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RCRA CLOSURE PLAN
FORMER ADHESIVES PRODUCTS CORPORATION SITE
1660 BOONE AVENUE
BRONX, NEW YORK
BLOCK 3015, LOT 1
NYSDEC SITE NO. 203130
RCRA SITE ID NO. NYD001360031

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

for
The Vaja Group LLC
23 Lorimer Street, 6th Floor
Brooklyn, New York 11206

File No. 0211582
September 2024

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24 September 2024
File No. 0211582

New York State Department of Environmental Conservation
Region 2 - Division of Environmental Remediation
47-40 21st Street
Long Island City, New York 11101-5401

Attention: Ms. Jane O'Connell

Subject: RCRA Closure Plan
Former Adhesives Products Corporation Site
1660 Boone Avenue
Bronx, New York
NYSDEC Site No. 203130

Dear Ms. O'Connell,

On behalf of The Vaja Group, LLC, H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) is submitting this Resource Conservation and Recovery Act (RCRA) Closure Plan for the proposed Former Adhesives Products Corporation Site located at 1660 Boone Avenue in the Bronx, New York (Site). This RCRA Closure Plan has been developed based on the New York State Department of Environmental Conservation's (NYSDEC's) "Technical Guidance for Site Investigation and Remediation" (Division of Environmental Remediation [DER]-10, dated May 2010).

Please do not hesitate to contact us if there are any questions regarding this submittal or any other aspects of the project.

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

DRAFT

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James M. Bellew
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Certification

I, James M. Bellew, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this RCRA Closure Plan was prepared in accordance with 6 NYCRR Part 373-2.7.

James M. Bellew	*Date*

Table of Contents

List of Figures

List of Appendices

1. Introduction

On behalf of The Vaja Group LLC, H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) has prepared this Resource Conservation and Recovery Act (RCRA) Closure Plan for the Former Adhesives Products Corporation Site located at 1660 Boone Avenue (see Figure 1) in the Crotona neighborhood of Bronx, New York (Site). In July 2020, the Former Adhesives Products Corporation Site received a referral to the New York State Department of Environmental Conservation (NYSDEC) Inactive Hazardous Waste Registry as P Site 203130. This RCRA Closure Plan was prepared in accordance with Division of Environmental Remediation (DER)-10 which is entitled "Technical Guidance for Site Investigation and Remediation" and dated May 2010.

The Former Adhesives Products Corporation Site is identified as Section 2, Block 3015, Lot 1 on the New York City tax map. The Site is approximately 10,906 square feet (sq ft) (0.25 acres) and is currently improved with a two-story former warehouse with a cellar. The Site is bound by a one-story warehouse to the north, East 173rd Street followed by a 15-story mixed-use commercial and residential building to the south, a New York City Department of Sanitation parking lot to the east, and Boone Avenue followed by one- and two-story warehouses to the west. The Site location is shown on Figure 1. Existing features are shown on Figure 2.

The activities outlined in this plan address closure items located on the Site where hazardous materials were handled. Any hazardous waste identified will be appropriately handled and disposed of. It is included herein as United States Environmental Protection Agency (USEPA) generator identification numbers are assigned to a facility and include all contiguous property owned and operated as part of the facility, as defined in Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 370.2. The Former Adhesives Products Corporation Site is listed under USEPA ID No. NYD001360031.

The Former Adhesives Products Corporation Site is within a residential and commercial zoning district (R7-A and C2-4). R7 districts are medium-density apartment house districts mapped in much of the Bronx. C1-1 through C1-5 and C2-1 through C2-5 districts are commercial overlays mapped within residence districts. Mapped along streets that serve local retail needs, they are found extensively throughout New York City's lower- and medium-density areas and occasionally in higher-density districts.

2. Background

2.1 CURRENT LAND USE

The Site is currently a vacant warehouse that was formerly operated by Adhesives Products Corporation. The Site received a referral to the NYSDEC as P Site 203130, meaning that preliminary information indicates that the Site may have contamination that makes it eligible for consideration for placement on the Registry of Inactive Hazardous Waste Disposal Sites. Historically, the facility was used for the manufacturing of adhesive products.

2.2 SITE HISTORY

According to a Phase I Environmental Site Assessment (ESA) conducted by Haley & Aldrich of New York in August 2024, the Site consists of a vacant two-story former warehouse with a full cellar. The Site was undeveloped until 1901 when a building was constructed in the central portion of the Site. By 1915, a dwelling was also present along East 173rd Street. By 1945, the former structures were demolished, and the Site was redeveloped with a building encompassing the entire Site occupied by the Adhesive Products Corporation which was a manufacturer of rubber cement. The Adhesive Products Corporation continued operations through 1992. Between 1995 and 2000, the subject property was occupied by Safeway Moving & Storage and between 2005 and 2017, it was occupied by a plumbing supplier. Currently, the Site is vacant.

2.3 SURROUNDING LAND USE

The Site is located within an urban area of the Crotona neighborhood of the Bronx, New York, characterized by low-rise commercial buildings, multi-story mixed-use commercial and residential buildings, industrial and manufacturing buildings, and one- and two-family homes. Starlight Park is located approximately 300 feet (ft) southeast of the Site. There are three sensitive receptors within a 500-ft radius of the Site as listed below:

1) X458 Samara Community School – 1570 Boone Avenue, Bronx, New York 10460, listed as a public school.
2) Starlight Park – 1490 Sheridan Boulevard, Bronx, New York 10459, listed as an urban park.
3) Smiley Face Group Day Care – 1664 Bryant Avenue, Bronx, New York 10460, listed as a family daycare.

Properties immediately surrounding the Site are zoned for commercial and residential use.

2.4 SURROUNDING LAND USE HISTORY

The area surrounding the Site has been used primarily for manufacturing, commercial, and residential uses from the late 1800s to the present day. From 1896 to 1915, the property across the Sheridan Expressway to the southeast operated as the Northern Gaslight Co., a manufactured gas plant (MGP), with two gas holders present on the property. From 1950 to the 2000s, several auto repair operations, garages, and manufacturing operations were active at adjacent properties.

2.5 GEOLOGY AND HYDROGEOLOGY

According to the previous Remedial Investigation Report (RIR) prepared by Impact Environmental dated August 2019, subsurface soil at the Site generally consisted of fill material mainly composed of brown, medium sand with silt and clay underlain by bedrock which was encountered at depths ranging from 4 to 15 ft below ground surface (bgs). Groundwater was reportedly not encountered during the Remedial Investigation (RI). Groundwater is anticipated to flow to the southeast towards the Bronx River.

2.6 PREVIOUS INVESTIGATIONS AND REMEDIAL MEASURES

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

- *Phase I Environmental Site Assessment*, 11 December 2018, Prepared by Equity Environmental Engineering (Equity), Prepared for Andrew Esposito.
- *Waste Characterization Report*, 30 July 2019, Prepared by Impact Environmental, Prepared for Barone Management LLC
- *Remedial Investigation Report*, 28 August 2019, Prepared by Impact Environmental, Prepared for JJS Boone LLC.
- *Phase I Environmental Site Assessment*, 23 September 2024, Prepared by Haley & Aldrich of New York, Prepared for The Vaja Group LLC.

Phase I ESA, 11 December 2018, Prepared by Equity, Prepared for Andrew Esposito

A Phase I ESA was conducted for the subject property by Equity in December 2018. At the time of the Phase I ESA Site reconnaissance in December 2018, the two-story building was being used for the storage and distribution of plumbing equipment. Equity indicted the following recognized environmental conditions (RECs) associated with the subject property.

REC #1: An E-Designation (E-277) was placed on the subject property. Specifically, E-277 for hazardous materials, air, and noise components.

Equity also identified that the Environmental Database Report (EDR) showed many Vapor Encroachment Conditions (VECs) within 1/10 of a mile of the Site. The findings include E-Designations for hazardous materials, reported spills, and an MGP identified within a 1/10 of a mile of the Site. Due to the identified sites, Equity concluded that a VEC cannot be ruled out.

Equity did not identify any other environmental concerns associated with the subject property.

Waste Characterization Report, 30 July 2019, Prepared by Impact Environmental, Prepared for Barone Management LLC

Impact Environmental prepared a Waste Characterization Report to summarize the soil characterization sampling conducted at the subject property in July 2019. The scope of work included the characterization of soil within the proposed building footprint to bedrock. Impact Environmental collected eight samples from four waste characterization grids. Grids WC-1 through WC-3 consisted of the upper intervals from surface grade to 8 ft below grade, while WC-4 consisted of the lower vertical interval from 8 to 15 ft below grade for the proposed cellar area. Waste characterization soil samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), total metals, extractable petroleum hydrocarbons (EPHs), and toxicity characteristic leachate procedure (TCLP) RCRA metals.

Field observations and laboratory analytical results are summarized below:

- Subsurface soil at the subject property consisted of fill, which was primarily comprised of brick, and gravel in a brown medium-grained sand matrix. Fill was encountered at a depth interval from surface grade to 15 ft bgs throughout the majority of the subject property. Brown medium- to fine-grained silty sand with clay was generally encountered in the deeper borings. Bedrock was encountered underlying the fill layer at varying depths from 4 to 15 ft bgs. No photoionization detector (PID) and olfactory responses were recorded during the excavation of the test pits.
- Soil results for the waste characterization were compared to the NYCDEC Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs), Restricted Residential Use Soil Cleanup Objectives (RRSCOs), and Restricted Commercial Use Soil Cleanup Objectives (RCSCOs) as well as New Jersey Residential and Non-Residential Direct Contact Soil Remediation Standards (NJRDCSRS; NJNRDCSRS), the New Jersey Default Impact to Groundwater Soil Screening Levels (NJIGWSSL), the Doremus Avenue Redevelopment Project acceptance criteria, Pennsylvania Clean Fill Limits (PACFL), and the Pennsylvania Regulated Fill Limits (PARFL). Soil analytical results are summarized as follows:
  - The grab sample collected from WC-1 contained acetone above the UUSCO and the composite sample contained exceedances of several metals above the NJIGWSSL and NJNRDCSRS.
  - The grab sample collected from WC-2 contained acetone above the UUSCO and the composite sample had exceedances of mercury and zinc above the UUSCOs and several metals above the NJIGWSSL and NJNRDCSRS.
  - The grab sample collected from WC-3 also contained acetone above the UUSCO, the composite sample had exceedances of lead, mercury, and zinc above the UUSCOs, and several metals above the NJIGWSSL and NJNRDCSRS. Additionally, benzo(a)pyrene was detected above the NJIGWSSL.
  - The grab sample collected from WC-4 contained acetone above the UUSCO and benzene above the NJIGWSSL. The composite sample collected from WC-4 contained zinc above the UUSCO and several metals were detected above the NJIGWSSL and NJNRDCSRS.

  - TCLP metals were not detected in any composite samples above the hazardous waste toxicity characteristic standards.

RIR, 28 August 2019, prepared by Impact Environmental, prepared for JJS Boone LLC

Impact Environmental performed an RI at the subject property in July 2019 for submission to the New York City Office of Environmental Remediation (NYCOER). The investigation included the completion of a ground penetrating radar (GPR) survey, installation of seven soil borings and collection of 13 soil samples, and installation of eight soil vapor probes to a depth of 5 ft bgs and collection of eight soil vapor samples. Soil samples were analyzed for VOCs, SVOCs, target analyte list (TAL) metals, pesticides, and PCBs. Soil vapor samples were analyzed for VOCs.

