HALEY ALDRICH

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INTERIM REMEDIAL MEASURE WORK PLAN
2864 ATLANTIC AVENUE REDEVELOPMENT SITE
NYSDEC BCP SITE C224349
BLOCK 3965 LOT 11
BROOKLYN, NEW YORK

by Haley & Aldrich of New York
New York, New York

for 2864 Atlantic Realty LLC
40 Oser Avenue, Ste 4
Hauppauge, NY 11788

File No. 0203563
March 2022

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7 March 2022
File No. 0203563

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Attention: Ms. Madeleine Babick

Subject: Interim Remedial Measure Work Plan
2864 Atlantic Avenue Redevelopment Site
NYSDEC BCP SITE C224349
Brooklyn, NY

Dear Ms. Babick,

On behalf of 2864 Atlantic Realty LLC, Haley & Aldrich of New York is submitting for the review and approval of the New York State Department of Environmental Conservation (NYSDEC) this draft Interim Remedial Measure Work Plan (IRMWP) for the 2864 Atlantic Avenue Redevelopment BCP Site C224349, Speedway Site 7823, located at 2864 Atlantic Avenue in the Cypress Hills neighborhood of Brooklyn, NY (Site). This document was submitted as part of 2864 Atlantic Realty LLC's Brownfield Cleanup Program Application for the Site, and has been revised to reflect comments received from the Department. This IRMWP has been developed based on the NYSDEC's "Technical Guidance for Site Investigation and 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,
HALEY & ALDRICH OF NEW YORK

James M. Bellew
Senior Associate

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Certification

I, Scott A. Underhill, certify that I am currently a NYS registered Professional Engineer and that this Remedial Action Work Plan was prepared in accordance with the applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

7 March 2022

Scott A. Underhill *Date*
NYS Professional Engineer # 075332

I, James M. Bellew, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that that this Remedial Action Work Plan was prepared in accordance with the applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

7 March 2022

James M. Bellew *Date*

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1. Introduction

On behalf of 2864 Atlantic Realty LLC, Haley & Aldrich of New York (Haley & Aldrich) has prepared this Interim Remedial Measure Work Plan (IRMWP) for the 2864 Atlantic Avenue Redevelopment Site, Speedway Site 7823 (see Figure 1), located in the Cypress Hills neighborhood of Brooklyn, NY (Site). This was prepared in accordance with the regulations and guidance applicable to the BCP, including DER-10 which is entitled "Technical Guidance for Site Investigation and Remediation" and dated May 2010 (DER-10).

The Site, identified as Block 3965 Lot 11 on the New York City tax map, is 18,111-square feet and is bounded by the Atlantic Avenue followed by multiple mixed use low-rise residential buildings to the north, Jerome Street followed by low-rise residential buildings to the east, low-rise residential buildings to the south, and Barbey Street followed by a vacant 3-story industrial use building to the west. Existing Site features are shown on Figure 2. The Site is currently an active gasoline filling station and is improved with a one-story store structure, a one-story storage building, an overhead canopy, and six dispenser islands. The Site is within a residential mixed-use zone R8A.

1.1 PURPOSE

The Site is registered in New York State Department of Environmental Conservation (NYSDEC) Petroleum Bulk Storage (PBS) database with four 10,000-gallon (gal) active underground storage tanks (USTs) containing gasoline/ethanol and one 600-gal diesel UST, both installed in 1998. Additionally, there were 38 550-gal USTs (most of them containing gasoline) and seven 2,000 to 4,000-gal gasoline USTs that were closed and removed from the Site in 1998.

There were two closed spills at the Site. Impacted soils were encountered during an UST upgrade project in August 1998, and one petroleum spill was assigned to the Site. During the removal activities, 1,006 tons of impacted soils were removed for off-Site disposal. From 1998 to 2000, seven monitoring wells have been installed at the Site. Since 2008, multiple remediation efforts had implemented on Site to remediate the petroleum impacts to the soil and groundwater: from 2008 to 2010, five air sparging (AS) wells were installed at the Site, and short-term remediation events via soil vapor extraction (SVE) and AS commenced; in 2019, injection wells were installed, and RegenOx Part A and B (PetroCleanze^{TM}) injections and Enhanced Fluid Recovery (EFR) events commenced.

The most recent sampling event, which took place on March 2021, revealed that benzene, toluene, ethylbenzene, and xylenes (BTEX) and volatile organic compounds (VOCs) concentrations in groundwater were above the regulatory limits. The groundwater level is approximately 25 to 35 ft below ground surface (ft bgs). No soil samples were taken, and no results about the soil were reported based on the records.

Previous investigations did not comprehensively delineate the extent of soil and groundwater contamination on the Site. An Interim Remedial Measures Work Plan was submitted to the Department addressing removal of petroleum underground storage tanks and related remediation. The objectives of the IRM are to remove the existing Site structures associated with the retail petroleum station, the four

USTs and associated petroleum-impacted material (i.e., visually impacted soils, elevated PID responses). Upon removal of all accessible petroleum-impacted material, confirmation (endpoint) soil samples will be collected from the excavation to confirm that remaining soil meets the Unrestricted Residential Soil Cleanup Objectives (UUSCOs). If the analytical data for soil samples collected exceeds the UUSCOs, additional soil samples will be collected to delineate these impacts and over excavation may be performed to ensure that all impacted material has been removed from the Site. If over excavation occurs, any impacted soil will be removed to the extent practical, or until the bedrock surface is encountered. The IRMWP will be implemented upon acceptance of the Site into the BCP and approval of this IRMWP.

2. Background

2.1 CURRENT LAND USE

The Site is currently occupied by an active retail petroleum station and consists of the following: a one story structure utilized for storage, located in the southwest portion of the Site; a one-story structure (accessible by employees only) and petroleum pump islands, located beneath an overhead canopy in the northwest portion of the Site (two petroleum pump islands are located outside of the overhead canopy); five USTs, containing gasoline/ethanol, and associated fill ports, located south-southwest of the overhead canopy; and, paved parking areas.

2.2 SITE HISTORY

The Site was partially developed in the late 1800s with two stores and one residential building. By the early 1950s, the Site was partially redeveloped with a garage and two gasoline tanks. By 1965, the entire Site was occupied by a filling station that was developed with an overhead canopy and a one-story office building. The Site remains unchanged since approximately 1965 and actively operates as a filling station.

2.3 SURROUNDING LAND USE

The Site is located on the southeast corner of the Greenpoint Avenue and McGuinness Boulevard intersection in the Greenpoint neighborhood of the borough of Brooklyn. The East River is located approximately 0.5-mile mile west of the Site; and, Newtown Creek a tributary to Hudson River, is located approximately 0.5-mile west of the Site. One school, ADAPT Community Network The Greenpoint School, is located approximately 500 ft southwest of the Site at 725 Leonard Street. No daycare facilities or hospitals are located within a 500 ft radius of the Site. Properties immediately surrounding the Site are zoned for mixed-use commercial and residential use.

2.4 SURROUNDING LAND USE HISTORY

The area surrounding the Site was used for commercial, manufacturing, and auto-related uses from the late 1800s through present day.

2.5 PREVIOUS INVESTIGATIONS

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

- Environmental Site Assessment Report (Geologic Service Corporation, July 1999)
- Fourth Quarterly Update Report with Pilot Test (EnviroTrac Ltd., February 2009)
- Revised Work Plan for Additional Air Sparge Wells (EnviroTrac Ltd., March 2009)
- STRE Work Plan (EnviroTrac Ltd., March 2009)
- First Quarterly Update Report with STRE Data (EnviroTrac Ltd., May 2010)
- Second Quarterly Update Report with STRE Data (EnviroTrac Ltd., August 2010)
- Fourth Quarterly Update Report (EnviroTrac Ltd., January 2019)

- First Quarterly Update Report (EnviroTrac Ltd., May 2021)
- Phase I Environmental Site Assessment (Haley & Aldrich, October 2021)
- Limited Phase II Environmental Site Investigation Report (Haley & Aldrich, November 2021)

Full investigation findings are included in Appendix A. A summary of environmental findings of these investigations is provided below.

***Environmental Site Assessment Report* (Geologic Service Corporation, July 1999)**

In this report, Geologic Service Corporation summarizes the data and findings from the investigation performed at the Site between August 1998 and July 1999.

Underground Storage Tank (UST) closure/upgrade activities were conducted in August, September, and November of 1998 which included removal of three dispenser islands, remote fill ports, remote fill piping, and 38 single-walled steel USTs. Petroleum impacts were observed during UST removal, and NYSDEC Spill No. Spill No. 9830002 was reported on 06 August 1998. A total of 1,006 tons of soil was excavated and transported off-Site for thermal processing and recycling into hot mix asphalt. Following completion of closure activities, five new double-walled fiberglass tanks and associated vapor recovery lines were installed on-Site.

Following completion of UST closure and upgrade activities, four soil borings and four monitoring wells were installed for the collection of soil and groundwater samples. Soil analytical results were below NYSDEC Stars #1 Memo Guidance Values with the exception of one soil sample, SB-2 which identified a concentration of methyl tert-butyl ether (MTBE) at 25,210.5 parts per billion ([ppb] regulatory standard of 1,000 ppb). All four groundwater samples identified petroleum-based VOCs (including MTBE and BTEX compounds) in excess of NYSDEC Groundwater Quality Standards.

***Fourth Quarterly Update Report with Pilot Test* (EnviroTrac Ltd., February 2009)**

This report prepared by EnviroTrac Ltd. summarizes the activities conducted at the Site between August 2008 to November 2008, which included: two short-term remediation events (STREs); gauging and sampling of seven monitoring wells; and installation of three air sparging wells. Groundwater analytical results indicated the following: a maximum combined concentration of BTEX of 6,041 ppb detected at MW-1; the concentration of benzene did not exceed 1.3 ppb in any groundwater sample collected; the concentration of xylene was more than 5,170 ppb in all groundwater samples collected; and MTBE was non-detect in all groundwater samples collected.

EnviroTrac Ltd. concluded that although residual BTEX concentrations remained in MW-1 and MW-6, the breakdown components of these compounds (mostly xylenes) indicated a more degraded, less mobile impact on the subsurface environment.

Due to the favorable results of the two STRE events, EnviroTrac Ltd. proposed to continue with these remediation efforts. A work plan to address the degraded impact in these wells was developed and submitted to the NYSDEC under separate cover to move this Site toward closure.

***Revised Work Plan for Additional Air Sparge Wells* (EnviroTrac Ltd., March 2009)**

This revised work plan prepared by EnviroTrac Ltd. proposed the installation of additional air sparge wells to address residual BTEX levels in the saturated soils beneath the Site. The work plan indicated that soil samples would be screened continuously during air sparge well installation activities, and two soil samples would be collected and submitted for the analysis of VOCs (plus MTBE) and SVOCs. Results from this investigation would be included in a subsequent report.

***STRE Work Plan* (EnviroTrac Ltd., March 2009)**

This report summarizes correspondence between the NYSDEC, EnviroTrac, and Hess during a meeting that took place in October 2008. The report concluded that in reviewing the historical groundwater data for the STREs that were conducted at the Site in October 2008 and November 2008, a decrease in residual levels of ethylbenzene and xylenes in monitoring wells MW-4 and MW-6 was evident, especially in MW-6 which showed a ten-fold reduction in ethylbenzene concentrations (from 2,430 ppb to 240 ppb) and a three-fold decrease in xylenes (from 5,850 to 1,271 ppb). However, monitoring wells MW-1 and MW-5 identified slight increases in residual petroleum impacts even though the data obtained during these events confirmed an effective radius of influence (ROI) on all wells.

EnviroTrac Ltd. recommended conducting two additional quarterly groundwater sampling events.

***First Quarterly Update Report with STRE Data* (EnviroTrac Ltd., May 2010)**

The first quarterly report summarizes the activities conducted at the Site between January 2010 to April 2010, which included performance of two STREs, gauging, and sampling of seven on-Site monitoring wells. Total benzene and MTBE were non-detect in the seven groundwater samples collected. Total BTEX concentrations ranged from non-detect in MW2, MW-3, and MW-7 to 3,620.7 ppb in MW-6.

The second quarterly report summarizes the activities conducted at the Site between April 2010 to June 2010, which included performance of two STREs, gauging, and sampling of seven on-Site monitoring wells. Total benzene and MTBE were non-detect in the seven groundwater samples collected. Total BTEX concentrations ranged from non-detect in MW2, MW-3, MW-4, MW-6 and MW-7 to 2,956 ppb in MW-1.

***Second Quarterly Update Report with STRE Data* (EnviroTrac Ltd., August 2010)**

This report summarizes the activities conducted at the Site between April 2010 and June 2010, which included two STREs and gauging and sampling of seven monitoring wells. Groundwater analysis results indicated the following: a maximum BTEX concentration of 2,956.0 ppb was detected at MW-1; and neither benzene nor MTBE were detected in any of the groundwater samples collected.

