drew University's Mead Hall.

Field Operations Lead/Project Geologist/Project Health & Safety Officer, November 2015–June 2018
Consolidated Edison, Various Sites, NY

Field lead in performing a multitude of projects including Site characterizations and investigations. Responsibilities included subsurface investigations including installing soil borings and monitoring wells using GeoProbe, hollow-stem, air-knife/vacu-systems and sonic drilling technologies to collect soil and groundwater, sample management, and instrument decontamination, equipment maintenance and calibration. Performed management of sample data and primary author of many site characterization closure reports.

Lauren Rush McHugh
Senior Chemist

EXPERIENCE SUMMARY

Lauren Rush McHugh is a senior chemist with 8 years of experience as an environmental chemist, quality control manager, data validator, and database manager. She has expertise as a data manager using Access, EQuIS, Locus EIM, and Microsoft Excel for databasing laboratory analytical data for a variety of Hazardous, Toxic, and Radioactive Waste (HTRW) and non-HTRW projects. Lauren is an expert in SW-846 methodologies and the associated validation guidance for federal and state projects across the United States. She has also performed quality assurance checks for new and emerging contaminants using current published guidance. Lauren prepares and reviews Quality Assurance Project Plans (QAPPs) for a variety of projects.

EDUCATION

BS, Chemistry, Rider University, 2013

AREA OF EXPERTISE

Data management

Data validation

Laboratory coordination and methods

QAPPs

Technical document review

TRAINING

40-Hour OSHA Hazardous Waste Health and Safety Training; 2016

OFFICE

Parsippany, NJ

YEARS OF EXPERIENCE

8

YEARS WITHIN FIRM

1

CORPORATE PROJECT EXPERIENCE

Quality Assurance Coordinator, 2022 – Present
LANXSS, Perth Amboy and Fords, NJ

Prepared and reviewed the revised 2022 QAPP. Validated site groundwater data for the following analyses: volatile organic compounds (VOCs), 1,4-dioxane, and polychlorinated biphenyls (PCBs). Maintain, adapt, and validate procedures used for data entry, verification, reporting, and manipulation. Oversee the implementation of the standard procedures. Responsible for all activities associated with laboratory analyses. Communicate with the laboratory on issues concerning the analytical program. Work with the project team of remediation specialists, scientists, and engineers. Review data as it is received from the laboratory and prepare data tables for the project team to make time-sensitive decisions regarding held samples and analyses.

Data Validator, 2022 – Present
TGP East 300 Upgrade Project, West Milford Township, NJ

Validated all laboratory soils data associated with the Phase II site inspection for the Line 300 Upgrade natural gas pipeline site following New Jersey Department of Environmental Protection Data of Known Quality Protocol (DKQP) requirements. Prepared laboratory data tables for use in the report deliverable.

Data Validator, 2022 – Present
Former Union Fork & Hoe Facility, Frankfort, NY

Validated all laboratory soil data for semi-volatile organic compounds (SVOCs) associated with the site characterization following New York State Department of Environmental Conservation (NYSDEC) Data Quality Objective (DQO) requirements.

PREVIOUS EXPERIENCE

Staff Chemist, 2021 – 2022
Langan, Lawrenceville, NJ (Remote)

Conducted data validations for projects in various states following U.S. Environmental Protection Agency (EPA) National Functional Guidelines (NFGs), EPA region-specific guidelines, and state-specific guidelines. Performed data validations on Per- and Polyfluoroalkyl Substances (PFAS) data using method-specific guidelines for groundwater, wastewater, and soil. Performed New Jersey (NJ) DKQP data quality assessments and data

usability evaluations. Prepared NYSDEC Data Usability Summary Reports (DUSRs) for reporting data validations and evaluations to clients and state regulators.

Senior Scientist (Data Quality Chemist), 2020 – 2022
Parsons, Syracuse, NY (Remote)

Conducted Stage 2A, 2B, and 3 data validations for Superfund and other federal projects following the EPA NFG. Performed data validations on radiochemistry data for a large, high-visibility Superfund site. Prepared and reviewed Uniform Federal Policy (UFP) QAPPs for multiple large superfund sites with EPA oversight.