Field observations and laboratory analytical results are summarized below:

- The stratigraphy of the subject property, from the surface down, generally consisted of fill material mainly composed of brown, medium sand with silt and clay underlain by bedrock which was encountered at depths ranging from 4 to 15 ft bgs. Groundwater was reportedly not encountered during the RI. Groundwater is anticipated to flow to the southeast towards the Bronx River.
- Soil analytical results were compared to NYSDEC 6 NYCRR Part 375 UUSCOs and RRSCOs. Results are summarized as follows:
  - VOCs were detected at concentrations above the UUSCOs in four soil samples. Of these, two samples had exceedances for acetone only (maximum concentration 0.059 milligrams per kilogram [mg/kg]). Two VOCs were detected above the UUSCOs in sample SB-4 (0-2), including benzene (0.1 mg/kg) and tetrachloroethene (1.9 mg/kg). Several VOCs were detected above UUSCOs in sample SB-3 (13-15), including 1,2,4-trimethylbenzene (38 mg/kg), 1,3,5-trimethylbenzene (9 mg/kg), ethylbenzene (1.4 mg/kg), n-propylbenzene (5 mg/kg), and total xylenes (1.8 mg/kg). No VOCs were detected above RRSCOs.
  - SVOCs were detected above the UUSCOs and RRSCOs in soil samples SB-2 (0-2) and SB-7 (0-2), including benzo(a)anthracene (maximum concentration 5.7 mg/kg), benzo(a)pyrene (maximum concentration 4.4 mg/kg), benzo(b)fluoranthene (maximum concentration 5.9 mg/kg), benzo(k)fluoranthene (maximum concentration 2.1 mg/kg), chrysene (maximum concentration 5.1 mg/kg), dibenzo(a,h)anthracene (maximum concentration 0.69 mg/kg), and indeno(1,2,3-cd)pyrene (maximum concentration 2.9 mg/kg).
  - Six metals were detected at concentrations above UUSCOs in at least one shallow soil sample analyzed, including lead in four soil samples (maximum concentration 359 mg/kg), zinc in three soil samples (maximum concentration 312 mg/kg), nickel in three soil samples (maximum concentration 37.9 mg/kg), cadmium in one soil sample at a concentration of 2.76 mg/kg, hexavalent chromium in one soil sample at a concentration of 16.6 mg/kg, and copper in one soil sample at a concentration of 67.8 mg/kg. Mercury was detected above both the UUSCO and RRSCO in one soil sample, SB-2 (0-2), at a concentration of 0.892 mg/kg.

  - The pesticide 4,4-DDT was detected above the UUSCO in one sample, SB-03 (0-2), at a concentration of 0.00823 mg/kg. No other pesticides were detected above UUSCOs or RRSCOs.
  - PCBs were detected above the UUSCO in one soil sample, SB-03 (0-2), at a concentration of 0.108 mg/kg. PCBs were not detected above the UUSCO or RRSCO in any other soil samples.

- Soil vapor results are summarized below.
  - Total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations ranged from 165.43 micrograms per cubic meter (µg/m^3) in sample SV-8 to 430.7 µg/m^3 in sample SV-2. Total VOC concentrations in soil vapor samples ranged from 666.89 µg/m^3 in sample SV-3 to 3,351.66 µg/m^3 in SV-4. Several chlorinated volatile organic compounds (CVOCs) were detected in multiple soil vapor samples including trichloroethene (TCE) (maximum concentration 26.8 µg/m^3), tetrachloroethene (PCE) (maximum concentration 2,540 µg/m^3), methylene chloride (maximum concentration 6.74 µg/m^3), vinyl chloride (maximum concentration 1.47 µg/m^3), carbon tetrachloride (maximum concentration 45.3 µg/m^3), and cis-1,2-dichloroethene (maximum concentration 2.09 µg/m^3).

***Phase I ESA, 23 September 2024,* prepared by Haley & Aldrich of New York, prepared for The Vaja Group LLC.**

A Phase I ESA was conducted for the Site by Haley & Aldrich of New York on behalf of the Vaja Group LLC in September 2024. At the time of the Phase I ESA Site reconnaissance in August 2024, the building was vacant. Haley & Aldrich of New York indicted the following RECs and Historical Recognized Environmental Conditions (HRECs) associated with the Site.

REC #1: Documented Subsurface Contamination at Subject Property

An RI was conducted at the subject property by Impact Environmental in August 2019. The presence of fill material was reportedly observed in a 4- to 15-ft-thick layer across the subject property underlain by bedrock. Soil analytical results indicated that soil is impacted with VOCs, specifically chlorinated and petroleum-related VOCs, SVOCs, specifically polycyclic aromatic hydrocarbons (PAHs), pesticides, PCBs, and metals above the UUSCOs and/or RRSCOs. Soil vapor analytical results indicated the presence of CVOCs and petroleum-related VOCs in soil vapor above laboratory detection limits throughout the subject property. Groundwater was reportedly not encountered during the investigation. In July 2020, the subject property received a referral to the NYSDEC as P Site 203130, meaning that preliminary information indicates that a site may have contamination that makes it eligible for consideration for placement on the Registry of Inactive Hazardous Waste Disposal Sites (State Superfund Registry). Documented subsurface contamination at the subject property, including impacts to soil and soil vapor, is indicated as a REC.

REC #2: Former Adhesives Products Corporation

The Adhesives Products Corporation formerly operated on the subject property from 1945 to 1992 and utilized the subject property to manufacture rubber cement. The Adhesives Products Corporation is listed in the Petroleum Bulk Storage (PBS) database under PBS ID 2-200688 for the former presence of six underground storage tanks (USTs) containing either gasoline or no. 2 fuel oil that were installed in 1942 and were closed and removed on 1 April 1992. Additionally, one 275-gallon gasoline UST installed in 1942 is currently listed as out of service. The Adhesives Products Corporation is also listed in the Chemical Bulk Storage (CBS) database under CBS ID 2-000246 with ten 550-gallon and six 1,500-gallon USTs that reportedly contained either ethyl acetate, methyl ethyl ketone (MEK), toluene, or 2-propanone. The tanks were reportedly installed in 1942, and all tanks are currently listed with a status of closed-in-place as of 1 April 1992. It is unknown whether the tanks are still present at the subject property. The Adhesives Products Corporation ceased operations in 1992 and a New York City Department of Environmental Protection (NYCDEP) inspection report from April 1992 indicated that approximately 300 55-gallon drums of material were stored within the subject property building from the Adhesives Products Corporation. Subsequently, in 1992, the subject property was listed as an RCRA Large Quantity Generator (LQG) of halogenated degreasing solvents for the removal of the 55-gallon drums stored in the building. Hazardous chemicals used in the adhesive manufacturing process have historically been stored in USTs on the subject property and in 55-gallon drums throughout the subject property building. In addition, former adhesive manufacturing uses of the subject property could have potentially used materials containing perfluorooctanoic acid (PFOA) or perfluorooctanesulfonic acid (PFOS), which reportedly may be added to adhesives to increase resistance to moisture. The historical operation of the Adhesives Products Corporation is considered a REC as potential or undocumented releases of chemicals used in the former manufacturing process may have adversely impacted groundwater, soil, and/or soil vapor at the subject property.

HREC #1: NY Spills Case No. 9203740

The subject property is identified in the NY Spills database under Spill Case No. 9203740. A spill reportedly occurred at the subject property on 09 June 1992 due to a release of an unknown petroleum product. Notes from the spill case were incomplete in detailing the nature of the release, however, notes indicate that total petroleum hydrocarbons (TPHs) and toluene were contaminants associated with the former Adhesives Product Corporation, that cleanup was ongoing, and the NYCDEP was involved. A Freedom of Information Law (FOIL) Request was submitted to the NYSDEC, and the spill report received in response indicates that the NYSDEC closed the spill case on 21 March 2001 since the NYCDEP supervised the removal of 55-gallon drums containing hazardous materials inside the building and manifests had been obtained. It is stated in the spill report that no other remedial work was reported to be completed as part of the remedial action other than the drum removal. Since the spill case was closed by NYSDEC and the 55-gallon drums were removed from the subject property, the closed spill case is considered an HREC.

3. RCRA Closure Activities

3.1 RCRA OBJECTIVES AND RATIONALE

The objective of the RCRA Closure Plan is to ensure the facility requires no further maintenance or control for the preparation of the planned demolition activities. The general closure procedure for the Site will include a visual inspection of the facility, potential surface decontamination, drum sampling, demolition of the facility, and Site security.

Upon completion of the above-referenced closure activities, if needed, confirmatory rinsate samples will be collected and analyzed to ensure contaminants associated with former use of the Site are successfully removed to closure performance standards in any areas where the visual inspection identified potential contamination.

Additionally, upon execution of a Brownfield Cleanup Agreement (BCA) and approval of a Remedial Action Work Plan (RAWP) for the project (regarding subsurface contamination), removal of previously closed-in-place USTs will occur.

Hazardous and non-hazardous waste generated during final closure of the Site shall be handled in accordance with applicable state and federal regulations. Chemicals will be inventoried, segregated, and disposed of in accordance with 6 NYCRR Part 373-3.7, and unlabeled chemicals will be analyzed to determine composition. Closure activities will be overseen by a Qualified Environmental Professional (QEP) under the supervision of the Remedial Engineer (RE).

3.2 GENERAL PROJECT INFORMATION

3.2.1 RCRA Remedial Engineer

The RE will review plans and submittals for this remedial project, contractor and subcontractor document submittals, and will confirm that plans and submittals are in compliance with this RCRA Closure Plan. Remedial documents, including contractor and subcontractor document submittals, will be submitted to the NYSDEC and New York State Department of Health (NYSDOH) in a timely manner and prior to the start of work associated with the RCRA Closure Plan.

The RE for this project will be Scott Underhill. The RE is a registered professional engineer (P.E.) licensed by the state of New York. The RE will have primary direct responsibility for the implementation of the remedial program at the Site. The RE will send to the NYSDEC, by registered mail, a certification that the hazardous waste management unit has been closed in accordance with the specifications in the approved closure plan. Documentation supporting the independent registered P.E.'s certification will be furnished to the NYSDEC upon request.

Under direction of the RE, the work of other contractors and subcontractors involved in aspects of the RCRA Closure Plan will be documented, including chemical inventory, decontamination of existing structures, confirmation sample collection, air monitoring, emergency spill response services, aboveground storage tank (AST) and former processing equipment removal, and management of waste transport and disposal.

The RE will review the work plans submitted by contractors and subcontractors for substantial conformance with this RCRA Closure Plan.

3.2.2 Closure Performance Standard

This RCRA Closure Plan is designed to ensure that the Site requires no further maintenance or controls following closure of the hazardous waste activities in accordance with 6 NYCRR 373-3.7(b). The contents of this RCRA Closure Plan are structured to minimize threats to human health and the environment. To ensure adequate closure, process equipment associated with regulated waste activity will be decontaminated and disposed of off-Site. Following decontamination, if needed, confirmatory rinsate samples will be collected and analyzed to ensure that no significant concentrations (i.e., those exceeding the closure performance standards) of hazardous contaminants remain in areas where the visual inspection indicates potential contamination. Potential rinsate sample locations, if necessary, will be determined following the visual inspection. If necessary, decontamination procedures will be repeated until contaminant levels are reduced to within acceptable guidelines or standards. If contamination exceeding performance standards is found to exist, appropriate remedial actions in accordance with NYSDEC requirements will be taken.

When available and applicable, federal, state, and/or local environmental quality standards are to be used to determine the adequacy of closure. Where formal standards do not exist, informal closure performance guidelines are to be used. The determination of informal closure performance guidelines was made after an assessment of the following:

1. Review of available federal, state, and local guidelines and remedial action levels;
2. Review of similar projects and past NYSDEC and NYSDOH guidance;
3. The contaminated media (e.g., concrete surfaces);
4. Migration potential of contaminants;
5. Toxicological data for contaminants (e.g., methods of exposure, National Institute for Occupational Safety and Health standards); and,
6. Anticipated future use of subject property.