EnviroTrac Ltd. proposed to continue conducting quarterly groundwater sampling events, with the next event scheduled for September 2010. An updated report summarizing these activities was submitted to NYSDEC in November 2010. Hess conducted STREs on select wells.

Fourth Quarterly Update Report **(EnviroTrac Ltd., January 2019)**

This report summarizes the STRE monitoring well gauging events and groundwater sampling events that were performed at the Site in 2018. The results indicate a BTEX concentration of 1,874 ppb at MW-1. MTBE was not detected in any groundwater sample collected. The concentration of total VOCs ranged from 308.3 ppb to 4,179.1 ppb.

This report concludes with a recommendation to perform a sensitive receptor survey to be submitted under separate cover. Based on the results of the Sensitive Receptor Survey and depth to groundwater (32 to 33 ft), off-Site receptors were not considered a concern. However, in an effort to reduce contaminant mass and to obtain spill closure, EnviroTrac Ltd. proposed additional soil borings be advanced in the area of MW-1 to assess soil conditions and identify the vertical extent of impacts in this area. If minimal impacts were observed, spill closure would be requested; if significant impacts were observed, additional remedial wells would be installed to aid in localized remediation moving forward.

EnviroTrac Ltd. indicated that monthly STREs and quarterly groundwater sampling would continue and an updated report summarizing these activities was submitted to NYSDEC in May 2019.

First Quarterly Update Report **(EnviroTrac Ltd., May 2021)**

This report summarizes the STREs, monitoring well gauging events, and groundwater sampling events that were performed at the Site between January 2021 and March 2021. The results indicated a maximum BTEX concentration of 352 ppb at MW-1. MTBE was not detected in any groundwater sample collected. The concentration of total VOCs ranged from 23.9 ppb to 1,080.9 ppb.

EnviroTrac indicates that quarterly groundwater sampling will continue, and an updated report summarizing activities completed from April through June 2021 will be submitted to NYSDEC in August 2021.

Phase I Environmental Site Assessment, October 2021, prepared by Haley & Aldrich

Haley & Aldrich of New York prepared a Phase I ESA in October 2021 for the Site to identify Recognized Environmental Conditions (RECs) in connection with the Site. As identified in the Phase I ESA, the Site was partially developed in the late 1800s with two stores and one residential building. By the early 1950s, the Site was partially redeveloped with a garage and two gasoline tanks. By 1965, the entire Site was occupied by a filling station that was developed with an overhead canopy and a one-story office building. The Site remained unchanged since approximately 1965 and actively operates as a filling station.

The Phase I ESA identified the following RECs associated with the Site:

1. Petroleum contamination at the Site - Regulatory records and previous reports identify the presence of petroleum-related contamination in groundwater at the Site associated with leaking USTs. The first petroleum-related impacts were reported in 1992; thereafter, investigative activities commenced in 1998 in response to the petroleum-impacted soil identified during a tank upgrade project. Since this time, additional spills have been reported, of which Spill Case 98-30002 is still active, due to petroleum releases impacting soil, groundwater, and soil vapor at

the subject Site. According to interviews with Site personnel, a soil vapor extraction (SVE) system was installed in 2010 and routine remedial/monitoring events (i.e., groundwater treatment, sampling, and gauging) commenced and continue, on a quarterly basis, to present-day. Records of installation and quarterly monitoring were not available for review.

2. Current and former use of the Site as a petroleum filling station/auto-related facility - Historic records indicate current and former use of the Site as a petroleum filling station/auto-related facility since the early 1950s. Impacts to soil and groundwater at the Site may be present due to the Site's history of petroleum-related operations and petroleum bulk storage.
3. Known contamination of hazardous materials at the upgradient, west-adjacent property – According to regulatory records, known contamination is present at a property located upgradient to the Site. This property, 2840 Atlantic Avenue, enrolled in the NYSDEC BCP in 2017. Investigations performed at the property revealed elevated concentrations of VOCs, SVOCs, and metals in groundwater and soil. Per- and polyfluoroalkyl substances were also detected in upgradient and downgradient monitoring wells on this property.

In addition, one Historic Recognized Environmental Condition (HREC) was identified in connection to closed spill cases associated with potential petroleum releases at the Site.

Limited Phase II Environmental Site Investigation Report, November 2021, prepared by Haley & Aldrich

Haley & Aldrich of New York completed a limited sampling event at the Site to investigate soil and soil vapor quality beneath the Site. The investigation was performed between 02 and 03 November 2021 and included installation of 11 soil borings up to 6 feet below grade surface, installation of two temporary soil vapor probes, and collection of soil and soil vapor samples. Urban fill generally consisting of brown to dark brown, coarse to medium sand with varying amounts of glass, gravel, brick, asphalt, and silt was observed from surface grade to approximately 2 to 4 ft bgs in each soil boring. The urban fill layer was underlain by a potential native layer consisting of brown to orange-brown coarse to fine sand with varying amounts of silt and gravel and intermittent clay lenses. In general, no apparent subsurface impacts were observed, including odors and staining, and PID readings of non-detect at 0.0 parts per million (ppm) were recorded. However, at B-10, surface soils (i.e. 0-2 ft bgs) exhibited a slight petroleum odor and PID readings up to a maximum of 20.1 ppm VOCs.

Seven SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were identified above RRSCOs in multiple shallow soil samples. Additionally, methylphenol/4-methylphenol was detected above UUSCOs, but below RRSCOs, in one shallow soil sample. Three VOCs – acetone, total xylenes, and 2-butanone – were identified at concentrations above the UUSCO in one soil sample collected. Acetone was also detected in a second shallow soil sample above the UUSCO. Metals including lead and mercury were detected above RRSCOs, with copper and zinc identified above the UUSCOs.

Total VOC concentrations in soil vapor samples ranged from 83 micrograms per cubic meter (µg/m3) in sample SV-1 to 18,546 µg/m3 in SV-2. Total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations ranged between 5.7 µg/m3 in SV-1 to 998.8 µg/m3 in SV-2. Tetrachloroethene (PCE) was detected in soil vapor sample SV-1 at a concentration of 34.2 $\mu g/m^3$ and carbon tetrachloride was

detected in soil vapor sample SV-1 at a concentration of 2.13 µg/m^3.The high total VOC soil vapor concentrations are indicative of source material contamination that was not readily identified in the subsurface at the limited sample locations that have been analyzed to date.

3. Interim Remedial Measure Work Plan

3.1 IRM OBJECTIVES AND RATIONALE

The objective of the IRM is to remove all existing building structures, dispenser islands, the overhead canopy and the USTs and associated impacted soils in preparation of Site-wide remediation.

IRM activities will require equipment mobilization, removal of the existing structures within the IRM work area, , removal of USTs and/or associated appurtenances, concrete pavement removal in the area of excavation, support of excavation (SOE) installation, excavation and off-Site disposal of historic fill and hydrocarbon contaminated soil, collection of confirmation samples. After removal of the existing structures and the underground storage tanks, foundation elements for the proposed building will be installed within the IRM area. The area will be backfilled with a 6-inch-thick temporary cover of NYSDEC approved certified clean fill and/or gravel. The temporary cover will be replaced with a DER-10 compliant final cover as part of the forthcoming final remedy. The Site will be locked and inaccessible to the public during IRM implementation and will remain locked and inaccessible until Remedial Action Work Plan (RAWP) implementation is complete, and a DER-10 compliant final cover is installed. The forthcoming RAWP will be submitted to and approved by the NYSDEC prior to implementation.

3.2 GENERAL PROJECT INFORMATION

3.2.1 Remedial Engineer

The Remedial Engineer (RE) will review plans and submittals for this remedial project, and Contractor and subcontractor document submittals, and will confirm that plans and submittals are in compliance with this IRMWP. 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 IRM.

The RE for this project will be Scott Underhill. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program at the Site. The RE will certify in the Construction Completion Report (CCR) that the IRM activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in this IRMWP and other relevant provisions of ECL 27-1419 have been achieved in substantial conformance with the IRMWP.

Under direction of the RE, the work of other contractors and subcontractors involved in aspects of the IRM will be documented: including soil excavation, stockpiling, sample collection, air monitoring, emergency spill response services, import of backfill, and management of waste transport and disposal.

The RE will review the pre-remedial plans submitted by contractors and subcontractors for substantial conformance with this IRMWP and will provide a certification in the CCR.

3.3 SUMMARY OF PROPOSED INTERIM REMEDIAL MEASURES

1. Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
2. Demolition of structures associated with the retail petroleum operations located within the IRM work area which include, but are not limited to, piping, product dispenser and dispenser islands, USTs, canopies, service shop/storage areas. Demolition will be limited to above grade structures being removed to grade level.
3. Remediation/disposal of petroleum impacted pavement and footings and removal of concrete pavement within the IRM work area.
4. Design and installation of SOE consisting of, at a minimum, sloping and/or benching as per New York City Department of Building (NYCDOB) Code along the northern, eastern, southern, and western UST area perimeter. Sloping of the excavation sides will be at a slope of approximately 2 horizontal to 1 vertical. If necessary, additional SOE elements such as trench boxes or soldier piles and lagging may be required to reach the desired depth without compromising adjacent structures/properties.
5. Excavation, stockpiling, off-Site transport, and disposal of about 1,900 cubic yards of historic fill, petroleum-impacted soil, and native soil that exceeds UUSCOs (as defined by 6 NYCRR Part 375-6.8) from the area of removed USTs and related equipment. Excavation is anticipated to extend to 12 feet below grade surface (ft bgs) in the IRM area.
6. Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) and collection of confirmation samples.
7. Localized dewatering (as needed), characterization, and treatment of water accumulated in excavations prior to discharge to a NYSDEC approved sewer/sanitary line (pending permits), or localize dewatering with containerization, classification, and disposal at an approved receiving facility.
8. Removal of USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-Site disposal during redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements. Removal of any petroleum-impacted soils associated with the USTs.
9. Installation of a demarcation barrier such as orange snow fence along the excavation sidewalls and excavation bottom prior to backfilling. The excavation area will be backfilled with imported material that will be sampled at a frequency consistent with the recommendations of Table 5.4(e)10 in DER-10 in order to confirm UUSCOs are achieved prior to placing backfill. Backfill source material will be proposed to NYSDEC prior to import to the Site.
10. Submission of daily reports to document the progress of the IRM to the NYSDEC.
11. Submission of a CCR at the completion of the IRM.

An IRM location plan is included as Figure 2 and a map showing the excavation area is shown as Figure 3. A proposed end-point sampling plan is included as Figure 4.

3.3.1 Site Preparation

Prior to commencing remedial construction, the Remediation Contractor will mobilize to the Site and prepare for remedial activities. Mobilization and Site preparation activities may include the following:

- Identifying the location of aboveground and underground utilities (e.g., power, gas, water, sewer, and telephone), equipment, and structures as necessary to implement remediation;
- Mobilizing necessary remediation personnel, equipment, and materials to the Site;
- Install soil erosion, pollution, and sediment control measures; and
- Mark out proposed IRM excavation area.

3.3.2 Temporary Stabilized Construction Entrances

Temporary stabilized construction entrances will be installed at the existing curb cuts along Ralph Avenue. The entrances will be covered with gravel or recycled concrete aggregate (RCA) and graded so that runoff water will be directed on Site. Vehicles exiting construction areas will be cleaned using clean water or dry brushing, as needed, to remove excess soil from the tires and undercarriages. The Remediation Contractor will protect and maintain the existing sidewalks and roadways at both Site access points.

3.3.3 Selective Demolition

Demolition of above grade structures as needed to facilitate evaluation of areas that may not be fully accessible and/or areas where the structures may inhibit evaluation of potential vertical migration of contaminates. Selective demolition may include removal of kiosks, canopies (which may restrict use of a sonic drill rig), storage sheds and/or product dispensers/pump islands.

3.3.4 Utility Mark out and Easement Layouts

The Volunteer and its Contractors are solely responsible for the identification of utilities and/or easements that might be affected by work under this IRM and implementation of the required, appropriate, or necessary health and safety measures during performance of the work under this IRM. The contractor will place a Dig Safely New York call out for public utilities to be confirmed complete prior to commencing work.

3.3.5 Excavation Support

SOE consisting of, at a minimum, sloping will be used along the northern, eastern and western UST area perimeter. The SOE to the southern extent will be a combination of sloping and soldier piles and lagging. The approximate location of the support slope (approximately 2 horizontal to 1 vertical) is shown in Figure 3.

Appropriate management of the structural stability of on-Site or off-Site structures during Site activities is the sole responsibility of the Volunteer and its Contractors. The Volunteer and its contractors are solely responsible for the safe execution of the work performed under this IRMWP. The Volunteer and

its Contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this IRMWP. Additionally, the Volunteer and its Contractors are solely responsible for the implementation of the required, appropriate, or necessary health and safety measures during performance of work conducted under this IRMWP.