Senior Scientist (Data Quality Chemist), 2019 – 2022
Kleinfelder, Hamilton, NJ

Managed data for multiple projects across the company using EarthSoft EQuIS Pro. Conducted data validations for projects in various states following the EPA NFG, EPA region-specific guidelines, and state-specific guidelines. Performed NJ DKQP data quality assessments and data usability evaluations. Prepared and maintained NJDEP, Department of Defense (DoD), and UFP QAPPs. Managed waste-tracking for confidential client retail sites and refinery facilities in NJ.

Staff Scientist (Data Manager), 2017 – 2019
Environmental Resources Management, Ewing, NJ

Managed data for multiple projects using EarthSoft EQuIS Pro and Enterprise. Performed NJ DKQP data quality assessments and data usability evaluations. Prepared and maintained EPA, DoD, and NJDEP QAPPs. Conducted data validations following the EPA NFG, EPA region-specific guidelines, and state-specific guidelines. Laboratory manager for all field sampling methods.

Environmental Chemist, 2014 – 2017
Golder Associates, Mount Laurel, NJ

Performed data quality validations for data generated by contract analytical laboratories in support of environmental projects within the Philadelphia operations and other North American offices. Assisted with subcontracting analytical laboratories in support of various projects, including solicitation of laboratory bids, preparation of subcontract documents, coordination of sample bottle delivery, data tracking and logging, quality control review of laboratory work products, and review of invoices. Functioned as a liaison between project managers, field staff, and laboratories for coordination of field sampling events. Managed and maintained database programs in Access and EQuIS formats. Designed and executed tables, queries, and reports. Prepared NJ and UFP QAPPs and Data Usability Summary Reports in support of various environmental projects. Conducted groundwater, surface water, soil/solid waste, and ambient air sampling.

OTHER INFORMATION

ADDITIONAL TRAINING

8-Hour OSHA Hazardous Waste Health and Safety Refresher Course; OSHA; 2022

Inside the “Black Box” of an Environmental Testing Laboratory; Eurofins TestAmerica Webinar; 2021

NJDEP DKQP Training Seminar; Alpha Analytical; 2017

PFAS Sampling, Data Validation, Data Review; Radiochemistry; Eurofins TestAmerica Webinar; 2018-Present

Various Topics Regarding EQuIS Data Management; EarthSoft EQuIS Office Hours; 2014-2020

Angel Guzman
Assistant Environmental Chemist

EXPERIENCE SUMMARY

Angel Guzman is an assistant Environmental Chemist with 2 years of experience in the organization, evaluation and validation of environmental chemistry data for a variety of environmental media including groundwater, soils, surface water and sediments. Angel is experienced in the application of New Jersey Department of Environmental Protection (NJDEP) Data of Known Quality Protocols (DKQP) and U.S. Environmental Protection Agency (EPA) National Functional Guidelines for Data Validation for Superfund and EPA regional specific guidelines for data evaluation. Validation included organic and inorganic data packages in the evaluation.

CORPORATE PROJECT EXPERIENCE

Environmental Chemist, 2021
Equinor, Offshore Wind Farm and Transmission Route Sediment Data Quality Evaluation, NY/NJ Region

Responsible for assisting in the review of data quality and validation of marine sediment data collected within the area of a proposed offshore wind farm and transmission route. Currently evaluating sediment data quality and quality assurance/quality control (QA/QC) performance criteria for data validation. Data will be used in assessing sediment quality within the proposed footprint of project and construction activities within the transmission route.

Environmental Chemist, 2021
Lanxess Industrial Manufacturing Facilities, Perth Amboy and Fords, NJ

Assisted and mentored by senior chemist in the review of data quality and validation of soil and ground water data at multiple facilities under the NJDEP SRP. Validated data using NJDEP Data of Known Quality Protocols (DKQP) for use by project geologists and environmental scientists. Produced validation summary reports detailing qualifiers applied to data based on laboratory performance standards and DKQP guidance.