Hazardous waste storage containers shall be handled and labeled as "hazardous waste" or "hazardous waste pending analysis" while awaiting laboratory results. Liquid hazardous waste shall be stored within secondary containment and shipped with a hazardous waste manifest. Confirmatory sampling will be conducted as part of the closure activities to document that no hazardous materials remain on the surface of the concrete that can adversely impact public health or the environment. Sampling will include rinsate sampling of solid surfaces. The scope of sampling is detailed in the project-specific Quality Assurance Project Plan (QAPP), which is included as Appendix A.

For potential rinsate sampling determined following the visual inspection, the closure performance standard shall be the New York State Ground Water Effluent Limitations from Class GA Waters as found in 6 NYCRR Part 703.6. If any rinsate sample exceeds the New York State Ground Water Effluent Limitations from Class GA Waters as found in 6NYCRR Part 703.6, then the corresponding process equipment or area shall be re-cleaned and subsequently resampled. This procedure shall be repeated until parameters are within the closure performance standards.

All contaminated equipment, structures, and soils must be properly disposed of or decontaminated. All decontamination wastes shall be contained.

3.3 SUMMARY OF RCRA CLOSURE PROCEDURES

The proposed above-grade RCRA action consists of the following elements:

1. **Visual Inspection**: Visual inspection of the facility, including identification of any potential contamination on structures and the walls and floors of the facility (i.e., staining), and preparation of a comprehensive inventory.
2. **Rinsate Sampling**: Collection and laboratory analysis of rinsate samples from the concrete building slab throughout the entirety of the facility. Rinsate samples will be collected and analyzed per the protocols written in Section 3.5.1 of this RCRA Closure Plan.
3. **Potential Facility Slab Decontamination**: Decontamination of any areas of the facility slab where rinsate samples indicate concentrations of contaminants of concern above New York State Ground Water Effluent Limitations from Class GA Waters as found in 6 NYCRR Part 703.6 or any structures with potential contamination identified during the visual inspection. Surface decontamination will include disposal of wastewater and confirmation rinsate sample collection.
4. **Drum Rinsate/Content Sampling**: Rinsate sampling of the remaining empty drums and if drums are not empty, the contents of the drums will be sampled followed by proper transportation and disposal to a permitted facility.
5. **Remaining Facility Demolition and Site Security**: Demolish the remainder of the facility and secure the Site with perimeter fencing to prevent entry from the public. Site fencing will be secured during all non-operational Site hours.

The proposed RCRA actions do not address sub-grade structures, including tanks, which will be decontaminated at a later date, under subgrade remedial actions to be proposed in the RAWP submission.

3.4 RCRA CLOSURE ACTIVITIES

3.4.1 Visual Inspection

A visual inspection will be performed at the facility and include a walkthrough of the entirety of the Site, identification of contamination on any structures, and observation of staining on the concrete slab. Following the visual inspection, a comprehensive inventory will be completed identifying any areas of potential contamination that would need to be decontaminated and/or sampled.

3.4.2 Rinsate Sampling

Rinsate samples will be collected from the concrete building slab throughout the entirety of the facility. Rinsate sampling protocol is discussed in Appendix B and Section 3.5.1 of this RCRA Closure Plan. If contaminants of concern are identified above the New York State Ground Water Effluent Limitations from Class GA Waters as found in 6 NYCRR Part 703.6, then these areas of the building slab will be decontaminated.

3.4.3 Potential Surface Decontamination

Based on the visual inspection of structures and rinsate sampling results of the building slab, closure and decontamination will be performed in accordance with the procedure described below:

1. Decontaminate the concrete slab and/or structure utilizing a hot power washer and detergent and remove water/detergent. The detergent will consist of a non-toxic cleaner, such as Green Extreme or an equivalent non-toxic cleaner. Wastes accumulated within the decontamination area will be pumped into 275-gallon plastic totes.
2. A second and third wash/rinse utilizing hot water applied via power washer and detergent will be performed to decontaminate the concrete slab and/or structure.
3. Collect and laboratory analyze a confirmation rinsate sample from the slab and/or structure from the third rinse. Confirmation rinsate samples are to be collected and analyzed per the protocols written in Section 3.5.1.
4. Perform additional decontamination in accordance with the procedures outlined in Section 3.7, if needed, based on confirmation rinsate sample analytical results.
5. To determine disposal options, liquid within the totes will be sampled in accordance procedure summarized in Section 3.5.2.
6. Following the issuance of approval by the disposal facility, a liquid pump truck will be utilized to empty each of the 275-gallon plastic totes and transport the liquid to the facility for off-Site disposal. All liquid and solid waste generated during decontamination of the concrete slab and/or structures in the building will be transported by licensed waste transporters to facilities approved to accept the waste.

Additional areas identified in the field during closure activities will be included in the RCRA Closure Report.

3.4.4 Drum Sampling

For any drums identified on the Site, a rinsate sample will be collected from empty drums, and if drums do contain solid or liquid material, the drum contents will be sampled in accordance with the procedures in Sections 3.5.2 and 3.5.3. Drum disposal will occur in accordance with the procedures in Section 3.6.

3.4.5 Facility Demolition and Site Security

Once decontamination and RCRA closure work is completed on the Site, the facility will be demolished in order to facilitate the execution of a remedial action that is not included in this closure plan and will be presented under a separate report cover. The proposed RCRA actions do not address sub-grade structures, which will be removed and decontaminated at a later date under a separate, future

Remedial Work Plan (RWP)[1]. Demolition of the building slab will be addressed under the future RWP as per NYSDEC requirements.

Once the facility is demolished, the Site will be secured by a Site-wide fence to prevent access from the public. The Site fence will be secured and locked during non-operational hours.

3.4.6 Underground Storage Tank Removal

Procedures for UST removal will be included in the future RAWP for the Site. It is noted that while the tanks are no longer regulated under the CBS program, they become wastes when they are excavated for disposal, which means they are subject to solid and hazardous waste regulations. Therefore, as potentially listed hazardous wastes, they will also require a contained-in determination when they are removed.

3.5 SAMPLING PROCEDURE AND PROTOCOLS

3.5.1 Confirmation Rinsate Samples

Confirmation rinsate samples will be collected in accordance with the Confirmation Rinsate Samples Collection Protocol included as Attachment B. Confirmation rinsate samples will be analyzed for VOCs via Target Compound List (TCL) USEPA Method 8260B and SVOCs using TCL USEPA Method 8270D. VOC analysis will include the following hazardous materials that were reportedly used at the facility and stored in USTs: ethyl acetate, MEK, toluene, and 2-propanone.

Rinsate sample results should be compared to New York State Ground Water Effluent Limitations from Class GA Waters as found in 6 NYCRR Part 703.6. Materials will be stored, and sampling completed (where possible) in a temporary containment area with both a flexible boom and bentonite clay, to ensure no leaks from the temporary containment area during sampling. Additional protocols for rinsate sampling are included in Appendix B.

3.5.2 Liquid Samples for Disposal

Liquid within the totes will be sampled based on the disposal facility's requirements and may include the following analysis: VOCs via TCL USEPA Method 8260B and SVOCS using TCL USEPA Method 8270D.

3.5.3 Solid Waste Samples for Disposal

Excess solids will be sampled to determine proper disposal at a sampling frequency of one sample set per each 500 cubic yards (750 tons) to comply with most treatment, storage, and disposal facilities (TSDFs) sampling protocols. Each set of samples will be comprised of one discrete sample for VOCs analysis and one 5-point composite sample. The soils will be sampled based on a disposal facility's requirements and may include the following analytes: TCLP VOCs via TCL USEPA Method 8260B, TCLP SVOCS using TCL USEPA Method 8270D, and TCLP RCRA metals using TAL USEPA Methods 6010B and 7470A (mercury in water).

[1] The Site is seeking entry into the Brownfield Cleanup Program (BCP); the application was submitted to the NYSDEC on 25 September 2024

3.6 DISPOSAL FACILITIES

All wastes generated in the cleanup, demolition, and remediation of all contaminated environmental media at this facility (Former Adhesives Products Corporation) have to be disposed of as listed hazardous waste unless the facility obtains a contained-in determination from the NYSDEC to dispose of the waste as non-hazardous. The final recycling and/or disposal facilities have not been identified. Once these facilities have been selected, the NYSDEC will be notified of the proposed facilities and provided copies of the laboratory reports for the samples collected to arrange disposal.

The Clean Debris Rule is an Alternate Treatment Standard for Hazardous Debris (6 NYCRR Part 376.4 [g]) which may be pursued to decontaminate and dispose of hazardous waste concrete. Treatment requirements include the following:

1. Facility to decontaminate/power wash concrete slab using a minimum pressure level to remove at least 0.6 centimeters from the concrete surface. The RCRA Closure Plan must include equipment specifications.
2. Decontamination/power wash waste must be disposed of as hazardous waste.
3. Concrete can be disposed of as non-hazardous after a P.E. visually inspects the slab and certifies that the concrete surface has been removed, there are no more stained, rusted, and cracked areas, or that these areas have been disposed of as hazardous waste. A contained-in determination from the NYSDEC is not required even if the waste would have been Listed.
4. During the demolition phase, soil and fill material must be cleaned from the underside of the concrete slab sections before the slab can be disposed of as non-hazardous, otherwise the concrete slab will have to be disposed of as hazardous waste.

3.7 DECONTAMINATION PROCEDURES

After the third rinse of the areas that require decontamination, collect confirmation rinsate samples per the sampling protocol outlined in **Section 3.5.1**. If the laboratory results of the confirmation rinsate sample do not meet New York State Ground Water Effluent Limitations from Class GA Waters as found in 6 NYCRR Part 703.6, additional decontamination and rinsate sampling will be repeated until results do meet.

Additional decontamination of the interior of the equipment will be implemented utilizing a hot power washer and detergent as needed.

4. Quality Assurance and Quality Control

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

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

5. Project Organization

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

The NYSDEC Case Manager will be Jennifer Gonzalez**.** The NYSDEC Case Manager will be responsible for overseeing the successful completion of the project work and adherence to the RCRA Closure Plan on behalf of NYSDEC.

The NYSDOH Case Manager will be **PENDING**. The NYSDOH Case Manager will be responsible for overseeing the successful completion of the project work and adherence to the work plan on behalf of NYSDOH.

Suzanne M. Bell, P.E. will be the RE for this work. Ms. Bell is a professional engineer licensed by the state of New York. The RE will have primary direct responsibility for the implementation of the overall remedial program for the Site. The RE will certify that the remedial activities were observed by a QEP(s) under his supervision and that the remediation requirements set forth in the RCRA Closure Plan and any other relevant provisions of Environmental Conservation Law (ECL) 27-1419 have been achieved in conformance with the plan.

James M. Bellew will be the QEP and Principal-in-Charge for this work. Mr. Bellew has 15 years of experience in investigation and remediation in New York and throughout the eastern United States. In this role, Mr. Bellew will be responsible for the overall completion of each task as per the requirements outlined in this work plan and in accordance with the DER-10 guidance.

Mari C. Conlon, P.G., will be the Project Manager for this work. In this role, Ms. Conlon will manage the day-to-day tasks, including coordination and supervision of field engineers and scientists, adherence to the work plan, and oversight of the project schedule. As the Project Manager, Ms. Conlon will be responsible for communications with the NYSDEC Case Manager regarding project status, schedule, issues, and updates for project work.

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

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

The analytical laboratory will be Alpha Analytical of Westborough, Massachusetts, a New York Environmental Laboratory Approval Program (ELAP)-certified laboratory. Alpha Analytical will be responsible for analyzing samples as per the analyses and methods identified in Section 3.