3.4 INTERIM REMEDIAL MEASURE ACTIVTY

3.4.1 Site Fencing

The Site will be secured with construction fence along the northern, eastern, southern, and western Site perimeter. The gates located on Atlantic Avenue will be barriered during work hours and securely locked doors during off hours and with appropriate signage maintained by the Contractor.

3.4.2 Soil Screening Methods

Visual, olfactory, and instrumental soil screening (PID) and assessment will be performed during remediation and development-related ground intrusive activities into known or potentially contaminated material. The purpose of soil screening is to ensure petroleum-impacted material associated with the USTs, if present, has been excavated.

3.4.3 Waste Characterization

Waste characterization samples will be collected from soil proposed for disposal during implementation of the IRM. Samples will be analyzed per disposal facility requirements. This activity will be coordinated and overseen by a representative of the RE. Samples will be representative of the material requiring disposal and will occur at a frequency consistent with disposal facility requirements. Waste characterization samples will be submitted to a NYSDOH Environmental Laboratory Approval Program (ELAP)-approved laboratory for analysis in accordance with the Quality Assurance Project Plan (QAPP) provided in Appendix B. Waste characterization samples will be analyzed for parameters that are typically required by disposal facilities. The following list is provided for planning purposes and may not reflect the analyses performed for waste characterization:

- Resource Conservation and Recovery Act (RCRA) characteristics, including ignitability, corrosivity, and reactivity (sulfide and cyanide)
- 6 NYCRR Part 375 and New Jersey Department of Environmental Protection (NJDEP) Total Compound List (TCL) VOCs
- Extractable petroleum hydrocarbon (EPH)
- 6 NYCRR Part 375 and NJDEP TCL Semi-Volatile Organic Compounds (SVOCs)
- TCL pesticides
- TCL herbicides
- TCL polychlorinated biphenyls (PCB)
- Target analyte list (TAL) metals, hexavalent chromium
- Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals
- Paint filter analysis

3.4.4 Stockpiles

Stockpiles may be used as necessary to separate and stage excavated material pending loading or characterization sampling. Separate stockpile areas will be constructed as necessary to avoid comingling materials. Stockpile areas will meet the following minimum requirements:

- Excavated soil will be placed onto a minimum thickness of 6 mil low-permeability liner of sufficient strength and thickness to prevent puncture during use; separate stockpiles will be created where material types are different. The use of multiple layers of thinner liners is permissible.
- Efforts will be made to place and remove the soil to minimize the potential to jeopardize the integrity of the liner.
- Stockpiles will be covered at the designated times (see below) with minimum 6-mil plastic sheeting or tarps which will be securely anchored to the ground. Stockpiles will be routinely inspected, and broken sheeting covers will be promptly replaced.
- Stockpiles will be covered upon reaching their capacity (approximately 500 cubic yards) until ready for loading. Stockpiles that have not reached their capacity will be covered at the end of each workday.
- Each stockpile will be encircled with silt fences and hay bales, as needed, to contain and filter particulates from rainwater that has drained off the soils and to mitigate the potential for surface water run-off.
- Stockpiles will be inspected at a minimum of once daily and after every storm event.

If encountered, stockpiling of hazardous waste on Site will be avoided and material will be live loaded into trucks permitted to transport hazardous waste, or containerized on-Site for appropriate off-site disposal.

3.4.5 Material Load Out and Transport

Field personnel, under the supervision of the RE, will monitor ground-intrusive work, the excavation, and load-out of excavated material.

Loaded vehicles leaving the Site will be appropriately lined, securely covered, manifested, and placarded in accordance with the applicable federal, state, and local requirements, including applicable transportation requirements (i.e., New York State Department of Transportation [NYSDOT] and New York City Department of Transportation [NYCDOT] requirements). Trucks hauling historic fill material will not be lined unless free liquids are present, or the material is grossly impacted. Trucks hauling hazardous lead impacted material will be lined and covered. Hazardous wastes derived from the Site will be stored, transported, and disposed of in compliance with applicable local, state, and federal regulations.

A truck wash will be operated on Site. Trucks will be washed, as necessary, before leaving the Site. Site ingress and egress points will be cleaned of dirt and other materials to prevent material generated during remediation and development from being tracked off-Site. A map detailing the truck ingress and egress points and the truck route is included as Figure 5.

The Volunteer and associated parties preparing the remedial documents submitted to the NYSDEC and the parties performing this work are responsible for the safe performance of ground intrusive work, the structural integrity of excavations, and structures that may be affected by excavations (such as building foundations).

The Volunteer and associated parties will ensure that Site development activities (including development-related grading) will not interfere with, or otherwise impair or compromise remedial activities proposed in this IRMWP or as required under a forthcoming RAWP. Mechanical processing of historic fill and contaminated soil on-Site is prohibited unless otherwise approved by NYSDEC.

Primary contaminant sources removal (including, but not limited to, tanks and hotspots) and implementation of the remedies will be surveyed by a surveyor licensed to practice in the State of New York. The excavation will be surveyed, and survey information will be shown on maps to be included with the CCR.

3.4.6 Materials Disposal Off-Site

Disposal facilities have not been determined at the time of this report submittal; however, facility determination will be reported to the NYSDEC Case Manager prior to off-Site transport and disposal of excavated material. About 1,500 cubic yards of historic fill, petroleum contaminated, and native soil is expected to require off-Site disposal in connection with implementation of this IRMWP. Soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with local, state (including 6 NYCRR Part 360), and federal regulations.

Although not anticipated, if disposal of soil/fill from the Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Off-Site management of unregulated materials from this Site is prohibited without formal NYSDEC approval. Material that does not meet UUSCOs, such as nonhazardous historic fill material, contaminated soil, is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility). Non-hazardous historic fill material, contaminated soil will be transported off-Site will be handled, at a minimum, as a solid waste per 6 NYCRR Part 360.

The following documentation, to be included in the CCR, will be obtained for each disposal facility used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms to applicable laws:

- A letter or equivalent document from the RE or Volunteer to the receiving facility describing the material to be disposed of and requesting formal written acceptance of the material. This document will state that material to be disposed of is contaminated material generated at an environmental remediation Site located in the New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include an attachment that summarizes chemical data for the material being transported (including waste characterization and remedial investigation [RI] data); and
- A letter from each receiving facility stating that it is in receipt of the correspondence (above) and acceptance of the material is approved.

3.4.7 Confirmation Sampling

Confirmation soil samples will be collected at the locations shown in Figure 4 in accordance with the protocols outlined in Section 4, Remedial Performance Evaluation.

3.4.8 Demarcation Barrier

A demarcation barrier, such as orange snow fence, will be placed along the excavation sidewalls and excavation bottom prior to backfilling.

3.4.9 Import of Backfill

Imported material for backfill, to be placed within the IRM excavation area, must meet the requirements of 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10. Material from industrial sites, spill sites, other environmental remediation sites, or other potentially contaminated sites will not be imported to the Site. Solid waste will not be imported onto the Site.

Backfill material will consist of clean fill (as described in the following paragraph) or other acceptable fill material such as virgin stone from a quarry or recycled concrete aggregate (RCA). If RCA is imported to the Site, it will be from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require chemical testing, unless required by the NYSDEC under the terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete, with no more than 10% by weight passing through a No. 80 sieve. RCA is not acceptable for and will not be used as cover or drainage material.

Imported soil (i.e., clean fill) will meet the UUSCOs. Non-compliant soils will not be imported to the Site. Clean fill will be segregated at a source/facility that is free of environmental contaminants. Qualified environmental personnel will collect representative samples at a frequency consistent with NYSDEC CP-51. The samples will be analyzed for Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, cyanide, metals including trivalent and hexavalent chromium, 1,4-dioxane, and PFAS by a NYSDOH ELAP-certified laboratory. Certified-clean fill will be transported to the Site and segregated from impacted material, as necessary, on plastic sheeting until used as backfill. Trucks entering the Site with imported soils will be secured with tight fitting covers.

Soils that meet “exempt” fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by the NYSDEC. The contents of this IRMWP and NYSDEC approval of this IRMWP should not be considered an approval for this purpose.

3.4.10 Fluids Management

Liquids removed from the Site, including dewatering fluids, will be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by the New York City Department of Environmental Protection (NYCDEP).

3.5 REMOVAL OF UNDERGROUND STORAGE TANKS

Based on the NYSDEC PBS database, there are five active USTs at the Site that were installed in 1998: four 10,000-gal tanks containing gasoline/ethanol; and, one 600-gal tank containing diesel. The above-

ground fill, gauge, product, and vent lines caps of the USTs suggest the extent of the approximate USTs area which is shown on Figure 2.

The Remediation Contractor will provide an individual who is a Certificate of License Holder from the NYC Fire Department. The tanks will be permanently closed/removed in accordance with 6 NYCRR Part 612.2 and 613.9 by submitting a modified Application for PBS Registration identifying the tanks and the date of permanent closure/removal.

The closure will include the removal of the tanks, lines, and ancillary equipment in accordance with DER-10, Section 5.5 Underground Storage Tank Closure. Following the removal, the tanks will be carefully examined for indications of failure and the open excavation will be inspected for physical evidence of petroleum impacts.

If there are no indications of tank failure or soil impacts, confirmation (endpoint) soil samples will be collected from the excavation to confirm that remaining soils meets UUSCOs. If the analytical data for soil samples collected exceeds the UUSCOs, additional soil samples will be collected to delineate these impacts and over excavation may be required to ensure that all impacted material has been removed from the Site.

If there are indications of tank failure and soil impacts, impacted soil will be removed to the extent practical, or until the bedrock surface is encountered. Confirmation samples will be collected from the excavation in accordance with the protocols outlined in Section 4, Remedial Performance Evaluation .

3.5.1 UST Removal Methods

USTs will be removed in accordance with the procedures described under the NYSDEC Memorandum for the Permanent Abandonment of Petroleum Storage Tanks and Section 5.5 of DER-10 as follows:

- Remove all product to its lowest draw-off point.
- Drain and flush piping into the tank.
- Vacuum out the tank bottom consisting of water product and sludge.
- Dig down to the top of the tank and expose the upper half of the tank.
- Remove the fill tube and disconnect the fill, gauge, product and vent lines and pumps. Cap and plug open ends of lines.
- Temporarily plug all tank openings, complete the excavation, remove the tank, and place it in a secure location.
- Render the tank safe and check the tank atmosphere to ensure that petroleum vapors have been satisfactorily purged from the tank.
- Clean tank or remove to a storage yard for cleaning.
- If the tank is to be moved, it must be transported by a licensed waste transporter. Plug and cap all holes prior to transport leaving a 1/8-inch vent hole located at the top of the tank during transport.
- After cleaning, the tank must be made acceptable for disposal at a scrap yard cleaning the tank interior with a high-pressure rinse and cutting the tank in several pieces.

During the tank and pipeline removal, the following field observations should be made and recorded:

- A description and photographic documentation of the tank and pipeline condition (pitting, holes, staining, leak points, evidence of repairs, etc.);
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.); and
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation with a properly calibrated PID.

4. Remedial Performance Evaluation

4.1 SOIL CLEANUP OBJECTIVES

Soil cleanup objectives for the Site will be the UUSCO concentrations listed in Table 1. UST closures will, at a minimum, conform to criteria defined in DER-10.

4.2 SOIL SAMPLING FREQUENCY

Confirmation samples will be collected to confirm that UUSCOs have been achieved. One confirmation soil sample will be collected at the base of each tank and one from each sidewall.

Confirmation sampling locations are shown in Figure 4. If the analytical data for soil samples collected exceeds the UUSCOs, additional soil samples will be collected to delineate these impacts and over excavation may be required to ensure that all impacted material has been removed from the Site. Impacted soil will be removed to the extent practical, or until the bedrock surface is encountered.

4.3 METHODOLOGY

Confirmation soil samples will be collected in accordance with NYSDEC DER-10 to document remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, pesticides, PCBs, metals, per-and polyfluoroalkyl substances (PFAS), and 1,4-dioxane. Samples will be collected into laboratory-provided bottle ware. VOCs will be collected into TerraCore or Encore samplers. Samples will be transported under chain of custody protocol to an ELAP certified laboratory.

4.4 QA/QC

Quality control procedures for confirmation soil sampling are included in the QAPP (refer to Appendix B). Confirmation analytical results will be provided in the NYSDEC's electronic data deliverable (EDD) format for EQuIS™. Guidance on the sampling frequency is presented in NYSDEC DER-10 Section 5.4.

The QA/QC procedures required by the NYSDEC Analytical Services Protocol (ASP), and SW-846 methods will be followed. This will include instrument calibration, standard compound spikes, surrogate compound spikes, and analysis of quality control samples. The laboratory will provide sample bottles, which will be pre-cleaned and preserved. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP will take precedence.

4.5 DATA VALIDATION

Data packages will be sent to a qualified data validation specialist, for evaluation of accuracy and precision of the analytical results. A Data Usability Summary Report (DUSR) will be created to confirm the compliance of methods with the protocols described in the NYSDEC ASP. DUSRs will summarize and confirm usability of the data for project-related decisions. Data validation will be completed in accordance with the DUSR guidelines from NYSDEC Division of Environmental Remediation.