Environmental Chemist, 2021
Confidential Client, Inactive, Former Industrial Facility, Frankfort, NY

Environmental chemist responsible for tabulation and summarization of environmental data collected as part of on-going site investigation activities. Organized data into excel sheets for use by the project geologist and supporting environmental scientists.

Environmental Chemist, 2021
Confidential DOD Client, Malta Rocket Test Site, Malta, NY

Assisted and mentored by senior chemist in the review of data quality and validation of soil and ground water data at multiple facilities under the New York State Department of Environmental Conservation DER-10 guidance.

Environmental Chemist, 2021
Hibco Corporation Groundwater Monitoring First Semi annual 2021 Monitoring Event, Hawthorne, CA

Assisted and mentored by senior chemist in the review of data quality and validation of ground water data using EPA National Functional Guidelines for Data Validation for Superfund.

EDUCATION

BS, Environmental Science/Biology, New Jersey Institute of Technology, May 2022

AREA OF EXPERTISE

Biological Surveys

Environmental Science

Environmental Data Validation

Data Management and Evaluation Screening

Environmental Data Analysis

OFFICE

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YEARS OF EXPERIENCE

2

YEARS WITHIN FIRM

<1

Environmental Chemist, 2021
Lonza Semiannual Groundwater Monitoring Event, Conley, GA

Assisted and mentored by senior chemist in the review of data quality and validation of ground water data using EPA National Functional Guidelines for Data Validation for Superfund.

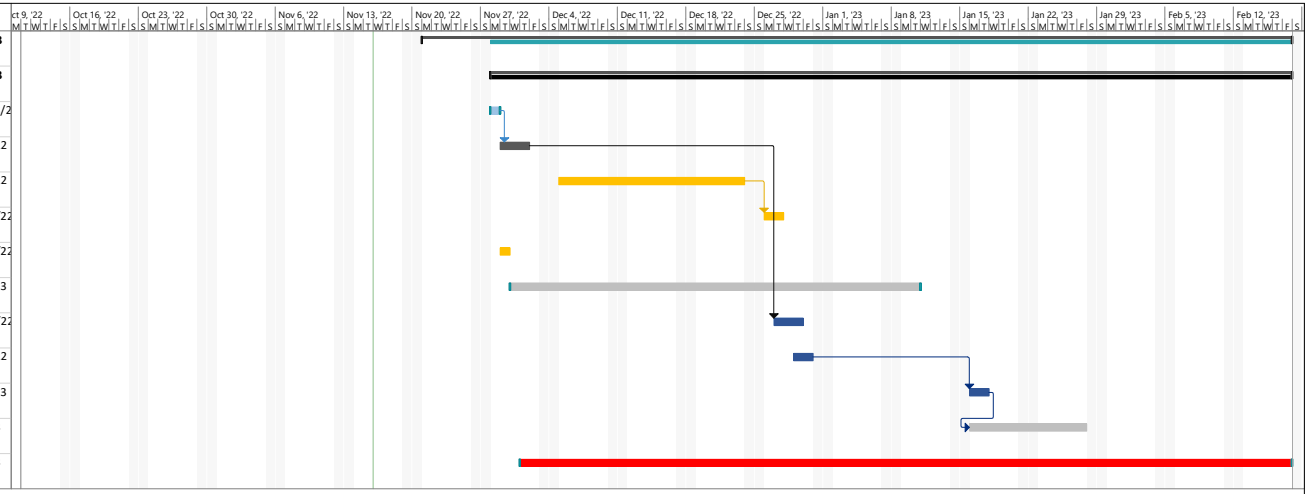
PREVIOUS EXPERIENCE

Undergraduate Researcher, 2020–Present
BioSMART, Life Sciences & Engineering Center, Newark, NJ

Assist senior researchers in running experiments. Synthesize metal nanoparticles and study their properties (size, shape, charge) using analytical chemical methods. Perform biological studies on green synthesized metal nanoparticles and microorganisms. Assist in writing papers on studies performed. Give oral presentations at undergraduate conferences as a representative of my research team and showcase the resulting research findings and future applications or investigation opportunities.