6. Health and Safety

6.1 HEALTH AND SAFETY PLAN

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

6.2 COMMUNITY AIR MONITORING PLAN

The proposed RCRA Closure Plan work will be completed both indoors and outdoors at the Site. Where intrusive operations and/or decontamination work are planned, community air monitoring will be implemented to protect the downwind receptors. A Haley & Aldrich of New York representative will continually monitor the breathing air in the vicinity of the immediate work area using a PID to measure total VOCs in air at concentrations as low as 1 part per million (ppm). The air in the work zone also will be monitored for visible dust generation. Figure 2 shows the potential locations of fixed stations whereby station locations will be adjusted to have at least one upwind and two downwind stations during demolition work. Additional stations may be employed upon consultation with the NYSDEC and NYSDOH.

The Community Air Monitoring Plan (CAMP) will require continuous real-time monitoring for particulate matter less than 10 micrometers in size (PM-10) and VOCs at the downwind perimeters when ground intrusive activities, including soil/waste excavation, soil handling, test pit excavation and/or trenching, are in progress at the Site. The CAMP will be in accordance with DER-10 Appendix 1A, “New York State Department of Health Generic Community Air Monitoring Plan,” and Appendix 1B, “Fugitive Dust and Particulate Monitoring,” which are included as Appendix C. Upwind background concentrations will be determined each day prior to commencement of intrusive work. The CAMP aims to provide protection for residents in the designated work area and residents and sensitive receptors of the downwind community from potential airborne releases that directly result from the remedial construction activities conducted at the Site. Adherence to the monitoring action levels specified in the CAMP requires monitoring and, when necessary, corrective actions to abate emissions, and/or shutdown work. The CAMP also helps to confirm that work activities do not spread contamination off-Site through the air. In addition, visual and olfactory observations will be made to keep dust and odors at a minimum around the work areas. VOCs will be monitored using a PID (or previously approved alternative), and particulates will be monitored using TSI DustTrak Environmental Monitor (DustTrak) equipment (or previously approved alternative). Readings will be recorded every 15 minutes at the Site by field personnel.

The following actions will be taken based on monitoring of particulate concentrations:

- If the downwind PM-10 particulate level is 100 µg/m^3 greater than background for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 µg/m^3 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 µg/m^3 above the background level, work will be stopped, the NYSDEC and NYSDOH will be notified, and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

The following actions will be taken based on VOC monitoring:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels 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, the NYSDEC and NYSDOH will be notified, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 ft 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 ft, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down and the NYSDEC and NYSDOH will be notified.

6.3 ODOR, DUST, AND NUISANCE CONTROL PLAN

While the majority of RCRA Closure Plan work detailed herein will be conducted within the building prior to demolition, dust, odor, and nuisance controls will be accomplished by the remediation contractor as described in this section.

Odor Control

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used, if needed, will include the application of foam suppressants or tarps over the odor or VOC source areas. If nuisance odors are identified, work will be halted, and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. The NYSDEC and NYSDOH will be notified of odor events and other complaints about the project. Implementation of odor controls is the responsibility of the Contractor. Monitoring odor emission, including the halt of work, will be the responsibility of the RE or his/her designated representative.

Necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (a) direct load-out of soils to trucks for off-Site disposal; (b) use of chemical odorants in spray or misting systems; and (c) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, the NYSDEC and NYSDOH will be notified and, upon approval, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

Dust Control

A dust suppression plan, in accordance with Appendix 1B, "Fugitive Dust and Particulate Monitoring" from DER-10, that addresses dust management during ground-intrusive on-Site work will include, at a minimum: (a) use of a dedicated water distribution system, on-Site water truck for road wetting, or an alternate source with suitable supply and pressure for use in dust control; (b) use of gravel for on-Site roads to provide a clean and dust-free road surface; and (c) limiting the total area of on-Site roads to minimize the area required for water spraying.

Other Nuisances

A plan for rodent control will be developed and used by the remediation contractor during Site preparation (including clearing and grubbing) and remedial work. A plan for noise control will be developed and used by the remediation contractor during Site preparation and remedial work and will conform, at a minimum, to the NYCDEP noise control standards.

7. Reporting

7.1 DAILY REPORTING

Daily reports will be submitted to NYSDEC and NYSDOH summarizing the Site activities completed during the RCRA Closure Plan activities. Daily reports will include a Site figure, a description of Site activities, a photo log, and CAMP data. Daily reports will be submitted to the NYSDEC and NYSDOH Case Managers the following morning after Site work is completed.

7.2 SUMMARY REPORTING

In accordance with 6 NYCRR 373-3.7(f)(1), within 60 days of completion of closure of the former hazardous waste storage areas, the owner/operator will submit to NYSDEC by registered mail, a certification that the former hazardous waste storage areas were closed in accordance with the specifications of the approved RCRA Closure Plan. The owner/operator of the Site and an independent P.E. registered in the state of New York will sign the certification. Documentation supporting the certification will be provided in a Certification Report submitted with the certification. The report will include the following:

- a. Text describing closure activities
- b. Tables and figures summarizing the sampling and analytical data
- c. Appendices containing, at a minimum:
    - i. Meeting notes from the pre-closure meeting
    - ii. Daily reports
    - iii. Photographs and logbook
    - iv. Laboratory analytical results including QA/QC documentation
    - v. Documentation of all stages of waste generation, handling, and disposal
    - vi. An electronic copy of the deliverables package in PDF format

8. Schedule

Upon approval of the RCRA Closure Plan, the Site owner will implement closure activities described in this plan in accordance with the following schedule. If the laboratory results of the confirmatory samples indicate additional decontamination is required, the schedule will be updated accordingly.

ANTICIPATED CLOSURE ACTIVITIES SCHEDULE		
TASK	START DATE	END DATE
RCRA Closure Plan / QAPP Submission	September 2024	October 2024
30-Day Public Comment Period	November 2024	December 2024
NYSDEC Approval of RCRA Closure Plan	January 2025	February 2025
Decontamination of Facility Slab (if required based on visual inspection)	February 2025	March 2025
Demolition of Structure	March 2025	April 2025
RCRA Closure Report Submission	April 2025	May 2025

Notes:

1. *The NYSDEC will be notified at least three days prior to the start of any Site work outlined in this RCRA Closure Plan. If necessary, a pre-closure meeting will be held to address closure requirements in detail.*
2. *A notice in a local newspaper will be issued by facility ownership's team, providing the public with the opportunity to submit written comments on this RCRA Closure Plan and to request modifications to the plan within 30 days of the date of the public notice. The NYSDEC can only approve the RCRA Closure Plan after public comments have been acceptably addressed.*

In accordance with 6 NYCRR Part 373-3.7 (d) and the schedule above, implementation of the Closure Plan shall begin within 30 days following the receipt of approval of the Closure Plan by NYSDEC. Final closure shall be completed within 180 days after approval of the Closure Plan by NYSDEC. Within 60 days of final closure, the closure certification shall be sent to the NYSDEC that the Site has been closed in accordance with the specifications of the approved closure plan. Notification of partial closure and final closure must be made to the NYSDEC in accordance with 6 NYCRR Part 373-3.7 (c)(4). The notification must be made at least 45 days prior to the date on which the owner or operator expects to begin final closure of a facility with only tanks, container storage, or incinerator units.

9. References

1. Brownfield Cleanup Program Application. Former Adhesives Products Corporation. 1660 Boone Avenue, Bronx, New York. Prepared by H & A of New York Engineering and Geology LLP, prepared for The Vaja Group LLC for submission to the New York State Department of Environmental Conservation. Submitted in September 2024.

2. Brownfield Cleanup Program Application. Former Adhesives Products Corporation. 1660 Boone Avenue, Bronx, New York. Prepared by Impact Environmental, prepared for JJS Boone LLC for submission to the New York State Department of Environmental Conservation. Submitted in January 2020.

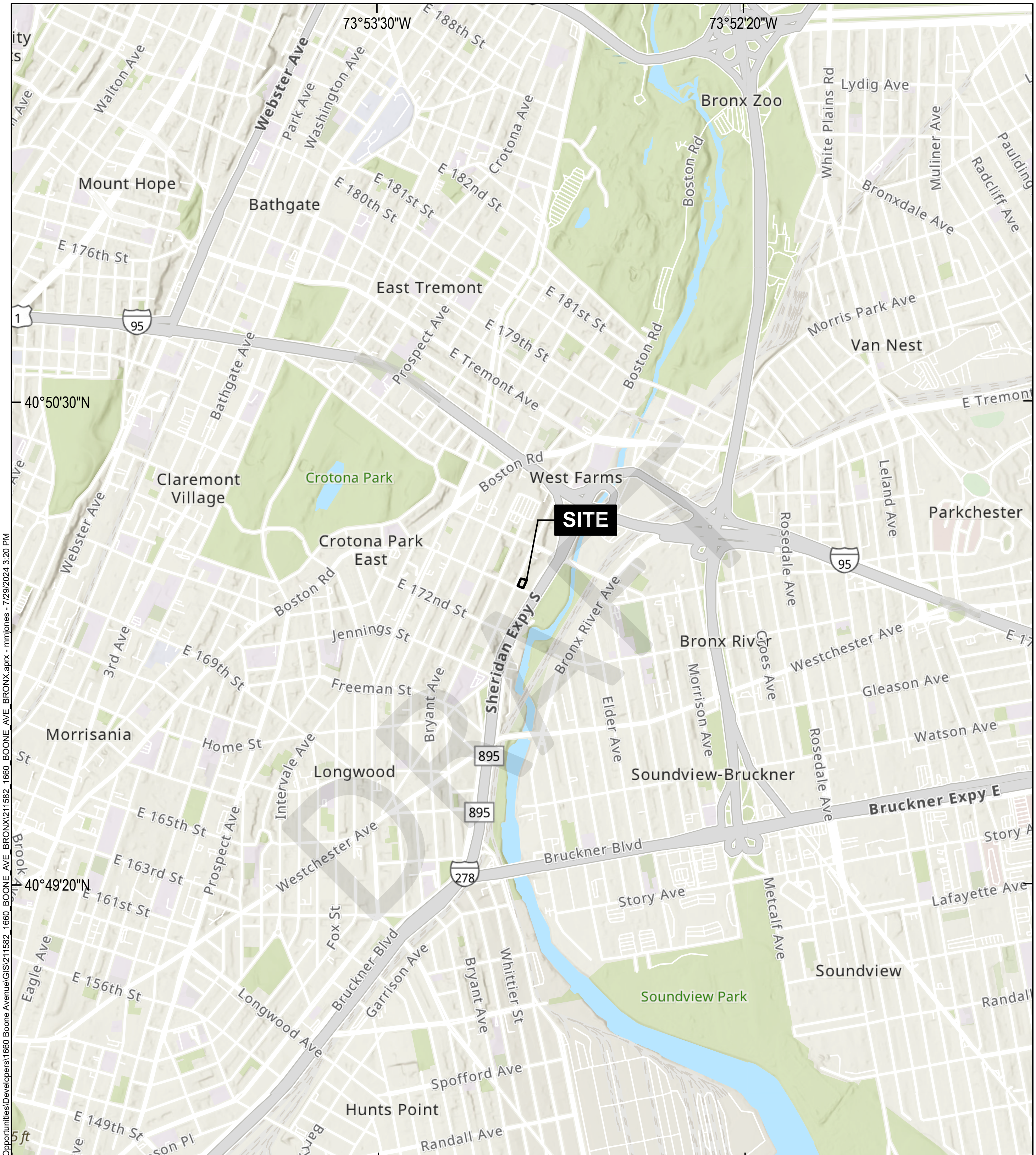
3. Phase I Environmental Site Assessment. 1660 Boone Avenue, Bronx, New York. Prepared by Equity Environmental Engineering, prepared for Andrew Esposito, 11 December 2018.