4.6 REPORTING

ASP Category B deliverables will be prepared for remedial performance samples collected during implementation of this IRM. Results of all analyses, including summary tables, laboratory data sheets and the laboratory data deliverables will be reported in the CCR. DUSR will be prepared by a qualified data validator and the findings will be reported in the CCR.

5. Project Organization

A project team for the Site has been created, based on qualifications and experience, with personnel suited for successful completion of the project. Project resumes are included in Appendix C.

The NYSDEC Case Manager, Madeleine Babick, will be responsible for overseeing the successful completion of the project work and adherence to the work plan on behalf of NYSDEC.

The NYSDOH Case Manager, Christine Vooris, will be responsible for overseeing the successful completion of the project work and adherence to the work plan on behalf of NYSDEC.

Scott Underhill P.E. will be the Engineer of Record and RE for this work. Mr. Underhill is a professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the overall remedial program for the Site. The RE will certify that the remedial activities were observed by a qualified environmental professional(s) under his supervision and that the remediation requirements set forth in the IRMWP and any other relevant provisions of ECL 27-1419 have been achieved in conformance with the plan.

James Bellew will be the Qualified Environmental Professional (QEP) and Principal in Charge for this work. In this role, Mr. Bellew will be responsible for the overall completion of each task as per requirements outlined in this work plan and in accordance with the DER-10 guidance.

Mari 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 project schedule. As the Project Manager, Ms. Conlon will also be responsible for communications with the NYSDEC Case Manager regarding project status, schedule, issues, and updates for project work.

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

Sarah Commisso will be the field geologist responsible for implementing the field effort for this work. Ms. Commisso's responsibilities will include implementing the work plan activities and directing the subcontractors to ensure successful completion of all field activities.

The tank removal subcontractor (e.g., Eastern Environmental Solutions) with all the necessary licensure requirements for UST closures.

The analytical laboratory will be Alpha Analytical of Westborough, MA, 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 4.

6. Health and Safety

6.1 HEALTH AND SAFETY PLAN

A Site-specific Health and Safety Plan (HASP) has been prepared in accordance with NYSDEC and NYSDOH guidelines and is provided as Appendix D of this work plan. The HASP includes a description of health and safety protocols to be followed by Haley & Aldrich field staff during implementation of the remedy, including monitoring within the work area, along with response actions should impacts be observed. The HASP has been developed in accordance with Occupational Health and Safety Administration (OSHA) 40 CFR Part 1910.120 regulatory requirements for use by Haley & Aldrich 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 health and safety plan and procedures of comparable or higher content for their respective personnel in accordance with relevant OSHA regulatory requirements for work at hazardous waste Sites as well as general industry as applicable based on the nature of work being performed.

6.2 COMMUNITY AIR MONITORING PLAN

The proposed remediation work will be completed outdoors at the Site. Where intrusive operations are planned, community air monitoring will be implemented to protect the downwind receptors. A Haley & Aldrich 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.

The Community Air Monitoring Plan (CAMP) will require real-time monitoring for particulates (i.e., dust) 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. 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 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, and particulates will be monitored using TSI DustTrak Environmental Monitor (DustTrak) equipment. 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 $\mu g/m^3$ 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, and a re-evaluation of activities will be initiated. Work will resume if dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration not to exceed 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 continues. 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, and monitoring continued. After these steps, work activities will 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.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down.

6.3 ODOR, DUST, AND NUISANCE CONTROL PLAN

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 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 of 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, 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 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) gravel used for on-Site roads to provide a clean and dust-free road surface; and (c) on-Site roads will be limited in total area 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 during 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 IRM. 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

Following completion of IRM activity, a CCR will be prepared to document all aspects of the USTs and contaminated soil removal. The CCR will be prepared in accordance with DER-10 guidelines and will include:

- A summary of the removal action including a detailed description of the extent and volume of soil excavated.
- All fully executed manifests documenting any off-Site transport of waste material.
- Scaled Site plan showing the location of all confirmation samples.
- Results of all analyses, including summary tables, laboratory data sheets and the required laboratory data deliverables.
- Photographic documentation of the excavation and the overall removal process.
- Information on backfill imported onto the Site including amount, type and origin and copies of transport tickets from the supplier.
- Certification of the Report by a P.E.

8. Schedule

The Site owner plans to implement this IRM promptly after approval of the IRM.

Anticipated IRM Schedule	
BCP Application, RIWP and IRM WP and 30-Day Public Comment Period (concurrent with BCP application)	January 2022-February 2022
Executed Brownfield Cleanup Agreement	March 2022
NYSDEC Approval of RIWP & IRM WP	March 2022
RI & IRM Implementation	March 2022-May 2022
CCR Submittal and 45-Day Public Comment Period	May-June 2022
NYSDEC Approval of CCR	June-July 2022

Note: The IRM will facilitate completion of work outlined in the RIWP.

References

1. Brownfield Cleanup Program Application. Speedway Site 7823, 2864 Atlantic Avenue, Brooklyn, NY. Prepared for 2864 Atlantic Realty LLC by Haley & Aldrich of New York for submission to the New York State Department of Environmental Conservation. Submitted in November 2021.

2. Phase I Environmental Site Assessment. Speedway Site 7823, 2864 Atlantic Avenue, Brooklyn, NY. Prepared for The Jay Group by Haley & Aldrich of New York. Submitted in October 2021.

3. Limited Phase II Environmental Site Investigation. Speedway Site 7823, 2864 Atlantic Avenue, Brooklyn, NY. Prepared for 2864 Atlantic Realty LLC by Haley & Aldrich of New York. Submitted in November 2021.

4. Environmental Site Assessment Report by Geologic Service Corporation, dated July 1999.

5. Fourth Quarterly Update Report with Pilot Test by EnviroTrac Ltd., dated February 2009.

6. Revised Work Plan for Additional Air Sparge Wells by EnviroTrac Ltd., dated March 2009.

7. STRE Work Plan by EnviroTrac Ltd., dated March 2009.

8. First Quarterly Update Report with STRE Data by EnviroTrac Ltd., dated May 2010.

9. Second Quarterly Update Report with STRE Data by EnviroTrac Ltd., dated August 2010.

10. Fourth Quarterly Update Report by EnviroTrac Ltd., dated January 2019.

11. First Quarterly Update Report by EnviroTrac Ltd., dated May 2021.

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

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TABLES

FIGURES

APPENDIX A

Previous Reports

(Included on USB)

APPENDIX B

Quality Assurance Project Plan

HALEY ALDRICH

APPENDIX C

Resumes

APPENDIX D

Health and Safety Plan

TABLES

Table 1. Soil Cleanup Objectives

2864 Atlantic Avenue, Brooklyn, NY

PCBs/Pesticides (mg/kg)	
Delta-BHC	0.04
Lindane	0.1
Alpha-BHC	0.02
Beta-BHC	0.036
Heptachlor	0.042
Aldrin	0.005
Endrin	0.014
Dieldrin	0.005
4,4'-DDE	0.0033
4,4'-DDD	0.0033
4,4'-DDT	0.0033
Endosulfan I	2.4
Endosulfan II	2.4
Endosulfan sulfate	2.4
cis-Chlordane	0.094
PCBs, Total	0.1

Volatile Organic Compounds (mg/kg)	
Methylene chloride	0.05
1,1-Dichloroethane	0.27
Chloroform	0.37
Carbon tetrachloride	0.76
Tetrachloroethene	1.3
Chlorobenzene	1.1
1,2-Dichloroethane	0.02
1,1,1-Trichloroethane	0.68
Benzene	0.06
Toluene	0.7
Ethylbenzene	1
Vinyl chloride	0.02
1,1-Dichloroethene	0.33
trans-1,2-Dichloroethene	0.19
Trichloroethene	0.47
1,2-Dichlorobenzene	1.1
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
Methyl tert butyl ether	0.93
Xylenes, Total	0.26
cis-1,2-Dichloroethene	0.25
Acetone	0.05
2-Butanone	0.12
n-Butylbenzene	12
sec-Butylbenzene	11
tert-Butylbenzene	5.9
Naphthalene	12
n-Propylbenzene	3.9
1,3,5-Trimethylbenzene	8.4
1,2,4-Trimethylbenzene	3.6
1,4-Dioxane	0.1

Semivolatile Organic Compounds (mg/kg)	
Acenaphthene	20
Hexachlorobenzene	0.33
1,2-Dichlorobenzene	1.1
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
Fluoranthene	100
Naphthalene	12
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(k)fluoranthene	0.8
Chrysene	1
Acenaphthylene	100
Anthracene	100
Benzo(ghi)perylene	100
Fluorene	30
Phenanthrene	100
Dibenzo(a,h)anthracene	0.33
Indeno(1,2,3-cd)pyrene	0.5
Pyrene	100
Dibenzofuran	7
Pentachlorophenol	0.8
Phenol	0.33
2-Methylphenol	0.33
3-Methylphenol/4-Methylph	0.33
1,4-Dioxane	0.1

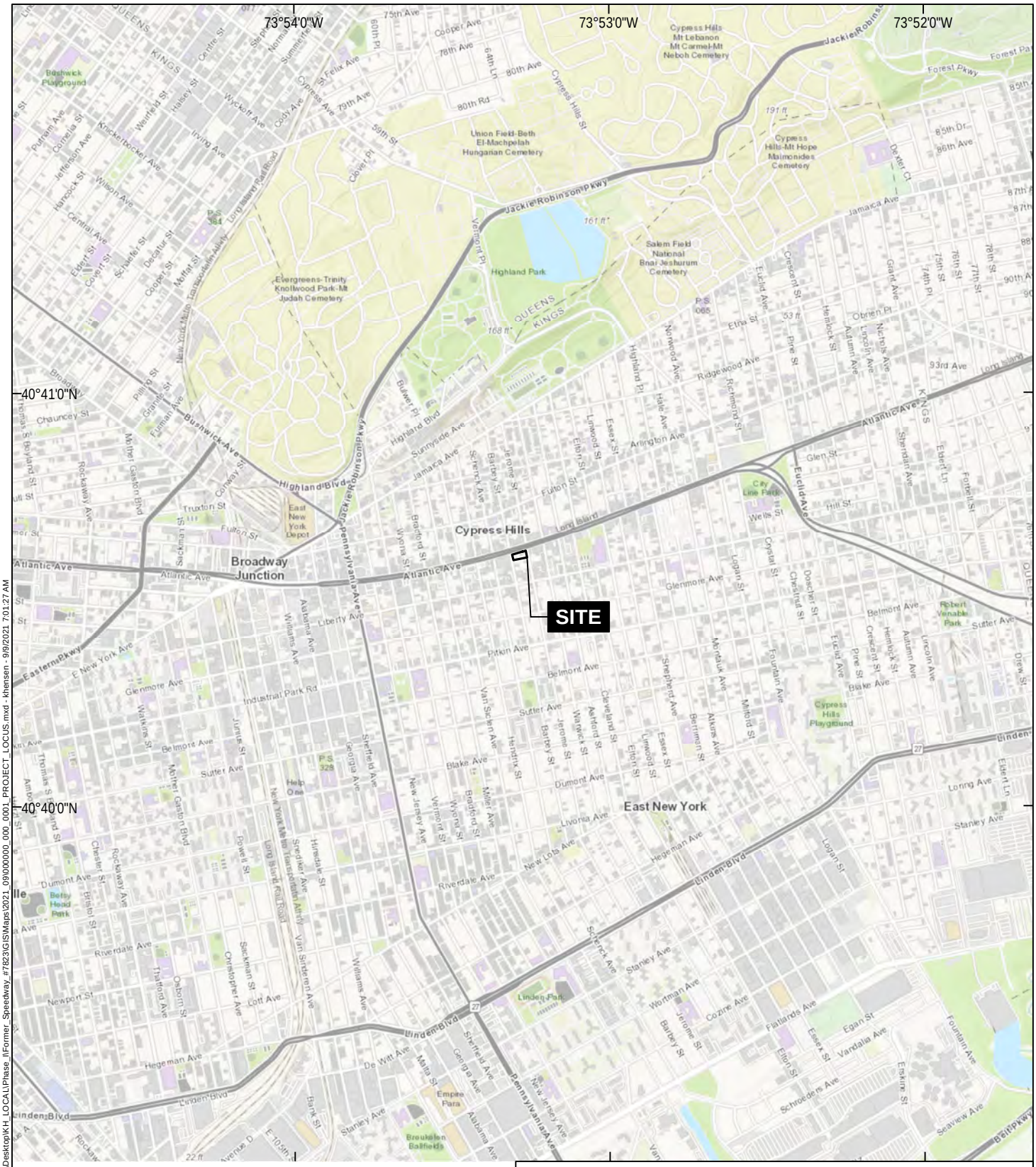
Metals (mg/kg)	
Arsenic, Total	13
Barium, Total	350
Beryllium, Total	7.2
Cadmium, Total	2.5
Copper, Total	50
Lead, Total	63
Manganese, Total	1600
Mercury, Total	0.18
Nickel, Total	30
Selenium, Total	3.9
Silver, Total	2
Zinc, Total	109