Appendix C – Project Schedule

ID	Task Mode	Task Name	Duration	Start	Finish
1		**Remedial Investigation**	**65 days**	**Mon 11/21/22**	**Fri 2/17/23**
2		**RIWP Field Work & Reporting**	**60 days**	**Mon 11/28/22**	**Fri 2/17/23**
3		Kick Off Mtg	1 day	Mon 11/28/22	Mon 11/28/2
4		Utilities Clearance	3 days	Tue 11/29/22	Thu 12/1/22
5		Soil Borings and install vapor points	15 days	Mon 12/5/22	Fri 12/23/22
6		Soil Vapor	2 days	Mon 12/26/22	Tue 12/27/22
7		Surfical Soil Sampling	1 day	Tue 11/29/22	Tue 11/29/22
8		Soil Analytical	30 days	Wed 11/30/22	Tue 1/10/23
9		Monitoring Well Installations	3 days	Tue 12/27/22	Thu 12/29/22
10		MW Development	2 days	Thu 12/29/22	Fri 12/30/22
11		Groundwater Sampling	2 days	Mon 1/16/23	Tue 1/17/23
12		GW Analytical	10 days	Mon 1/16/23	Fri 1/27/23
13		Preparation Remedial Investigation Report (RIR)	57 days	Thu 12/1/22	Fri 2/17/23



Project: SBMT RI Schedule 1116
Date: Wed 11/16/22

Task	Summary	Inactive Milestone	Duration-only	Start-only	External Milestone	Manual Progress
Split	Project Summary	Inactive Summary	Manual Summary Rollup	Finish-only	Deadline	
Milestone	Inactive Task	Manual Task	Manual Summary	External Tasks	Progress	

Appendix D – Community Air Monitoring Plan

APPENDIX C

COMMUNITY AIR MONITORING PLAN

Real-time air monitoring for volatile compounds and particulates at the perimeter of the exclusion zones will be conducted. Exclusion zones will be established at each area of subsurface investigation (e.g., borings and wells near TT-SB-13, borings and wells around the Tower building, etc.). Monitoring will be conducted at one upwind and one downwind station. The locations of these stations will be determined on a daily basis by use of wind sock to determine predominant wind directions, and will be adjusted throughout the day as necessary.

If particulates become a concern at the Site as a result of drilling activities, this plan will be modified accordingly. The following procedures will be implemented during field activities as appropriate:

Volatile organic compounds will be monitored at the downwind perimeter of the exclusion zone on a continuous basis at monitoring stations using a PID with data logging capabilities, as well as visible and audible alarms.

- 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 will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- 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 will 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.

    - All readings will be recorded in the field logbook and be available for State (NYSDEC & NYSDOH) personnel to review.

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will 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 will be capable of logging data, and will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.
- All readings will be recorded in the field logbook and be available for State (NYSDEC & NYSDOH) personnel to review. These action levels can be modified with the agreement of NYSDEC & NYSDOH if particulates are better characterized and identified.

Vapor Emission Response Plan

If the organic vapor level is above 50 ppm over background at the perimeter of the exclusion zone, work activities will halt and odor control contingencies will be implemented. When work shutdown occurs, downwind air monitoring as directed by the ESS will be implemented to ensure that vapor emissions do not impact the nearest residential or commercial structure.

If organic vapor levels greater than 25 ppm over background are identified 200 feet downwind from the investigation site, or half the distance to the nearest residential or commercial property line, whichever is less, all work must cease. If, following cessation of work activities and implementation of odor control contingencies, organic vapor levels persist above 25 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the exclusion zone, then air quality must be monitored within 20 feet of the perimeter of the nearest residential/commercial structure (the “20 foot zone”).

If organic vapor levels approach 25 ppm above background within the “20 foot zone” for a period of more than 30 minutes, or organic vapor levels greater than 50 ppm above background for any time period occur within the “20 foot zone”, then the following steps will be taken:

- The local police/authorities will immediately be contacted by the ESS and advised of the situation.
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 foot zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the EL.
- All emergency contacts will go into effect as appropriate.
- If readings fail to drop below 25 ppm after 30 minutes the borehole will be sealed.