4. Phase I Environmental Site Assessment. 1660 Boone Avenue, Bronx, New York. Prepared by H & A of New York Engineering and Geology, LLP, prepared for The Vaja Group LLC, 23 September 2024.

5. Remedial Investigation Report. 1660 Boone Avenue, Bronx, New York. Prepared by Impact Environmental Closures, Inc., prepared for JJS Boone LLC, 28 August 2019.

6. Waste Characterization Report, prepared by Impact, prepared for Barone Management LLC, 30 July 2019.

FIGURES



GIS: \\haleyaldrich.com\share\CF\Groups\nyc\Proposal Opportunities\Developers\1660 Boone Avenue\GIS\211582_1660_BOONE_AVE_BRONX\211582_1660_BOONE_AVE_BRONX.aprx - mmjones - 7/29/2024 3:20 PM

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MAP SOURCE: ESRI
SITE COORDINATES: 40°50'04"N, 73°53'02"W

HALEY ALDRICH

1660 BOONE AVENUE
BRONX, NEW YORK

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
AUGUST 2024

FIGURE 1

LEGEND

SITE BOUNDARY

PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: BRONX COUNTY
3. AERIAL IMAGERY SOURCE: NEARMAP, 18 JUNE 2024

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

1660 BOONE AVENUE
BRONX, NEW YORK

SITE PLAN

JULY 2024

FIGURE 2

GIS FILE PATH: \\haleyaldrich.com\share\CF\Groups\nyc\Proposal Opportunities\Developers\1660 Boone Avenue\GIS\211582_1660_BOONE_AVE_BRONX\211582_1660_BOONE_AVE_BRONX.aprx - USER: mmjones - LAST SAVED: 7/29/2024 3:06 PM

APPENDIX A
Quality Assurance Project Plan

www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
1660 BOONE AVENUE
BRONX, NEW YORK

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

for
The Vaja Group LLC
23 Lorimer Street, 6th Floor
Brooklyn, New York 11206

File No. 0211582
September 2024

Executive Summary

This Quality Assurance Project Plan outlines the scope of the quality assurance and quality control activities associated with the Site sampling activities associated with the Resource Conservation and Recovery Act (RCRA) Closure Work Plan for the property located at 1660 Boone Avenue, Bronx, New York (Site).

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

Table of Contents

Page

Table of Contents

Page

Table of Contents

List of Tables

List of Attachments

1. Project Description

This Quality Assurance Project Plan (QAPP) has been prepared as a component of the Resource Conservation and Recovery Act (RCRA) Closure Work Plan for 1660 Boone Avenue, Bronx, New York (Site).

1.1 PROJECT OBJECTIVES

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

1.2 SITE DESCRIPTION AND HISTORY

The general Site description and Site history are provided in the Site Description and History Summary that accompanies the Remedial Investigation Work Plan (RIWP) appended to the Brownfield Cleanup Program (BCP) Application for the Site and incorporated herein by reference.

1.3 LABORATORY PARAMETERS

The laboratory parameters for rinsate samples include:

- Target Compound List (TCL) volatile organic compounds (VOCs) using U.S. Environmental Protection Agency (EPA) Method 8260B; and,
- TCL semi-volatile organic compounds (SVOCs) using EPA Method 8270C.

1.4 SAMPLING LOCATIONS

Rinsate sampling locations will be determined in accordance with the RCRA Closure Work Plan.

2. Project Organization and Responsibilities

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

2.1 PROJECT TEAM

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

NYSDEC* Case Manager	Jennifer Gonzalez
NYSDOH Case Manager	Pending
Qualified Environmental Professional (QEP)	James Bellew
Project Manager	Mari C. Conlon
Haley & Aldrich of New York** Health & Safety Director	Brian Fitzpatrick, CHMM
Health & Safety Officer (HSO)	Brian Ferguson
Quality Assurance (QA) Officer	Sarah Commisso
Third-Party Validator	Katherine Miller

**New York State Department of Environmental Conservation (NYSDEC)*
***H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York)*

2.2 MANAGEMENT RESPONSIBILITIES

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

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

2.3 QUALITY ASSURANCE RESPONSIBILITIES

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

2.3.1 Quality Assurance Officer

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

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

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

2.3.2 Data Validation Staff

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

2.4 LABORATORY RESPONSIBILITIES

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

2.4.1 Laboratory Project Manager

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

2.4.2 Laboratory Operations Manager

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

2.4.3 Laboratory Quality Assurance Officer

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

2.4.4 Laboratory Sample Custodian

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

- Receive and inspect the incoming sample containers;
- Record the condition of the incoming sample containers;
- Sign appropriate documents;
- Verify chain of custody and its correctness;
- Notify the Project Manager and Operations Manager of sample receipt and inspection;
- Assign a unique identification number and enter each into the sample receiving log;
- Initiate transfer of samples to laboratory analytical sections; and,
- Control and monitor access/storage of samples and extracts.

2.4.5 Laboratory Technical Personnel

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

2.5 FIELD RESPONSIBILITIES

2.5.1 Field Coordinator

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

Other responsibilities include the following:

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

2.5.2 Field Team Personnel

Field Team Personnel will be responsible for the following:

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

3. Sampling Procedures

The FSP in Appendix C of the RIWP provides the SOPs for sampling required by the RIWP. Sampling will be conducted in general accordance with the NYSDEC Technical Guidance for Site Investigation and Remediation (Division of Environmental Remediation [DER]-10) and the Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under the NYSDEC Part 375 Remedial Program (April 2023) when applicable. Proposed sample locations are shown on Figure 2 of the RIWP.

3.1 SAMPLE CONTAINERS

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

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

3.2 SAMPLE LABELING

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

Refer to the FSP (Appendix C of the RIWP) for the sample labeling procedures.

3.3 FIELD QC SAMPLE COLLECTION

3.3.1 Field Duplicate Sample Collection

3.3.1.1 Water Samples

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

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

3.4 GENERAL DECONTAMINATION PROCEDURES

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

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

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

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

4. Custody Procedures

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

A sample is under custody if:

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

4.1 FIELD CUSTODY PROCEDURES

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

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

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

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

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

4.1.1 Field Procedures

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

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

4.1.2 Transfer of Custody and Shipment Procedures

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

4.2 LABORATORY CHAIN OF CUSTODY PROCEDURES

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

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

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

4.3 STORAGE OF SAMPLES

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

4.4 FINAL PROJECT FILES CUSTODY PROCEDURES

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

The final project file will include the following:

- Project plans and drawings;
- Field data records;
- Sample identification documents and soil boring/monitoring well logs;
- All chain of custody documentation;
- Correspondence;
- References, literature;
- Laboratory data deliverables;
- Data validation and assessment reports;
- Progress reports, QA reports; and,

- A final report.

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

5. Calibration Procedures and Frequency

5.1 FIELD INSTRUMENT CALIBRATION PROCEDURES

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

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

5.2 LABORATORY INSTRUMENT CALIBRATION PROCEDURES

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

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

6. Analytical Procedures

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

6.1 FIELD ANALYTICAL PROCEDURES

Field analytical procedures include the measurement of pH, temperature, oxygen-reduction potential (ORP), dissolved oxygen (DO), and specific conductivity during sampling of groundwater, and the qualitative measurement of VOCs during the collection of soil samples.

6.2 LABORATORY ANALYTICAL PROCEDURES

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

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

6.2.1 List of Project Target Compounds and Laboratory Detection Limits

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

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

6.2.2 List of Method-Specific Quality Control Criteria

The laboratory SOPs include a section that presents the minimum QC requirements for the project analyses. Section 7.0 references the frequency of the associated QC samples for each sampling effort and matrix.

7. Internal Quality Control Checks

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

7.1 FIELD QUALITY CONTROL

7.1.1 Field Blanks

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

7.1.2 Trip Blanks

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

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

7.2 LABORATORY PROCEDURES

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

7.2.1 Field Duplicate Samples

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

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

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

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

7.2.2 Matrix Spike Samples

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

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

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

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

7.2.3 Laboratory Control Sample Analyses

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

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

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

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

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

7.2.4 Surrogate Compound/Internal Standard Recoveries

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

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

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

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

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

7.2.5 Calibration Verification Standards

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

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

7.2.6 Laboratory Method Blank Analyses

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

8. Data Quality Objectives

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

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

8.1 PRECISION

8.1.1 Definition

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

8.1.2 Field Precision Sample Objectives

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

8.1.3 Laboratory Precision Sample Objectives

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

8.2 ACCURACY

8.2.1 Definition

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

8.2.2 Field Accuracy Objectives

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

If non-dedicated sampling equipment is used, equipment rinse blanks will be collected by passing ASTM Type II water over and/or through the respective sampling equipment utilized during each sampling effort. One equipment rinse blank will be collected for each type of non-dedicated sampling equipment used for the sampling effort. Equipment rinse blanks will be analyzed for each target parameter for the respective sampling effort for which environmental media have been collected. (Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

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

8.3 LABORATORY ACCURACY OBJECTIVES

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

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

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

8.4 REPRESENTATIVENESS

8.4.1 Definition

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

8.4.2 Measures to Ensure Representativeness of Field Data

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

8.5 COMPLETENESS

8.5.1 Definition

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

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

8.5.2 Field Completeness Objectives

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

8.5.3 Laboratory Completeness Objectives

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

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

8.6 COMPARABILITY

8.6.1 Definition

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

8.6.2 Measures to Ensure Comparability of Laboratory Data

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

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

8.7 LEVEL OF QUALITY CONTROL EFFORT

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

If necessary, a separate equipment rinse blank sample will be collected for PFAS.(Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

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

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

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

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

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

9. Data Reduction, Validation, and Reporting

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

9.1 DATA REDUCTION

9.1.1 Field Data Reduction Procedures

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

9.1.2 Laboratory Data Reduction Procedures

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

9.1.3 Quality Control Data

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

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

9.2 DATA VALIDATION

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

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

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

9.3 DATA REPORTING

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

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

10. Performance and System Audits

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

10.1 FIELD PERFORMANCE AND SYSTEM AUDITS

10.1.1 Internal Field Audit Responsibilities

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

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

10.1.2 External Field Audit Responsibilities

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

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

10.2 LABORATORY PERFORMANCE AND SYSTEM AUDITS

10.2.1 Internal Laboratory Audit Responsibilities

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

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

10.2.2 External Laboratory Audit Responsibilities

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

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

Failure of any of the above audit procedures can lead to laboratory de-certification. An audit may consist of but not be limited to:

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

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

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

11. Preventive Maintenance

11.1 FIELD INSTRUMENT PREVENTIVE MAINTENANCE

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

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

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

11.2 LABORATORY INSTRUMENT PREVENTIVE MAINTENANCE

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

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

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

12.1 FIELD MEASUREMENTS

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

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

12.2 LABORATORY DATA

Laboratory data will be assessed by the Haley & Aldrich of New York QA Officer or designee who will review the laboratory results for compliance with the established QC criteria that are specified in Sections 7.0 and 8.0 of this QAPP.