Notes:

1. Criteria are 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives

2. mg/kg: milligram per kilogram

FIGURES



HALEY ALDRICH

INTERIM REMEDIAL MEASURE WORK PLAN
SPEEDWAY #7823
2864 ATLANTIC AVENUE
BROOKLYN, NEW YORK

PROJECT LOCUS

MAP SOURCE: ESRI
SITE COORDINATES: 40°40'36"N, 73°53'17"W

APPROXIMATE SCALE: 1 IN = 2000 FT
NOVEMBER 2021

FIGURE 1

LEGEND

- COMMUTER RAIL LINE
- BLOCK 3965 SITE BOUNDARY
- APPROXIMATE LOCATION OF UNDERGROUND STORAGE TANKS
- EXISTING STRUCTURES TO BE DEMOLISHED

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: KINGS COUNTY
3. AERIAL IMAGERY SOURCE: NEARMAP, 12 AUGUST 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

INTERIM REMEDIAL MEASURE WORK PLAN
SPEEDWAY #7823
2864 ATLANTIC AVENUE
BROOKLYN, NEW YORK

IRM LOCATION PLAN

NOVEMBER 2021

FIGURE 2

GIS: C:\Users\khensen\OneDrive - haleyaldrich.com\Desktop\KH_LOCAL\Phase_I\Former_Speedway_#7823\GIS\Maps\2021_09\000000_000_0002_SITE_PLAN.mxd - khensen - 9/9/2021 6:48:56 AM

LEGEND

- COMMUTER RAIL LINE
- BLOCK 3965 SITE BOUNDARY
- APPROXIMATE LOCATION OF USTs EXCAVATION (TO 12 FT BGS)
- APPROXIMATE LOCATION OF SUPPORT SLOPE EXCAVATION (0 TO 12 FT BGS)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: KINGS COUNTY
3. AERIAL IMAGERY SOURCE: NEARMAP, 12 AUGUST 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

INTERIM REMEDIAL MEASURE WORK PLAN
SPEEDWAY #7823
2864 ATLANTIC AVENUE
BROOKLYN, NEW YORK

IRM EXCAVATION PLAN

NOVEMBER 2021

FIGURE 3

GIS: C:\Users\khensen\OneDrive - haleyaldrich.com\Desktop\KH_LOCAL\Phase_I\Former_Speedway_#7823\GIS\Maps\2021_09\000000_000_0002_SITE_PLAN.mxd - khensen - 9/6/2021 6:48:56 AM

LEGEND

- COMMUTER RAIL LINE
- BLOCK 3965 SITE BOUNDARY
- APPROXIMATE LOCATION OF UNDERGROUND STORAGE TANKS EXCAVATION
- APPROXIMATE LOCATION OF ENDPOINT AND SIDEWALL SAMPLES

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ASSESSOR PARCEL DATA SOURCE: KINGS COUNTY
3. AERIAL IMAGERY SOURCE: NEARMAP, 12 AUGUST 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

INTERIM REMEDIAL MEASURE WORK PLAN
SPEEDWAY #7823
2864 ATLANTIC AVENUE
BROOKLYN, NEW YORK

PROPOSED ENDPOINT SAMPLE LOCATION PLAN

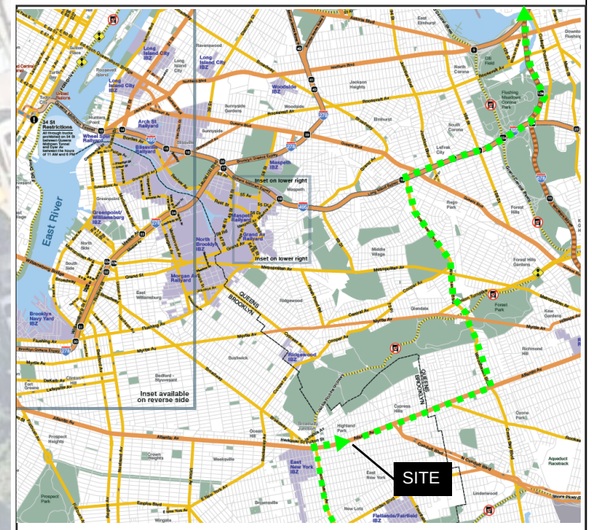
NOVEMBER 2021

FIGURE 4

GIS: C:\Users\khensen\OneDrive - haleyaldrich.com\Desktop\KH_LOCAL\Phase_I\Former_Speedway_#7823\GIS\Maps\2021_09\000000_000_0002_SITE_PLAN.mxd - khensen - 9/6/2021 6:48:56 AM

LEGEND

- COMMUTER RAIL LINE
- BLOCK 3965 SITE BOUNDARY
- INBOUND ROUTE
- TRUCK ROUTE
- OUTBOUND ROUTE
- CONSTRUCTURE ENTRANCE



Local Truck Route
Trucks with an origin or destination for the purpose of delivery, loading or servicing within the respective Borough, shall only operate on designated local routes, except that an operator may operate on a non-designated street for the purpose of arriving at his/her destination. This shall be accomplished by leaving a designated truck route at the intersection that is nearest to their destination, proceeding by the most direct route, and then returning to the nearest designated truck route by the most direct route. If the operator has additional destinations in the same general area, he/she may proceed by the most direct route to his/her next destination without returning to a designated truck route, provided that the operator's next destination does not require that he/she cross a designated truck route.

Through Truck Route
Trucks having neither an origin nor a destination within the respective Borough shall restrict the operation of such vehicles to those street segments designated as Through Truck Routes.

Through Truck Route on Expressway

Through Truck Route on Tunnel

Exception 53' Trailers Allowed
For definition see information on reverse side.

Industrial Business Zones (IBZ)

Parks and Open Spaces

29A **Highway Exit**

Commercial Vehicles Prohibited

Low Vertical Clearance Area

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

INTERIM REMEDIAL MEASURE WORK PLAN
SPEEDWAY #7823
2864 ATLANTIC AVENUE
BROOKLYN, NEW YORK

TRUCK ROUTE MAP

NOVEMBER 2021

FIGURE 5

GIS: C:\Users\khensen\OneDrive - haleyaldrich.com\Desktop\KH_LOCAL\Phase_II\Former_Speedway_#7823\GIS\Maps\2021_09\000000_000_0002_SITE_PLAN.mxd - khensen - 9/9/2021 6:48:56 AM

APPENDIX A

Previous Reports

(Included on USB)

APPENDIX B

Quality Assurance Project Plan

HALEY ALDRICH

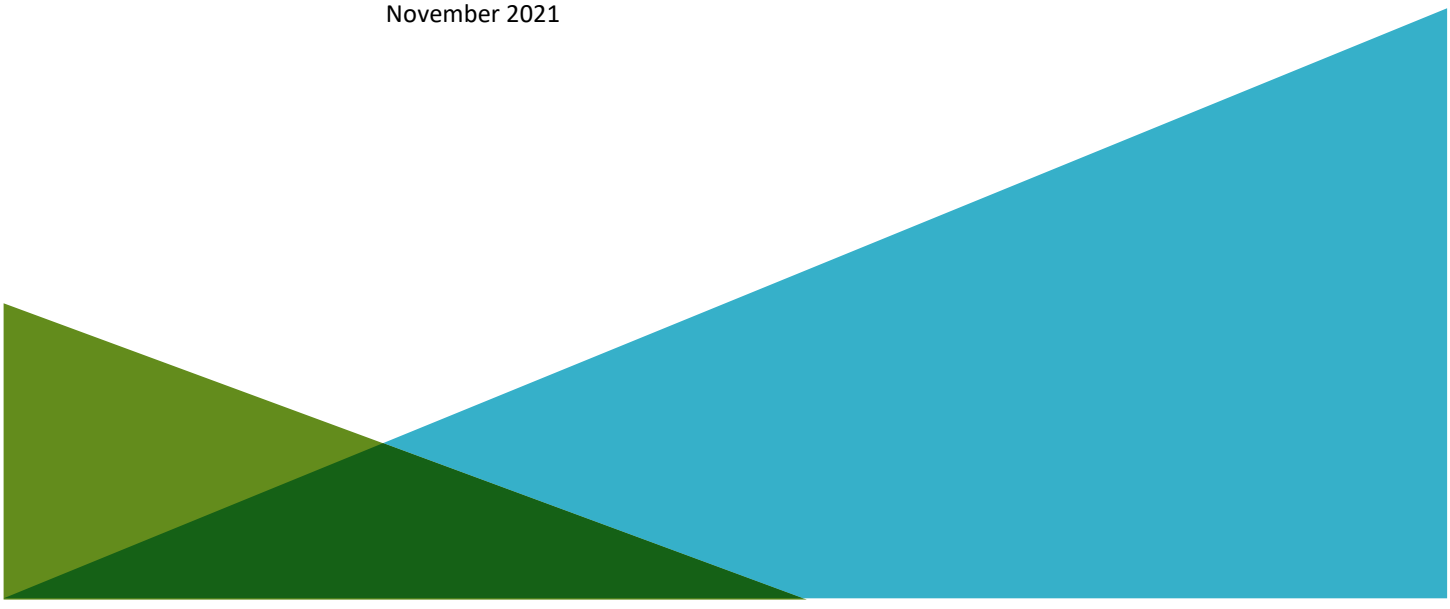
www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
2864 ATLANTIC AVENUE REDEVELOPMENT
SPEEDWAY #7823
BROOKLYN, NEW YORK

by
Haley & Aldrich of New York
New York, New York

for
2864 Atlantic Realty LLC
Hauppauge, New York

File No. 0203563
November 2021



Executive Summary

This Quality Assurance Project Plan outlines the scope of the quality assurance and quality control activities associated with the site monitoring activities associated with the Remedial Investigation Work Plan and Interim Remedial Measure Work Plan for 2864 Atlantic Avenue in Brooklyn, 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.

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1. Project Description

This Quality Assurance Project Plan (QAPP) has been prepared as a component of the Remedial Investigation Work Plan (RIWP) and Interim Remedial Measure Work Plan (IRMWP) for 2864 Atlantic Avenue in Brooklyn, 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 is provided in the Site Description and History Summary that accompanies the RIWP appended to the Brownfield Cleanup Program application for the Site and incorporated herein by reference.

1.3 LABORATORY PARAMETERS

The laboratory parameters for soil include:

- Target Compound List volatile organic compounds (VOCs) using EPA method 8260B
- Target Compound List semi-volatile organic compounds (SVOCs) using EPA method 8270C
- Total Analyte List (TAL) Metals using EPA method 6010
- Polychlorinated biphenyls (PCBs) using EPA method 8082
- Per- and polyfluoroalkyl substances (PFAS) using EPA method 537
- 1,4-Dioxane using EPA method 8260B

The laboratory parameters for groundwater include:

- Target Compound List VOCs using EPA method 8260C
- Target Compound List SVOCs using EPA method 8270C
- TAL Metals using EPA method 6010
- PFAS using EPA method 537
- 1,4-Dioxane using EPA method 8260B

Note: 1,4-Dioxane and PFAS sampling techniques will be conducted following the NYSDEC Collection of Groundwater Samples for PFAS from Monitoring Wells Sample Protocol.

During the collection of groundwater samples, pH, specific conductivity, temperature, dissolved oxygen (DO), and oxidation/reduction potential (ORP) will be measured until stabilized.

The laboratory parameter for soil vapor includes:

- VOCs using EPA method TO-15

Laboratory parameters for disposal samples will be determined by the disposal facility after an approved facility has been determined.

1.4 SAMPLING LOCATIONS

The RIWP/IRMWP provides the locations of soil borings, soil vapor implants and groundwater monitoring wells that will be sampled (as applicable).

2. Project Organization and Responsibilities

This section defines the roles and responsibilities of the individuals who will perform the RIWP/IRMWP monitoring activities. A NYSDOH certified analytical laboratory will perform the analyses of environmental samples collected at the Site.

2.1 MANAGEMENT RESPONSIBILITIES

The Project Manager is responsible for managing the implementation of the RIWP/IRMWP and monitoring and coordinating the collection of data. The Project Manager is responsible for technical quality control (QC) and project oversight. The Project Manager 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/IRMWP monitoring activities; and,
- Assure compliance with Site health and safety plan.

2.2 QUALITY ASSURANCE RESPONSIBILITIES

The Quality Assurance (QA) team will consist of a QA Officer and the Data Validation Staff. QA responsibilities are described as follows:

2.2.1 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.

2.2.2 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.

2.3 LABORATORY RESPONSIBILITIES

Laboratory services in support of the RIWP/IRMWP monitoring include the following personnel:

2.3.1 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.

2.3.2 Laboratory Operations Manager

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

2.3.3 Laboratory QA Officer

The Laboratory QA Officer will have sole responsibility for 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.