13. Quality Assurance Reports

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

QA reports to management can include:

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

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

References

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

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

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

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

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

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

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

TABLE

TABLE I
SUMMARY OF ANALYSIS METHOD, PRESERVATION METHOD, HOLDING TIME, SAMPLE SIZE REQUIREMENTS AND SAMPLE CONTAINERS
1660 BOONE AVENUE
BRONX, NEW YORK

Analysis/Method	Sample Type	Preservation	Holding Time	Volume/Weight	Container
Volatile Organic Compounds/8260C/5035	Solid Waste	1 - 1 Vial MeOH/2 Vial Water, Cool, 4 ± 2 °C	14 days[1]	120 mL	3 - 40 mL Glass Vials
Semivolatile Organic Compounds/8270D	Solid Waste	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Metals/6010C	Solid Waste	Cool, 4 ± 2 °C	180 days	60 mL	1 - 2 oz Glass
Volatile Organic Compounds/8260B	Rinsate	HCl, Cool, 4 ± 2 °C	14 days	120 mL	3 - 40 mL Glass Vials
Semivolatile Organic Compounds/8270C	Rinsate	Cool, 4 ± 2 °C	7 days	500 mL	2 - 250 mL Amber Glass

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

ATTACHMENT A
Project Team Resumes

JAMES BELLEW

Principal

EDUCATION

M.S., Environmental Geology, Queens College
B.S., Geology, Pre-Law, Environmental Science, Binghamton University

PROFESSIONAL SOCIETIES

American Council of Engineering Companies, Member, 2017
Urban Land Institute, Member, 2016
Business Council of New York, Member, 2018

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
30-Hour OSHA Construction Safety and Heath
8-hour OSHA Site Supervisor Certification
OSHA Confined Space Entry Training Certification
Erosion and Sediment Control, New York, No. 006925
USDOT/IATA Training on the Shipping and/or Transportation of Hazardous Materials

James has a hands-on approach to every project. He believes that being present and putting himself into his clients' shoes is the best way to understand their needs. As a Principal, James' expertise includes due diligence, environmental risk development, building surveys, remedial investigations, remedial design, and technical oversight. Mr. Bellew has completed over 50 New York City Office of Environmental Remediation (NYCOER) E-Designation Sites and New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Sites which include preparation of all reports through the certificate of completion and a certificate of occupancy.

Clients appreciate James' strategies from the inception of a project through closure under various regulatory programs nationwide. That comprehensive approach is what James loves the most about his job. He enjoys taking on complex projects and finding rational, cost-effective, remedial solutions. His biggest reward? When he can bring a client cost relief through value engineering.

RELEVANT PROJECT EXPERIENCE

Development, NYCDDC Shirley Chisholm Recreational Center, Brooklyn, New York. Principal for the project released by the New York City Department of Design and Construction (NYCDDC), on behalf of the NYC Parks Department, for the design and construction of a new recreational center located at 3002 Foster Avenue in Brooklyn, New York. Scope of services included execution of a Phase II Environmental Site Assessment (ESA), soil characterization, remedial oversight, geotechnical percolation testing, and closure with the New York City Department of Environmental Protection (NYCDEP).

Developments, New York State Superfund Site, Former NuHart Plastics Site, New York State Superfund Site (NuHart West) and BCP Site (NuHart East), Brooklyn, New York. Principal for the preparation of the feasibility study, offsite investigation reports, Resource Conservation and Recovery Act (RCRA) Closure Work Plan, execution of the RCRA Closure, preparation of the Brownfield Cleanup Application (NuHart East), 100% Remedial Design, preparation of all BCP-related work plans (NuHart East), coordination to vest the site for 421-a and all community outreach programs for a former plasticizer facility with on- and off-site pollutant concerns. Responsible for all remedial costs and alternative analyses with the client to bring the site to a certificate of completion. NuHart is a high-profile site that requires coordination with the NYSDEC, the NYCOER, local regulatory agencies, community stakeholders, and local elected officials. The NuHart East Site has completed the remediation and received the Certificate of Completion with the NYSDEC and the NuHart West Site is close to completion with an anticipated 2024 transition from a Class 2 to a Class 4 Inactive Hazardous Waste Site.

Developments, 101 Fleet Place, Brooklyn, New York. Principal responsible for the due diligence during acquisition, preparation of the BCP Application, Change of Use Documents, Brownfield Cleanup Agreement (BCA) Amendments, remedial investigation, and remedial action design (BCP and NYCOER) for a former bus depot site under the New York State BCP and NYCOER E-Designation Programs (Air/Noise). The Site has a footprint of 20,000 square feet (sq ft) with a planned development of a 21-story mixed-use building with approximately 292 units which include affordable housing.

Developments, Speedway Portfolio, Multiple Boroughs, New York. Principal responsible for the expedited due diligence during the acquisition of five former Speedway Sites of Phase I ESAs and Limited Phase II Environmental Site Investigations (ESIs), preparation of the BCP Applications, Remedial Investigation Work Plans, Interim Remedial Measure Work Plans and Air/Noise Remedial Action Work Plans (NYCOER). Five of the sites were accepted into the NYSDEC BCP. Remedial Investigations for compliance with the BCP have been completed and the remedial designs on the sites include a variety of remedial approaches which include in situ chemical treatment for groundwater, soil vapor extraction, excavation, and dewatering removal and treatment.

Development, 138 Bruckner Boulevard, Bronx, New York. Principal responsible for the due diligence during acquisition, preparation of the BCP Application, Change of Use Documents, coordination to vest the site for 421-a, BCA Amendments, remedial investigation, and remedial action design (BCP and NYCOER) for the former Zaro's Bakery Site under the New York State BCP and NYCOER E-Designation Programs (Air/Noise). The Site has a footprint of 50,000 sq ft with a planned development of a 12-story mixed-use building with approximately 447 units which include affordable housing.

Development, 310 Grand Concourse, Bronx, New York. Principal responsible for environmental and construction management services required to successfully navigate this two-building redevelopment project through the NYSDEC BCP and NYCOER E-Designation Program (Air/Noise). Project included site investigation, design, and remediation for development of two buildings within a 30,000-sq-ft lot in the Bronx, New York. Remediation included excavation of approximately 20,000 cubic yards (cu yd) of soil, groundwater extraction and treatment, underground storage tank (UST) removal, design, and installation of an ex-situ chemical in situ soil stabilization process for elevated levels of metals.

Development, 40 Bruckner Boulevard, Bronx, New York. Principal responsible for the due diligence during acquisition, preparation of the BCP Application, Change of Use Documents, BCA Amendments, remedial investigation, and remedial action design (BCP and NYCOER) for the former Mill Sanitary Wiping Cloth Site under the New York State BCP and NYCOER E-Designation Programs (Air/Noise). The Site has a footprint of 45,000 sq ft with a planned development of a 12-story mixed-use building with approximately 480 units which include affordable housing.

Development, 297 Wallabout Street, Brooklyn New York. Principal responsible for the due diligence during acquisition, preparation of the BCP Application, Change of Use Documents, BCA Amendments, remedial investigation, and remedial action design (BCP and NYCOER) for the 297 Wallabout Street site under the New York State BCP and NYCOER E-Designation Programs (Air). Successfully delineated the on-site tetrachloroethene (PCE) plume in soil and groundwater. The site is currently in the remedial implementation phase.

Developments, 89-91 Gerry & 93 Gerry Street, Brooklyn New York. Principal responsible for the due diligence during acquisition, preparation of the BCP Application, Change of Use Documents, BCA Amendments, remedial investigation, and remedial action design (BCP and NYCOER) for two sites (adjacent to each other) located at 89-91 Gerry Street and 93 Gerry Street under the New York State BCP and NYCOER E-Designation Programs (Air). The sites are currently preparing to execute the remedial action.

Development, Former Techtronics Site (8 Walworth Street), Brooklyn, New York. Principal for the remedial investigation, remedial action design, and remedial action implementation for the former Techtronics Site under the New York State BCP as a Participant where trichloroethene (TCE) and PCE were encountered in soil and groundwater. James successfully delineated the vertical and lateral extents of the plumes which were identified as upgradient, on-site. For this site we have designed source removal to 20 feet (ft) below ground surface (bgs), Zero Valent Iron (ZVI)

Reactive Barrier Wall, in situ ZVI injections sitewide, and a vertical vapor mitigation system. The site is currently in the remedial implementation phase.

Development, 346 Grand Concourse, Bronx, New York. Principal for the proposed nine-story, 60-key commercial building with a one-level deep cellar. Design phase environmental services consist of guiding the Site through the NYCOER Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality, and Noise requirements. This program included the submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise), and the Final Installation Report for the Certificate of Occupancy.

Development, 3294 Atlantic Avenue, Brooklyn, New York. Principal for the proposed 12-story, 80-key commercial building with a one-level deep cellar. Design phase environmental services consist of guiding the site through the NYCOER Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality, and Noise requirements. This program included the submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise), and the Final Installation Report for the Certificate of Occupancy.

590-594 Myrtle Avenue, Brooklyn, New York. Principal for the proposed six-story, 12-unit residential building with a one-level deep cellar. Design phase environmental services consist of guiding the site through the NYCOER Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality, and Noise requirements. This program included the submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise), and the Final Installation Report for the Certificate of Occupancy.

Development, 3530 Webster Avenue, Bronx, New York. Principal for the proposed eight-story, 75-key commercial building with a one-level deep cellar. Design phase environmental services consist of guiding the site through the NYCOER Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality, and Noise requirements. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, and Remedial Action Work Plans (Hazmat Air and Noise). The project is currently in the construction phase of the NYCOER program.

Development, Former BP Station, Elmhurst Queens, New York. Principal for the preparation of a full environmental impact statement with respect to a mixed-use development proposed in Elmhurst Queens for submission to the New York City Department of City Planning to rezone the project. The work included a full impact assessment of the proposed construction with respect to the neighborhood, evaluation of green/open spaces for the community, and environmental site investigation and remediation services.

New York State Brownfield Site, Former Delta Metals Site, Brooklyn, New York. Senior Project manager for the remedial investigation and remedial action design for the former Delta Metal Products Company. Project is under the New York State BCP as a Participant where TCE and PCE were encountered in soil and groundwater. James successfully delineated the vertical and lateral extents of the plumes which were identified as an upgradient, on-site, and downgradient plume. Investigation results triggered the NYSDEC to utilize its call-out contract to perform a plume trackdown for the immediate area and identify additional Potentially Responsible Parties. The design for an Air Sparge Soil Vapor Extraction system has been accepted and the project is currently under construction.

Manufacturing-Industrial, Hess Amerada, Bogota and Edgewater, New Jersey. Senior Project Manager and Technical Lead for the construction management services for the demolition of two waterfront terminals on the Hackensack and Hudson Rivers. Services included demolition design, submittal review, site execution, and coordination of activities related to asbestos abatement, demolition of buildings, thirty holding tanks, piping structures, containment structures, and stormwater structures.

Manufacturing-Industrial, PQ Corporation, Northeastern United States. Senior Project Manager responsible for the design and implementation of a three-phased program for handling polychlorinated biphenyl (PCB)-containing materials on approximately 100 tank structures at large, active industrial sites, which included coating removal, encapsulation, demolition, and Toxic Substances Control Act (TSCA) remediation. He was responsible for development of the overall program, specifications, drawings, bid packages, construction oversight, and project administration until closure. The program also included the design and oversight of a new façade and roof upgrades completed concurrently with client operations.

Development, New York State Brownfield Site, Former Cascade Laundry, Brooklyn, New York. Senior Project Manager responsible for environmental and construction management services required to successfully navigate a seven-building redevelopment project through the NYSDEC BCP and NYCOER E-Designation Program (Air/Noise). Project included site investigation, design, and remediation for development of seven buildings within a 2-acre site in Brooklyn, New York. Remediation included excavation of approximately 40,000 cu yd of soil, groundwater extraction and treatment, UST removal, design, and installation of a sub-slab depressurization system (SSDS), and ex situ chemical oxidation of groundwater impacted by petroleum.

Development, New York City Brownfield Site - 520-534 West 29th Street, New York, New York. James was responsible for environmental site investigation and remediation activities required to successfully navigate the project through the NYCOER's E-Designation and Voluntary Cleanup Programs. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, and Remedial Action Work Plans (Hazmat Air and Noise). The project is currently in the construction phase of the NYCOER program.

Development, New York State Brownfield Site, BJ's Wholesale, Brooklyn, New York. Senior Project Manager for the remedial execution within the NYSDEC BCP and NYCOER E-Designation programs at an 8-acre peninsula in Gravesend Bay being redeveloped by BJ's Wholesale Club (BJ's) into a "big-box" warehouse and parking garage, and a publicly accessible, waterfront open space. He implemented a comprehensive Community Air Monitoring Plan (CAMP), managed the design and installation of a passive SSDS, and oversaw handling and off-site disposal of impacted material generated by BJ's (the Lessee for the subject site) during their foundation construction activities.

Development, New York State Brownfield Site, Coney Island, Brooklyn, New York. Senior Project Manager responsible for the environmental design during the rehabilitation and expansion of a 1970s-era mixed-use complex, which covers an area equivalent to three city blocks. He facilitated the BCP applications for two adjacent parcels within the complex impacted by historic dry-cleaning uses. Site investigations performed had documented the presence of PCE in soil gas and were delineated over three separate structural slabs in commercial and residential space utilizing a mobile laboratory. He designed and installed two SSDS and prepared a Remedial Investigation Work Plan which outlined the work required to delineate the vertical and horizontal extent of the impacted soils, soil vapor, and groundwater at both BCP sites. The system was designed with below slab suction pits, remote sensing vacuum monitoring points, and a variable frequency drive blower tied into the monitoring points for optimization and power savings.

Development, New York City Brownfield Site, Hospitals, Memorial Sloan Kettering Cancer Center (MSKCC), New York, New York. Project Manager for environmental remediation for this MSKCC development project. James was solely responsible for subsurface investigation and remediation activities, large, manufactured gas plant (MGP) gas holder removal (from former Con Edison Operations), UST removal, daily status updates to the NYCOER, implementation of the CAMP and the management, handling, characterization, and off-site disposal of MGP-impacted soil and dewatering fluids.

New York State Spill Remediation, Metropolitan Transportation Agency Bridges and Tunnels, New York, New York. Project Manager responsible for the execution of a remedial action scope which included UST removal, excavation of 600 cu yd of petroleum-impacted soil, design and installation of a groundwater extraction and treatment system, and post-remediation samples. He implemented the In Situ Chemical Oxidation program for the injection of 54,000 gallons of 8 percent solution Fenton's Reagent and the Operation and Maintenance (O&M) of the petroleum spill with respect to Fenton's performance and the plume migration.

Various Public Schools, New York City School Construction Authority, New York, New York. Project Manager responsible for environmental remediation proposed for several school development sites, including P.S. 312, P.S. 281, and P.S. 27K. Assisted in the design and implementation of the remediation programs for the sites for petroleum spills, PCB TSCA contamination, and hazardous lead hot spots.

Development, i.Park Edgewater, Edgewater, New Jersey. Project Manager responsible for the design and environmental remediation on-site. Implemented the construction plan for remediation of arsenic, pitch- and PCB-impacted soil for excavation and off-site disposal of 20,000 tons. He managed the air monitoring system on-site which consisted of four permanent stations set upwind and downwind on-site for volatile organic compounds (VOCs) and particulate migration off-site. Also, James performed redesigns throughout the project to keep within the current schedule and budget.

Development, New York State Brownfield, Queens West, Long Island City, New York. Project Manager responsible for oversight of the Environmental Remediation on-site. James implemented the construction plan for remediation of 20,000 cu yd of light non-aqueous phase liquid (LNAPL) on the site; he assisted in the design and oversight of the In Situ Chemical Oxidation mixing on-site. The project was eventually developed into three large towers and a new school.

MGP, National Grid, Rockaway, New York. James aided in the design and implementation of the soil characterization plan for MGP-impacted sands. After delineation of the contamination plume, drafted work plans and site layout of the negative pressure tent. He performed and trained the on-site staff on the use of personal air monitoring equipment and aided with design considerations on the installation of a waterloo barrier to be advanced to minus 80 ft below grade surface. James also helped with the design and permitting for the groundwater treatment system installed on-site.

MGP, Con Edison, New York, New York. Environmental engineer for responsible party for all environmental issues associated with this job, including transportation and disposal of 8,000 tons of MGP-contaminated soil from former Con Edison operations. James scheduled weekly work for all civil and environmental tasks on the job. He was responsible for the design and installation of the dewatering treatment system with a daily discharge of 25,000 gallons per day of MGP-impacted water.

New York State Superfund Project, NYSDEC, Hicksville, New York. James performed O&M and reporting on the site's Potassium Permanganate Injection System, which was on a timed system; maintaining the system, troubleshooting problems and ensuring that the proper ratios were being injected. He performed the fieldwork for analysis and drafted interim reports for the project manager.

Retail Petroleum, New York State Spills Program, Hess Amerada, Various Locations, New York. Environmental Engineer responsible for the design and installation of groundwater and soil vapor remedial systems at over 30 retail petroleum stations for Hess. Responsible for ensuring that the remedial systems were operating properly and performing repairs as necessary during operation. He performed groundwater and soil vapor monitoring and drafted O&M reports for the NYSDEC. Plume size ranged from within the retail station property with monitoring off-site impacts in local neighborhoods greater than a 3-mile radius.

Retail Petroleum, New York State Spills Program, British Petroleum (BP), Various Locations, New York. Environmental Engineer responsible for the design and installation of groundwater and soil vapor remedial systems at over 10 retail petroleum stations for BP. He was responsible for ensuring that the remedial systems were operating properly and performing repairs necessary during operation. He performed groundwater and soil vapor monitoring and drafted O&M reports for the NYSDEC. Plume size ranged from within the retail station property with monitoring off-site impacts in local neighborhoods greater than a 2-mile radius.

Development, 524 West 19th Street, New York, NY (Metal Shutter Homes). Project Engineer for responsible party for all environmental and civil issues associated with this job, including transportation and disposal of 5,000 tons of MGP-contaminated soil from former Con Edison operations. James scheduled weekly work for all civil and environmental tasks on the job. He successfully redesigned the grout cutoff wall connections to the installed steel sheeting with a secant wall installed off-site. He provided technical guidance for drilling 4-ft-diameter exploratory casings for subsurface anomalies. Additionally, James was responsible for the design and installation of the dewatering treatment system with a daily discharge of 25,000 gallons per day of MGP-impacted water.

U. S. Environmental Protection Agency (EPA) Superfund Site, Newtown Creek Superfund, Brooklyn, New York. Environmental Engineer who aided in the design of the pump and treat system installed at Peerless Importers. He also aided in the design and installation of the harbor boom setup. Operated and maintained groundwater/LNAPL extraction systems on-site and performed monthly site gauging as part of the O&M plan.

MARI C. CONLON

Senior Client Account Manager

EDUCATION
MS, Geology, Boston College
BS, Geology with a minor in Economics and Business, Lafayette College

PROFESSIONAL REGISTRATIONS
NY: Professional Geologist (License No. 000769)

PROFESSIONAL SOCIETIES
Big Apple Brownfield Awards, Co-Chair, 2018-2019
Big Apple Brownfield Awards Nomination Committee, 2016-2017

SPECIAL STUDIES AND COURSES
40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
10-Hour OSHA Construction Safety
8-Hour OSHA Supervisor of Hazardous Waste (29 CFR 1910.120 & 29 CFR 1926.65)

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

Mari has experience in composing site closure documentation including Remedial Closure Reports and Noise Installation Reports reviewed by the Office of Environmental Remediation as well as Final Engineering Reports reviewed by the New York State Department of Environmental Conservation. Her background includes developing and complying with approved site management plans overseeing the operation and maintenance of on-site engineering controls and ensuring the protection of human health and the environment.

Mari has also worked on city rezoning proposals by performing work associated with and composing the Hazardous Materials Analysis chapter included in Final Environmental Impact Statements published by New York City Department of Planning. Analysis methods were performed in accordance with the City Environmental Quality Review (CEQR) guidelines for neighborhoods including East New York, Brooklyn, Jerome Avenue, Brooklyn, Inwood, and Manhattan.

RELEVANT PROJECT EXPERIENCE

State and City Agencies

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

Department of City Planning, Rezoning Environmental Impact Statement, Bronx, New York. Project lead for analysis and composing the Hazardous Materials Chapter as per City Environmental Quality Review (CEQR) Technical Manual guidelines included in the Final Environmental Impact Statement (FEIS) for an approximately 92-block area primarily along Jerome Avenue and its east-west commercial corridors in the Bronx. The review assessed the potential for the presence of hazardous materials in soil and/or groundwater at both the projected and potential development sites identified in the reasonable worst-case development scenario under the proposed East New York Rezoning Proposal. Procedures involved site inspections and review of historic Sanborn fire insurance maps, city directories and city/state regulatory databases. The assessment identified that each of the 146 projected and potential development sites has some associated concern regarding environmental conditions. As a result, the proposed zoning map actions include (E) designations (E-366) for all privately-held projected and potential development sites.

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

Redevelopment and Remediation

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

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

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

Queens West Development Corporation, Queens Waterfront Development, Long Island City, New York. Field geologist for performance of site management post remedial action. Services included annual groundwater monitoring, evaluation of engineering and institutional controls completion and Period Review Reports. In addition to conducting annual site management activities, responsibilities included composing a work plan to evaluate the transition from active sub-slab depressurization systems to passive. Upon NYSDEC approval, active systems were shut down for 30 days prior to a sub-slab vapor sampling event evaluation soil vapor, indoor and outdoor air conditions for potential vapor intrusion risk. As results indicated no evidence of vapor intrusion, continued pressure monitoring was conducted for from the existing monitoring ports for one year assessing whether negative pressure was held by the existing slab by stack-effect or other passive processes.

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

Due Diligence and Site Characterization

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

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

Spill Consulting

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

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

BRIAN FITZPATRICK, CHMM

Corporate Director, Health and Safety

EDUCATION

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

CERTIFICATIONS

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

PROFESSIONAL SOCIETIES

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

SPECIAL STUDIES AND COURSES

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

AWARDS

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

Brian has over 25 years of experience in developing, implementing, and managing a wide range of environmental, health, and safety (EH&S) solutions for a variety of clients. Brian has served as the Health and Safety Manager and Incident Commander at several research and development sites and has managed extensive programs to maintain and clean contaminated sites under Federal and State regulatory programs. He has provided expertise in managing EH&S programs as a consultant, and has actively developed, implemented, and managed these programs as an EH&S professional for various industries.

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

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

RELEVANT PROJECT EXPERIENCE

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

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

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

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

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

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

BRIAN A. FERGUSON

Senior Engineer

EDUCATION

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

PROFESSIONAL SOCIETIES

Order of the Engineer – 2000
Boston Society of Civil Engineers (BSCE)
American Society of Civil Engineers (ASCE)

SPECIAL STUDIES AND COURSES

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

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

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

RELEVANT PROJECT EXPERIENCE

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

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

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

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

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

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

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

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

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

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

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

Harvard Law School, Cambridge, MA. The Harvard Law School project is located on Massachusetts Avenue in Cambridge. The project consisted of a multistory building above ground with 5 levels below ground for a parking garage. Field Representative was responsible for overseeing the installation of slurry walls into bedrock and LBEs with three installation rigs while monitoring the removal of urban fill and transfer to several different receiving facilities from another portion of the site. The slurry walls were constructed into bedrock. Other Field Representative activities were: testing of the slurry, management of the excavated soils, and record keeping of the Contractor's obstruction and down time of the equipment. In addition, assisted with weekly project meetings, maintaining a record of obstruction and machine time, and providing weekly field reports.