2.3.4 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.

2.3.5 Laboratory Technical Personnel

The Laboratory Technical Personnel will have the primary responsibility in 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 (SOP).

2.4 FIELD RESPONSIBILITIES

2.4.1 Field Coordinator

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

Other responsibilities include the following:

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

2.4.2 Field Team Personnel

Field Team Personnel will be responsible for the following:

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

3. Sampling Procedures

The FSP provides the SOPs for sampling required by the RIWP. Sampling will be conducted in general accordance with the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10) and the Sampling, Analysis and Assessment of PFAS under NYSDEC Part 375 Remedial Program when applicable.

3.1 SAMPLE CONTAINERS

Sample containers for each sampling task will be provided by the laboratory performing the analysis. The containers will be cleaned by the manufacturer to meet or exceed the analyte specifications established in the USEPA, "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. Equipment rinse blank 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 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 repeated for the second set of sample container.

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

3.3.1.2 Soil Samples

Soil field duplicates will be collected as specified in the following procedure:

1. Soils will be sampling directly from acetate liners.

2. Soil for VOC analysis will be removed from the sampling device as specified in the FSP.
3. Soil for non-VOC analysis will be removed from the sampling device and collected into clean laboratory provided containers.

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 sample or make 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 for sample packaging procedures.

- Samples will be assigned a unique sample number and will be affixed to a sample label. Refer to the FSP for sample labeling procedures.

- Samples will be properly and appropriately preserved by field personnel in order to minimize loss of the constituent(s) of interest due to physical, chemical or biological mechanisms.

- Appropriate volumes will be collected to ensure that the appropriate reporting limits can be successfully achieved and that the required QC sample analyses can be performed.

4.1.2 Transfer of Custody and Shipment Procedures

- A chain-of-custody (COC) 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 COC 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 have 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 thirty (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 Project Manager will be the custodian of the project file. The project files including all relevant records, reports, logs, field notebooks, pictures, subcontractor reports and data reviews will be maintained in a secured, limited access area and under custody of the Project Director or his designee.

The final project file will include the following:

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

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

5. Calibration Procedures and Frequency

5.1 FIELD INSTRUMENT CALIBRATION PROCEDURES

Several field instruments will be used for both on-site screening of samples and for health and safety monitoring, as described in the HASP. On-site air monitoring for health and safety purposes may be accomplished using a vapor detection device, such as a Photo-ionization 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 (formerly National Bureau of Standards), the U.S. 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 USEPA analytical protocols and/or project specific SOP.

6.1 FIELD ANALYTICAL PROCEDURES

Field analytical procedures include the measurement of pH, temperature, ORP, DO and specific conductivity during sampling of groundwater, and the qualitative measurement of VOC during the collection of soil samples.

6.2 LABORATORY ANALYTICAL PROCEDURES

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

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

6.2.1 List of Project Target Compounds and Laboratory Detection Limits

The laboratory reporting limits (RLs) and associated method detection limits (MDLs) for the target analytes and compounds for the environmental media to be analyzed are presented in Table I. MDLs have been experimentally determined by the project laboratory using the method provided in 40 CFR, Part 136 Appendix B.

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

6.2.2 List of Method Specific Quality Control Criteria

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

7. Internal Quality Control Checks

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

7.1 FIELD QUALITY CONTROL

7.1.1 Field Blanks

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

7.1.2 Trip Blanks

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

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

7.2 LABORATORY PROCEDURES

Procedures which contribute to maintenance of overall laboratory quality assurance and control 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 1 in 20 project samples.

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

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

Acceptance criteria for duplicate analyses performed on solid matrices will be 100% and aqueous matrices will be 35%. 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 (UCL or LCL) due to sample matrix effects, the results will be reported with appropriate data qualifiers. To determine the effect a non-compliant MS recovery has on the reported results, the recovery data will be evaluated as part of the validation process.

7.2.3 Laboratory Control Sample Analyses

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

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

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

Corrective actions will be initiated by the Haley & Aldrich 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 sample delivery group (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 standard immediately before analysis for quantitation via internal standardization techniques.

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

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

7.2.5 Calibration Verification Standards

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

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

7.2.6 Laboratory Method Blank Analyses

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

8. Data Quality Objectives

Sampling that will be performed as described in the RIWP/IRMWP 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 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.

8.1.2 Field Precision Sample Objectives

Field precision will be assessed through collection and measurement of field duplicate samples at a rate of 1 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 5 times (5X) the laboratory RL.

8.1.3 Laboratory Precision Sample Objectives

Laboratory precision will be assessed through the analysis of LCS and laboratory control duplicate samples (LCS/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 5 times (5X) 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 laboratory control samples (LCS) and Site-specific matrix spike (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 of the 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.

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%.

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 >90%.

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 Cooperative Research and Development Agreement (CRADA) suppliers or the National Institute of Standards and Technology (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 – mg/kg of media (Dry Weight).
- Aqueous Matrices – ng/L for PFAS analyses, ug/L of media for organic analyses, and 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 using the sample collection procedure described in Section 8.1.1 of the NYSDEC-approved Avangrid Field Sampling Plan. (Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

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

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

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

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

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

9. Data Reduction, Validation and Reporting

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

9.1 DATA REDUCTION

9.1.1 Field Data Reduction Procedures

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

9.1.2 Laboratory Data Reduction Procedures

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

9.1.3 Quality Control Data

QC data (e.g., laboratory duplicates, surrogates, matrix spikes, and matrix spike duplicates) 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 QA Officer or designee using the following documents as guidance for the review process:

- "U.S. EPA National Functional Guidelines for Organic Data Review”, 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 QAO. Tier 1 data validation (the equivalent of USEPA’s Stage 2A validation) will be performed to evaluate data quality.

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

9.3 DATA REPORTING

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

- Field Data Reporting: Field data reporting will be conducted principally through the transmission of report sheets containing tabulated results of measurements made in the field and documentation of field calibration activities.

- Laboratory Data Reporting: The laboratory data reporting package will enable data validation based on the protocols described above. The final laboratory data report format will include the QA/QC sample analysis deliverables to enable the development of a data usability summary report (DUSR) based on Department DER-10 Appendix 2B.

10. Performance and System Audits

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

10.1 FIELD PERFORMANCE AND SYSTEM AUDITS

10.1.1 Internal Field Audit Responsibilities

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

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

10.1.2 External Field Audit Responsibilities

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

- Sampling equipment decontamination procedures;
- Sample bottle preparation procedures;
- Sampling procedures;
- Examination of health and safety plans;
- 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 limited to:

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

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

- Comparison of 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 down time. 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 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 include 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 Section 7.0 of this QAPP. The accuracy of pH and specific conductance will be assessed using daily instrument calibration, calibration check, 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:

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

12.2 LABORATORY DATA

Surrogate, internal standard and matrix spike recoveries will be used to evaluate data quality. The laboratory QA/QC program will include the following elements:

- Precision, in terms of RPD, will be determined by relative sample analysis at a frequency of one duplicate analysis for each batch of ten project samples or a frequency of 10%. RPD is defined as the absolute difference of duplicate measurements divided by the mean of these analyses normalized to percentage.

- Accuracy, in terms of percent recovery (recovery of known constituent additions or surrogate recoveries), will be determined by the analysis of spiked and unspiked samples. MS/MSD will be used to determine analytical accuracy. The frequency of MS/MSD analyses will be one project sample MS/MSD per set of 20 project samples.

- One method blank will be prepared and analyzed with each batch of project samples. The total number of method blank sample analyses will be determined by the laboratory analytical batch size.

- SRMs will be used for each analysis. Sources of SRM's include the U.S. EPA, commercially available material from CRADA certified vendors and/or laboratory produced solutions. SRMs, when available and appropriate, will be processed and analyzed on a frequency of one per set of samples.

- Completeness is the evaluation of the amount of valid data generated versus the total set of data produced from a particular sampling and analysis event. Valid data is determined by independent confirmation of compliance with method-specific and project-specific data quality

objectives. The calculation of data set completeness will be performed by the following equation.

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

13. Quality Assurance Reports

Critically important to the successful implementation of the QA Plan 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 QA Officer when appropriate and presented to the project and/or laboratory management personnel so that performance criteria can be monitored for all analyses from each analytical department. The updated trend/QA charts prepared by the laboratory QA personnel will be distributed and reviewed by various levels of the laboratory management.

References

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

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

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

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

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

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

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

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

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

10. New York State Department of Environmental Conservation, NYSDEC, Division of Environmental Remediation, Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC Part 375 Remedial Program, January 2021.

TABLES

TABLE I

SUMMARY OF ANALYSIS METHOD, PRESERVATION METHOD, HOLDING TIME, SAMPLE SIZE REQUIREMENTS AND SAMPLE CONTAINERS

2864 Atlantic Avenue
Brooklyn, NY

Analysis/Method	Sample Type	Preservation	Holding Time	Volume/Weight	Container
Volatile Organic Compounds/8260C	Soil	1 - 1 Vial MeOH/2 Vial Water, Cool, 4 ± 2 °C	14 days[1]	120 mL	3 - 40ml glass vials
Semivolatile Organic Compounds/8270D	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Polychlorinated Biphenyls/8082A	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Metals/6010D	Soil	Cool, 4 ± 2 °C	180 days	60 mL	1 - 2 oz Glass
PFAS 537	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
1,4-Dioxane 8270	Soil	Cool, 4 ± 2 °C	14 days	250 mL	1 - 8 oz Glass
Volatile Organic Compounds/8260C	Groundwater	HCl, Cool, 4 ± 2 °C	14 days	120 mL	3 - 40ml glass vials
Semivolatile Organic Compounds/8270D	Groundwater	Cool, 4 ± 2 °C	7 days	500 mL	2 - 250 mL amber glass
TAL Metals 6020	Groundwater	HNO_3Cool, 4 ± 2 °C	180 days	500 mL	1 - 500 mL plastic bottle
PFAS 537	Groundwater	H2O Cool, 4 ± 2 °C	14 days	500 mL	2 - teflon free 250 ml plastic containers
1,4-Dioxane 8270	Groundwater	Cool, 4 ± 2 °C	7 days	500 mL	1 - 500 mL plastic bottle
Volatile Organic Compounds/TO-15	Soil Vapor	N/A	30 days	2.7 - 6 L	1 2.7 or 6 L Summa Canister

Notes:

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

APPENDIX C

Resumes

HALEY ALDRICH

SCOTT A. UNDERHILL, P.E.

Senior Environmental Remediation Engineer

EDUCATION

M.S., Environmental Engineering, State University of New York
B.S., Civil Engineering, State University of New York

PROFESSIONAL REGISTRATIONS

1998/ NY: Professional Engineer (Reg. No. 075332)

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour Hazardous Waste Operations and Emergency Response Supervisor Training
Project Management Training
8-Hour Hazardous Waste Operations and Emergency Response Refresher

Scott has 25 years of experience as an environmental engineer. His diverse background includes the investigation, design, installation, and operation of remediation systems for soil, water, and air; design of water and wastewater treatment facilities; energy studies; and numerical modeling of environmental media. Scott has worked for federal, state and industrial clients throughout the United States, most recently working on the remediation of contaminated sites, such as manufactured gas plant (MGP) and chlorinated solvent, in the Northeast and Midwest.

RELEVANT PROJECT EXPERIENCE

New Jersey Natural Gas, Former MGP Remediation, Toms River, New Jersey. Construction project manager for the construction inspection oversight of a former MGP that consists of the removal and off-site disposal of 6,800 cubic yards of impacted soils, dewatering during excavation that produced over 12,000,000 gallons of water to handle, treat and dispose, and in situ solidification (ISS) of 85,000 cubic yards of soil to depths of 45 feet. Engineering oversight services provided during construction included attending weekly meetings, reviewing contractor submittals, issuing field orders and work change directives, reviewing and responding to change order requests, developing change orders, responding to request for information, and documenting remediation activities in a remedial action report.

Duke Energy, Former MGP Remediation, Cincinnati, Ohio. Lead design engineer for a design/build remediation project at a former MGP that consists of the removal and off-site disposal of 75,000 cubic yards of impacted soils, dewatering during excavations, and ISS of over 150,000 cubic yards of soil to depths of 60 feet below ground surface. Engineering services provided during construction included weekly engineering calls, working with contractor to develop engineering solutions to changes in field conditions, reviewing contractor submittals, issuing field orders, developing change orders, and documenting remediation activities in a construction completion report.

AEP, Former MGP Remediation, Three Rivers, Michigan. Lead design engineer for a design/build remediation project at a former manufactured gas plant (MGP) that consists of the installation of a four-cell sheeting system, installation and operation of a dewatering system that removed and discharged 420,000 gallons of water, and removal and off-site disposal of 5,400 cubic yards of impacted soils. Engineering services included developing full set of design drawings and specifications and provided engineering oversight during construction included weekly engineering calls, working to develop engineering solutions to changes in field conditions, and documenting remediation activities in a construction completion report.