HALEY ALDRICH

SARAH COMMISSO, GIT

Assistant Project Manager

EDUCATION

B.S., Geological Sciences with a minor in Chemistry, State University of New York-Binghamton

PROFESSIONAL REGISTRATIONS

2021/ NY: Geologist in Training (GIT) Certification

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour OSHA HAZWOPER Refresher Training
10-Hour OSHA Construction Safety Training
8-Hour DOT Hazmat Employee & RCRA Hazardous Waste Generator Training

Sarah is a geologist with experience in soil, groundwater, and soil vapor investigation, and preparation of technical reports. She also has extensive experience with conducting Phase I Environmental Site Assessments (ESAs) and Phase II Environmental Site Investigations (ESIs), site characterization, and hazardous materials analysis. She has performed soil, groundwater, and soil vapor sampling events, geotechnical drilling projects, and has drafted site investigation plans and reports.

RELEVANT PROJECT EXPERIENCE

Environmental Experience

Madison Realty Capital, New York State Superfund Site, Former NuHart Plastics Site, New York State Superfund Site (NuHart West) and Brownfield Cleanup Program (BCP) Site (NuHart East), Brooklyn, New York. Sarah served as a staff geologist for the preparation of offsite investigation reports, Resource Conservation and Recovery Act (RCRA) Closure Work Plan, execution of the RCRA Closure, preparation of the BCP Application (NuHart East), 30% Remedial Design, preparation of all BCP related work plans (NuHart East), coordination to vest the Site for 421-a and all community outreach programs for a former plasticizer facility with on- and off-site pollutant concerns. She was responsible for assisting in the remedial cost and alternative analysis with the client to bring the site to a certificate of completion. NuHart is a high-profile site that requires coordination with the New York State Department of Environmental Conservation (NYSDEC), the New York City Office of Environmental Remediation (NYCOER), local regulatory agencies, community stakeholders, and local elected officials.

The Jay Group, Speedway Portfolio, Multiple Boroughs, New York. As staff geologist, Sarah was responsible for the expedited due diligence during the acquisition of five former Speedway Sites of Phase I ESAs and Limited Phase II ESIs, preparation of the BCP Applications, Remedial Investigation Work Plans, Interim Remedial Measure Work Plans and Air/Noise Remedial Action Work Plans (NYCOER). Four of the sites were accepted into the NYSDEC BCP with one currently pursuing the program pending the acquisition. Remedial investigations for compliance with the BCP have been completed and the Remedial Investigation Reports are being drafted.

JCS Realty, 40 Bruckner Boulevard, Bronx, New York. As staff geologist, Sarah was responsible for the due diligence during acquisition, preparation of the BCP Application, Change of Use Documents, Brownfield Cleanup Agreement (BCA) Amendments, remedial investigation, and remedial action design (BCP and NYCOER) for the former Mill Sanitary Wiping Cloth Site under the New York State BCP (NYSBCP) and NYCOER E-Designation Programs (Air/Noise). The site has a footprint of 45,000 square feet (sq ft) with a planned development of a 12-story mixed-use building with approximately 480 units which include affordable housing.

Toldos Yehuda, Former Techtronics Site (8 Walworth Street), Brooklyn, New York. Sarah served as staff geologist for the remedial investigation, remedial action design, and remedial action implementation for the former Techtronics Site under the NYSBCP as a participant where trichloroethene (TCE) and tetrachloroethene (PCE) were encountered in soil and groundwater. Successfully delineated the vertical and lateral extents of the plumes which were identified as an upgradient, on-site. For this site, we have designed source removal to 20 feet (ft) below ground surface, zero valent Iron (ZVI) reactive barrier wall, in situ ZVI injections sitewide, and a vertical vapor mitigation system. The site is currently in the remedial implementation phase.

Waterfront Management of NY, 590-594 Myrtle Avenue, Brooklyn, New York. As lead field geologist, Sarah was responsible for the oversight of the excavation and remediation of the property under the NYCOER. During remediation, Sarah observed and documented the excavation and proper disposal of on-site soil required for the installation of foundation elements. In addition, she oversaw the proper cleaning and removal of three underground storage tanks (USTs) encountered during site-wide excavation. After excavation was complete, she inspected the installation of a sub-slab vapor barrier and conducted the community air monitoring program during the course of remedial action.

Madison Realty Capital, 644 East 14th Street, New York, New York. Sarah is the lead drafter of the Remedial Investigation Work Plan and the Remedial Investigation Report for the site, which is enrolled in the NYSDEC BCP. She coordinated field staff and subcontractors for the execution of the Remedial Investigation Work Plan which included installation of soil borings, groundwater monitoring wells, and soil vapor points, and sampling of each.

Madison Realty Capital, River North, Staten Island, New York. Sarah coordinates field staff and subcontractors for the execution of the remedial investigation at this approximately 2-acre site enrolled in the NYSDEC BCP. The remedial investigation involved the installation of approximately 50 soil borings, 20 soil vapor points, including soil borings extending to bedrock.

Oxford Property Group, Naval Yard Phase I Portfolio. Sarah conducted two of five Phase I ESAs for Oxford Property Group in the Philadelphia Naval Yard as part of due diligence for potential acquisition of the properties. Each property was approximately 8 acres in size and developed with active life sciences facilities. Sarah conducted site reconnaissance of the properties and reviewed historical site documentation to identify recognized environmental conditions (RECs) at each site.

Target, Multiple Locations, New York and New Jersey. Sarah conducted Phase I ESAs as part of due diligence for the potential acquisition of properties by Target in Jersey City, performed oversight of upgrades and construction at various Target stores in Brooklyn, Queens, Long Island, and Jersey City, including methane monitoring, air monitoring, collection of endpoint soil samples, and groundwater sampling. Sarah performed all oversight work in accordance with the site-specific Soil Materials Management Plan.

BCP Applications and Remedial Investigation Work Plans for NYSDEC. Sarah has completed writing several BCP Applications for various clients in New York State. In writing the applications, Sarah reviews previous subsurface investigations of the site, and historical information to help get underutilized and abandoned contaminated properties into the BCP to be remediated and redeveloped under NYSDEC. After completing the application, she prepares a Remedial Investigation Work Plan to strategically investigate site contamination so proper remedial action can take place.

Excavation Oversight and Community Air Monitoring Plan (CAMP) Monitoring, Various Sites, Bronx and Brooklyn, New York. Sarah served as field geologist for several projects under the NYCOER program and NYSBCP. Her responsibilities included performing excavation oversight, air monitoring, vapor barrier installation oversight, and logging trucks for off-site disposal.

Multiple Clients, Phase I ESAs and Due Diligence, Multiple Locations in New York, New Jersey, Pennsylvania, and Massachusetts. Sarah conducted Phase I ESAs, for buyers on a variety of properties, including commercial, industrial, and residential sites in New York, New Jersey, Pennsylvania, and Massachusetts. She has experience conducting site reconnaissance and reviewing historical site documentation to identify RECs at the sites.

Multiple Clients, Phase II, Multiple Locations, New York. As field geologist, Sarah conducted Phase II ESAs on a variety of different sites. She assisted with the development of sampling plans primarily based on previous environmental investigations and due diligence. Primary responsibilities for Phase II investigations included oversight of the installation of test borings and/or test pits, the installation of groundwater monitoring wells, and soil vapor points.

Geotechnical Engineering Experience

Smithsonian Institution Revitalization of the Historic Core, Washington, D.C. Sarah supported a team providing geotechnical engineering services for the renovation of several Smithsonian Institution buildings adjacent to the National Mall. Sarah was responsible for the oversight of geotechnical borings using hollow stem augur and mud rotary techniques as well as rock coring operations. Sarah classified soil samples using the Unified Soil Classification System, analyzed bedrock samples, and analyzed the geology of the Washington D.C. area.

Parcel B Development, Washington, D.C. Sarah was the lead field geologist for the geotechnical investigation for the development of the Parcel B Site adjacent to the D.C. United Stadium in Washington D.C. Sarah was responsible for the oversight of geotechnical borings using hollow stem auger and mud rotary techniques. She observed and coordinated pressure meter testing of several borings and observed the installation of several groundwater monitoring wells to investigate impacted groundwater on the property. Additionally, based on her soil classifications in the field, she drafted boring logs and analyzed subsurface conditions at the site.

HALEY ALDRICH

KATHERINE R. MILLER

Project Manager

EDUCATION

B.S., Chemistry, University of Arizona

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120 and 40 CFR 265.16)

8-Hour OSHA Refresher Training (29 CFR 1910.120)

Level IV Data Validation Training

AWARDS

Pinnacle Award, 2009

Pathfinder Award, 2014

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

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

RELEVANT PROJECT EXPERIENCE

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

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

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

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

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

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

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

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

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

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

APPENDIX B
Rinsate Sample Collection Protocol

Attachment A

Rinsate Sample Collection Protocol

This procedure is intended to be used to collect samples for analysis of concrete floors, secondary containment areas and sumps, including surfaces that have been coated, to establish whether or not there is any contamination on the concrete surfaces. This procedure is to be performed after the surfaces have been cleaned and decontaminated pursuant to the approved closure plan. This procedure may also be suitable for use on other surfaces on a case-by-case basis.

1. Mark areas to be sampled on a facility floor plan for the area(s) to be closed. Sketches should include locations of building columns, walls, fixed equipment, and the rinsate sampling locations themselves to accurately locate the rinsate sampling points within the buildings.

2. Assemble and clean all equipment necessary for sample collection. Equipment needs to be cleaned, if not already pre-cleaned by the laboratory.

3. Create a temporary containment area on the floor using an inert, pre-cleaned, flexible boom.

4. Label the sample containers with a unique sample code, information on the site, sample location and date/time sample was collected. Affix appropriate labels for test parameters on the sample containers. Put on a new pair of disposable nitrile gloves.

5. At each sampling location, slowly pour the minimum quantity of de-ionized water (start with one gallon for metals analysis, much less for only volatiles) needed to collect all sample parameters, including QC samples, onto the concrete area. If the individual area is sloped, start pouring at the highest elevation. The de-ionized water may be provided by the analytical laboratory, purchased, or generated on-site.

6. Allow de-ionized water to collect and remain in the sample location for 10 minutes.

7. Collect the number of samples as specified in the closure plan along with appropriate QA/QC samples. Samples may be collected using dedicated, sterile glass pipettes provided by the laboratory, or any other suitable device approved in the closure plan. The pipettes are used to transfer the sample fluids into the appropriate laboratory supplied containers. Volatile sample containers shall be filled first to minimize loss of volatiles.

8. Samples must not be composited.

9. Cap the sample container and place sample containers in a cooler with ice to maintain a temperature of 4 °C.

10. Remove and discard the gloves. Place all disposable gloves into a plastic bag designated

for proper disposal.

11. Fill out sampling details in field log book. Photographs of the sample locations, wetted areas, equipment, and actual sampling events may be taken by the facility or Department staff and a list of the photographs shall be recorded in the field book.

12. Fill out the chain-of-custody and any other sample forms. Prepare the samples for storage and shipping in the cooler with ice to maintain a temperature of $4 \pm 2^{\circ}C$. Ship overnight to the laboratory for analysis.

13. Follow the chain-of custody procedures as detailed in the Quality Assurance Project Plan.

APPENDIX C
DER-10 Appendix 1A and 1B for CAMP

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

Overview

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

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

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

Community Air Monitoring Plan

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

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

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

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

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

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Appendix 1B
Fugitive Dust and Particulate Monitoring

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

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

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

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

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

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

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

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

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

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

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

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

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