American Electric Power, Former MGP Remediation, Dowagiac, Michigan. Lead design engineer for a design/build remediation project at a former manufactured gas plant (MGP) that consists of the removal and off-site disposal of 1,000 tons of impacted soils. Engineering services included developing full set of design drawings and specifications

and provided engineering oversight during construction included weekly engineering calls, working to develop engineering solutions to changes in field conditions, and documenting remediation activities in a construction completion report.

New York State Energy and Gas, Former MGP Remediation, Lockport, New York. Project manager for the remedial design of a former MGP that consists of the removal of 4,000 cubic yards of impacted soils, overburden non-aqueous phase liquid (NAPL) collection trench, 600 linear feet of bedrock grout wall, bedrock NAPL collection wells and the removal of 1,200 cubic yards of impacted sediment from the NYS Barge Canal. Design required submission of work plan, pilot test for grout wall implementation, and New York State Department of Environmental Conservation (NYSDEC) approval of final design drawing, report and specifications. Program director for the engineering oversight services provided during construction which included attending weekly meetings, reviewing contractor submittals, reviewing and approving change orders, responding to request for information, and certifying the construction completion report.

New York State Energy and Gas, Former MGP Remediation, Norwich, New York. Project manager for design and construction management, including design of an ISS system of 52,000 cubic yards of soil and NAPL recovery, in situ chemical oxidation (ISCO) and enhanced in situ bioremediation systems for the off-site groundwater plume. Scott managed preparation of work plans for submission to the NYSDEC and on-site construction management services during remediation of the on-site ISS services. Scott managed the operation and maintenance of the NAPL recovery system from 2009-2016 which resulted in the recovery of almost 100,000 gallons of total fluids or 40,000 gallons of NAPL. Due to the large quantities of NAPL encountered off-site, initiated and obtained NYSDEC approval in 2015 for a modification to the Record of Decision to all for ISS of the off-site soils rather than NAPL recovery and ISCO. Program director for the design package for the ISS treatment of 11,500 cubic yards of soil and NAPL.

New York State Energy and Gas, Former MGP Remediation, Ithaca, New York. Project manager for remedial design of a former MGP plant that consisted of the removal of 11,000 tons of impacted soils within sheet piling down to a depth of 18 feet, temporary relocation of a sewer main, and three injection events for in situ chemical oxidation (ISCO) treatment of coal tar stringers. Design requires submission of work plan, pilot test for ISCO implementation, and NYSDEC approval of final design drawing, report and specifications. Program director for the engineering oversight services provided during construction which included attending weekly meetings, reviewing contractor submittals, reviewing and approving change orders, responding to request for information, and certifying the construction completion report.

New York State Department of Environmental Conservation, New York. Program manager of three standby engineering services contracts issued by the NYSDEC for the investigation, design, construction oversight, and site management of inactive hazardous waste sites within New York. Responsible for overall program management, including budgeting, schedule and quality deliverable to the NYSDEC for over 100 individual work assignments valued at over $35,000,000, which was managed by a team of over 12 project managers. As required, acted as engineer-of-record for many sites, which required approval of feasibility studies, remedial designs, construction completion reports, and periodic review reports.

United States Army Corps of Engineers, Former Scotia Naval Depot, Scotia, New York. Project manager for the design and installation of a 900-foot-long, 45-foot-high and 0.25-foot-thick permeable reactive barrier (PRB) wall containing zero valent iron. The PRB was installed to treat a chlorinated solvent groundwater plume. In addition, four large commercial buildings (80,000 square feet) over a portion of the groundwater plume were fitted with sub-slab depressurization systems to mitigate indoor air concerns. As project manager, Scott was responsible for project deliverables, costs, schedule and quality for the $10MM remediation project.

New York State Department of Environmental Conservation, Scotia New York. Remedial design lead and engineer of record for the development and issuance of two feasibility studies (on-site and off-site) for a large, complex inactive hazardous waste site. An estimated 7,000 gallons of tetrachloroethylene (PCE) released to the environment created a groundwater plume almost ¾ mile in length and impacting numerous residential supply wells. The on-site feasibility

study evaluated remedial technologies selecting excavation and in situ thermal treatment for a present worth cost of $14,000,000. The off-site feasibility study selected ISCO/bioremediation and downgradient permeable reactive barrier wall to treat the plume with concentrations greater than 100 μg/L with a present worth cost of $13,000,000. Also designed an aeration system as an interim remedial measure to treat PCE impacts to local surface water detention pond and stream.

New York State Department of Environmental Conservation, Scotia New York. Project manager for the design and construction oversight of the installation of water line to a residential neighborhood affected by a PCE plume. The design consisted of engineering calculations, basis of design, drawings, and specifications for the installation of 8,800 linear feet of water main and 100 residential connections. Construction services included reviewing contractor submittals and invoices, overseeing contractor work, responding to request for information and attending weekly construction meetings.

New York State Energy and Gas, Former MGP Remediation, Homer, New York. Project manager for design and construction management, including design of a permanent watertight barrier wall system, in situ stabilization system within the utility corridor and a temporary water treatment plant as part of the remediation of 25,000 cubic yards of soil. Scott managed preparation of work plans for submission to the NYSDEC and on-site construction management services during remediation. Scott managed air monitoring, scheduling of trucks for off-site disposal of impacted soil, and preparation of daily reports and a final closure report.

New York State Energy and Gas, Former MGP Remediation, Mechanicville, New York. Project manager for design and construction management, including the design of a temporary watertight barrier wall system and temporary water treatment system as part of a remediation of 10,000 cubic yards of soil. The project also included the evaluation and development of alternatives for the recovery of coal tar contamination in the fractured bedrock underlying the site, which included performing multiple long-term NAPL recovery pump tests. Project manager for the engineering oversight services provided during construction which included attending weekly meetings, reviewing contractor submittals, reviewing and approving change orders, responding to request for information, and certifying the construction completion report.

New York State Department of Environmental Conservation, Poughkeepsie, New York. Engineer of record for the design and construction oversight of the thermal treatment of soil and groundwater at an inactive hazardous waste site impacted with chlorinated solvents. The design consisted of engineering calculations, basis of design, drawings, and specifications for the installation 100 electrodes to treat the 0.5-acre plume. Construction services included reviewing contractor submittals and invoices, overseeing contractor work, responding to request for information and attending regular construction meetings.

New York State Department of Environmental Conservation, Poughkeepsie, New York. Project engineer for the design and implementation of a full-scale pilot test of in situ enhanced bioremediation to treatment of soil and groundwater at an inactive hazardous waste site impacted with chlorinated solvents. The pilot study consisted of direct injection of approximately 4,150 gallons of 60% edible vegetable oil (EVO) and 7,825 pounds zero-valent iron (ZVI) at 75 points. Scott managed development of design and bid package, selected and oversaw injection contractor, and reviewed follow-on sampling reports.

United States Army Corps of Engineers, Griffiss Air Force Base, Rome, New York. Project engineer for land farming treatment of over 50,000 cubic yards of petroleum impacted soils. Activities included design of a land farming approach in a performance based contract to successfully remediate the soils within a three-year contract period. Due to an aggressive remediation approach, all soils were remediated within two years.

New York State Electric and Gas, Cortland Homer Manufactured Gas Plant Demolition Procurement, Homer, New York. Project manager for procuring a contractor to demolish the southern portion of the MGP building as defined by the demolition drawings. Work included developing a request for proposal with final demolition drawings, specifications, and bid schedule and overseeing successful completion of the building demolition.

New York State Energy and Gas, Former MGP Remediation, Oneonta, New York. Project engineer for the design of temporary water treatment system as part of the remediation of a former MGP site.

US Air National Guard, Site Management and Project Close-Out for Site 2 – Pesticide Burial Pit, Stewart ANGB, Newburg, New York. Project manager for preparation of a site management plan (SMP) and periodic review report (PRR) for Site 2 - Pesticide Burial Pit Area at the 105th Airlift Wing (AW), New York Air National Guard (ANG), and Stewart International Airport. Due to negotiations with the NYSDEC, Site 2 was delisted.

US Air National Guard, Remedial Design and Remedial Action, Site 15, Hancock ANGB, New York. Project engineer for the bioremediation of a petroleum groundwater plume. The project included the design, installation and operation of a 15 well biosparing system for the on-site source area and the injection of calcium peroxide for the downgradient plume. Responsible for the remedial action work plan, construction completion report and annual periodic review reports.

US Air National Guard, Interim Remedial Action and Focused Feasibility Study, Sites 3 and 6, Stratton ANGB, New York. Project manager for an interim remedial measure and focused feasibility study at Site 3 contaminated with chlorinated solvents, and Site 6 contaminated with petroleum hydrocarbons. At Site 6, managed removal of 6,200 tons of contaminated soil, installation of a horizontal well network below the water table, and injection of a substrate into the groundwater to enhance biodegradation of the contaminants. At Site 3, managing removal of 600 tons of contaminated soils from four hot spots, delineation of the nature and extent of groundwater contamination by installing and sampling new wells.

BP, Pilot-Scale Soil Thermal Treatment, Rumaila, Iraq. Primary author of a pilot scale work plan for the treatment of heavily-impacted soils at the Rumaila Well Field. Work plan included the evaluation of several thermal desorption units capable of being shipped to the location, transportation logistics, compound design for placement of the unit and utility requirements to operate the TDU.

Confidential Client, Lagoon Biocell Design, Maybrook, New York. Project engineer for the design of a membrane lined biocell for the treatment of 25,000 cubic yards of soils impacted with petroleum and pyridine compounds associated with former waste lagoons. Design also included the use of enhanced bioremediation for the contaminants of concern in groundwater. Scott managed development of a design in accordance with the remedial design and remedial action framework developed by the United States Environmental Protection Agency (USEPA).

Chevron, Malabalay Remediation Project, Philippines. Project engineer for remedial design sub-slab depressurization system and vapor barrier for the redevelopment of a gasoline station for a Jolibee Store in Malabalay. Project was completed within budget and on-time given challenging field conditions.

Confidential Client, Solid Waste Disposal Area, Kisladag, Turkey. Project engineer responsible for the development of a feasibility study to evaluate 1,250 cubic meters of petroleum impacted soil as a waste storage area at an active mining facility in Turkey. Remedial alternatives evaluated included land farming, windrow composting, bioremediation in piles, in situ solidification, and capping.

Chevron, Remedial Design and construction Oversight, Service Station/Residential House, Manila, Philippines. Project engineer for the design and implementation of a sub-slab barrier system and vapor collection system at a residential home downgradient from a gas station. Travelled to site to oversee installation and quality control of the first sub-slab barrier system to be installed in the Philippines. Project was recognized by Chevron for being completed with zero accidents.

BEM Systems, Remedial Design and Remedial Action, Site 6, Schenectady ANGB, New York. Project manager for the design and implementation of the in situ chemical oxidation of chlorinated hydrocarbon impacted groundwater at Site 6. Project included supporting the development and issuance of the Record of Decision (ROD), submission and approval of the remedial design and implementation of the injection of sodium permanganate to treat the residual groundwater plume at Site 6.

Navy, Light Non-Aqueous Phase Liquid (LNAPL) Modeling Effort, Pearl Harbor, HI. Provided technical support for investigation and modeling of several large LNAPL plumes at the Shipyard GSA at Pearl Harbor. The modeling effort included applying the van Genuchten method to properly estimating the LNAPL plume size, volume, distribution, transport, and potential release to the harbor.

New York State Department of Environmental Conservation, Remediation System Installation, National Heatset Printing, East Farmingdale, New York. Project engineer supporting the installation and evaluation of a pilot study evaluating the use of an innovative technology - density driven convection (DDC) and in-well stripping – for the treatment of a large chlorinated solvent plume in a sandy aquifer on Long Island.

NYSDEC, Remedial Design and Construction Oversight, North East Alloy and Metals Site, Utica, New York. Project engineer for the design of a sub-slab depressurization system (SSDS) at a residential house above a chlorinated solvent plume. The design utilized two fans and six vacuum points installed over a concrete slab. Oversaw contractor's installation of the system including sealing of the concrete floor cracks and documented installed system met the performance requirements of the design.

Confidential Client, Remediation System Pilot Study and Evaluation, Schenectady, New York. Project engineer responsible for technical evaluation and comparison of a traditional and an innovative thermal enhanced soil vapor extraction system below a concrete slab. The innovative thermal enhanced soil vapor extraction (TESVE) system removed over 99.99% of the volatile compounds and over 96% of the semi volatile compounds in the unsaturated zone and outperformed the traditional TESVE system.

NYSDEC, Remedial Design and Construction Oversight, Utility Manufacturing Site, New Hampstead, New York. Project engineer for the design of nine SSDSs at three industrial buildings above a chlorinated solvent plume. The design utilized 30 fans and 30 vacuum points installed over a concrete slab. Oversaw contractor's installation of the system and documented that the installed system met the performance requirements of the design.

NYSDEC, Remediation System Optimization, Multiple Sites, New York. Provided technical support for the optimization and improvements of a number of remediation systems currently operated under the NYSDEC contract (D004445). System evaluations and improvements included the Becker Electronic pump-and treat system; NOW Corporation pump-and-treat system; SMS Industries biosparge (PhoSTER) system; Kingsbury Landfill pump and treat system, Fort Edward phytoremediation system; and Korkay soil vapor extraction/air sparging system.

NYSDEC, Site Management, Multiple Sites, New York. Provided technical support, final review and engineering certification for periodic reviews on the following sites: Armonk; Becker Electronics; Dzus Fasteners; Fort Edward Landfill; Kingsbury Landfill; Korkay; Liberty Industries; Now Corporation; Old Agway; ServeAll; and SMS Industries.

NYSDEC, Remedial Design, BB&S Treated Lumber Site, Southampton, New York. Project engineer reviewing preliminary design concepts of the groundwater remedy selected in the ROD for this former wood pressure treating site. The site was contaminated primarily with chromium, which was associated with the former wood preservative chromated copper arsenate (CCA). Using results from the pre-design investigations, prepared a Supplemental Feasibility Study (FS) that formed the basis for NYSDEC to amend the ROD for the site. The Amended ROD revised the groundwater remedy for the site from groundwater pump and treat to providing an alternative water-supply to authorized homes and businesses, and ongoing monitoring of plume attenuation.

New York State Department of Environmental Conservation, Construction Oversight, Freeman's Bridge Site, Scotia, New York. Quality assurance/quality control (QA/QC) manager for the certification report of completion for the remediation of contaminated soils using low-temperature thermal desorption at the 34 Freeman's Bridge Road site.

New York State Office of General Services (NYSOGS), Remediation System Optimization, Multiple Sites, New York. Provided technical support for optimization and improvements of a number of remediation systems operated under the NYSOGS contract. System evaluations and improvements included the Bedford Hills pump-and-treat system and the Highland Residential pump-and-treat system.

Bank of New York, Brownfield Remediation Monthly Site Visits, Flushing, New York. Project manager for periodic site visits to review progress of work performed by Creamer Environmental, Inc., the remedial contractor working on behalf of Muss Development. Scott managed the review of the remedial progress in relation to the proposed schedule, budget, and New York State Department of Environmental Conservation approved work plans. Scott managed preparation of a site observation report with information pertaining to construction status; permits, tests, and certifications; subcontracts; change orders; and contractor's completion schedule.

Remediation System Design, Fort Drum Military Reservation, New York. Scott designed a 150-well multiphase extraction and air sparging system for remediation of a 200,000-gallon gasoline-contaminated area and oversaw installation, start-up, and operation of the complex remedial systems.

Solvent Site Remediation, Batavia, New York. Scott designed and implemented injection of whey powder solution for the bioremediation of a chlorinated solvent site.

Railyard, Oneonta, New York. Scott designed, installed, and operated two 8-well soil vapor extraction and air sparging system at an industrial facility.

Railyard Site, North Creek, New York. Scott implemented an innovative application of Fenton's reagent to remediate diesel-contaminated soil at a historic railyard. Was awarded an Engineering Excellence Award by the American Consulting Engineering Council.

Toluene Site, Pittsburgh, Pennsylvania. Scott optimized a 20-well soil vapor extraction and air sparge system at an industrial facility in an urban area.

Town of Windham, Wastewater Treatment Plant, Windham, New York. Scott designed a new 250,000-gpd wastewater treatment plant that used tertiary filtration, microfiltration, and ultraviolet disinfection.

Ski Windham, Wastewater Treatment Plant, Windham, New York. Scott designed tertiary filtration, microfiltration, and ultraviolet disinfection for a treatment plant upgrade.

Wastewater Treatment Plant Upgrade, Endicott, New York. Scott designed solids contact tanks, secondary clarifiers, ultraviolet disinfection system, and pumping station as part of the upgrade of the 10-mgd wastewater treatment plant.

New York State, Gas-to-Energy Studies, New York. Scott evaluated the potential of using landfill gas from Colonie Landfill at Mohawk Paper mills boilers.

New York State, Sludge-to-Energy Study, Glens Falls, New York. Scott evaluated the potential of using dried paper sludge from a paper manufacturer as feed material and energy source at a cement kiln.

Groundwater and Soil Vapor Treatment, Pease AFB, NH, and Loring AFB, Maine. Scott designed, installed, and operated in-situ treatment systems at the former bases, including two groundwater pump-and-treat systems, four soil vapor extraction and air sparging systems, and 16 bioventing systems.

Hydrocarbon Cleanup, Pease AFB, New Hampshire. Scott evaluated and implemented the use of natural attenuation to remediate more than 60 petroleum hydrocarbon plumes.

Remedial Action, Loring AFB, Maine. Field engineer responsible for eight remedial actions including oversight of three subcontractors.

Oak Ridge National Laboratory, RI Report, Oak Ridge, Tennessee. Scott prepared remedial investigation report for a radioactive waste burial.

Radioactive Waste Disposal Sitting Study, Nebraska. Scott provided hydrologic modeling support for the safety analysis and license application permit for siting a low-level radioactive waste disposal site.

PUBLICATIONS

"Subsurface Solution," with C.H. Floess, T. Blazicek, M. Thorpe, S. McDonough and R. Doshi, *American Society of Civil Engineering Magazine*, pp. 76-81,86. September 2012.

"In Situ Chemical Oxidation of Saturated and Unsaturated Petroleum-Containing Soils at a Historic Railroad Site," with A.R. Vitolins, B.R. Nelson, L.M. Thomas, *Contaminated Soil Sediment and Water, International Issue*, pp. 38-40, 2001.

"Development and Application of a Geographically-Based Groundwater Flow and Solute Transport Model," Master's Thesis, State University of New York at Buffalo, 1993.

INVITED LECTURER OR SPEAKER

"Developing a Water Supply System in Rural Haiti," Albany, New York Celebration of Engineer's Week. February 16, 2012.

"Remediation of a Former MGP Site in Norwich, New York: A Case Study," with C. Floess and T. Blazicek, 27th Annual Conference on Contaminated Soils, Amherst, Massachusetts, October 17-20, 2011.

"Developing a Water Supply System in Rural Zimbabwe,". Albany, 7 June 2016, New York Celebration of Engineer's Week. February 15, 2008.

"Remediation of Petroleum-Containing Soil and Groundwater at a Former Rail Yard Locomotive Fueling Area," with S. Compston, B.R. Nelson, L.M. Thomas, 20th Annual Conference on Contaminated Soils, Amherst, Massachusetts, October 18-21, 2004.

"Optimization of an LNAPL Recovery System Based on the Observational Approach," with S. Taylor and A. Ditto, ASCE International Water Resources Engineering Conference in Seattle, Washington, August 8-11, 1999.

"Natural Attenuation of 60 Petroleum Groundwater Plumes at Pease Air Force Base, New Hampshire, USA," with S. Szojka and J. Flagg, 6th FZK/TNO International Conference on Contaminated Soils, Edinburgh, Scotland. May 17-21, 1998.

"Bioremediation of Petroleum Contaminated Soils at Loring Air Force Base, Maine," with P. Forbes and J.A. Mueller, Fourth International Conference on Bioremediation, New Orleans, Louisiana, April 28-May 2, 1997.

"Expedited CERCLA Removal Actions at Loring AFB," with T.R. Wood, D. St. Peter, D.S. Hopkins and J.A. Mueller, Maine. 11th Annual Conference on Contaminated Soils, Amherst, Massachusetts, October 21-24, 1996.

"Innovative Investigative Technique for Characterization of Radioactive Disposal Trenches," with J.B. Cange and S.A. Blair, Superfund XVI Conference, Washington D.C., November 6-8, 1995.

"Development of a Geographically Based Groundwater Flow and Solute Transport Model," with S.W. Taylor and J.V. DePinto, ASCE International Groundwater Symposium, San Antonio, Texas, August 14-18, 1995.

"Modeling Surface Water Flow and Contaminant Flux from a Mixed Waste Burial Ground," with R.A. Lambert and J.B. Cange, 21st Environmental Symposium. San Diego, California, April 18-21, 1995.

"Who's Taking Out the Garbage?", ASCE Environmental Engineering Division Conference. Reno, Nevada, July 6-10, 1991.

JAMES BELLEW

Senior Client Leader

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 Bellew is a senior client leader and geologist with experience in bedrock, soil and groundwater investigation and an emphasis on remedial design and implementation and will focus his time at Haley & Aldrich serving the Buildings and Infrastructure markets. His experience also includes completion of numerous Phase I Environmental Site Assessments and Phase II Environmental Site Investigations, development of conceptual site models, site characterization, environmental permitting, environmental compliance reports as well as remedial design and implementation. He has been involved with numerous projects within the New York State Superfund Program, New York State Brownfield Clean-up Program and New York City Office of Environmental Remediation E-Designation Program.

James has designed, estimated and managed large-scale remediation jobs in a variety of settings in the New York/New Jersey metropolitan area. He has performed construction management services on large scale projects requiring abatement of asbestos-containing materials and polychlorinated biphenyls (PCBs). He has direct experience developing and implementing operation, maintenance and monitoring programs for groundwater and soil remediation systems.

James has also worked on large scale remediation projects for Manufactured Gas Product (MGP) in the lower New York Region from former operations associated with National Grid and Con Edison. He has also designed, installed, operated and maintained remedial systems at retail petroleum stations for Hess Amerada, British Petroleum, Sunoco and Shell in addition to providing operation and maintenance programs for chemical injection and petroleum systems for New York State Department of Environmental Conservation (NYSDEC) Superfund and Environmental Protection Agency (EPA) Superfund Sites.

RELEVANT PROJECT EXPERIENCE

Development, Former BP Station, Elmhurst Queens, NY. James was responsible for the preparation of a full environmental impact statement with respect to a mixed-use development proposed in Elmhurst Queens. The work includes 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 Superfund Site, Former Nuhart Plastics Site, New York State Superfund Site, Brooklyn, NY. Senior Project Manager for a feasibility study and remedial planning for a former plasticizer facility with on- and off-site pollutant concerns. Project was a high-profile New York State Superfund Site that required compliance with the

NYSDEC, the New York City Office of Environmental Remediation (NYCOER), and local regulatory agencies. Ongoing work was the operation and maintenance (O&M) activities related to two large groundwater plumes impacted by light non-aqueous liquids (LNAPL) with phthalates and trichloroethene (TCE), which extend downgradient of the Site. Completed the first remedial action design for Lot 57 with is enrolled in the NYCOER E-Designation program. The Site will include two additional developments within the former manufacturing building footprint.

New York State Brownfield Site, Former Delta Metals Site, Brooklyn, NY. 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 Brownfield Cleanup program as a Participant where TCE and tetrachloroethene (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 in construction.

Manufacturing-Industrial, Hess Amerada, Bogota and Edgewater, NJ. James provided construction management services for the demolition of two waterfront terminals, one each on the Hackensack and Hudson rivers. Demolition included oversight, planning and coordination of activities related to asbestos abatement, demolition of buildings, thirty holding tanks, piping structures, containment structures and storm water structures.

Manufacturing-Industrial, PQ Corporation, Northeastern United States. James designed and implemented a three phased program for handling PCBs 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. Program also included design and oversight of a new façade and roof upgrades completed concurrently to client operations.

Development, New York State Brownfield Site, Former Cascade Laundry, Brooklyn, NY. James was responsible for environmental and construction management services required to successfully navigate seven-building redevelopment project through the NYSDEC Brownfield Cleanup Program (BCP). 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 cubic yards of soil, groundwater extraction and treatment, underground storage tank (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, NY. James was responsible for environmental site investigation and remediation activities required to successfully navigate the project through the New York City Office of Environmental Remediation's (NYCOER's) E-Designation and Voluntary Cleanup Programs. Project included demolition of for existing buildings and development of two separate mixed-use buildings.

Development, New York State Brownfield Site, BJ's Wholesale, Brooklyn, NY. James managed construction oversight activities 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. Implemented a comprehensive community air monitoring plan (CAMP), managed the design and installation of a passive sub slab depressurization system, 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, NY. James provided environmental services during the rehabilitation and expansion of a 1970s-era mixed-use complex, which covers an area equivalent to three city block. 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 was delineated over three separate structural slabs in commercial and residential space utilizing a mobile laboratory. He designed and installed two sub-slab depressurization systems and prepared Remedial Investigation Work Plan which outlined 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, NY. Project Manager for environmental remediation for this MSKCC development project. James was directly responsible for subsurface investigation and remediation activities, large 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, NY. James managed investigation for underground storage tank removal, excavation of 600 cubic yards of petroleum impacted soil, design and installation of a groundwater extraction and treatment system and post remediation samples. Implemented the In Situ Chemical Oxidation program for the injection of 54,000 gallons of 8 percent solution Fenton's Reagent and the O&M of the petroleum spill with respect to the Fenton's performance and the plume migration.

Various Public Schools, New York City School Construction Authority, New York, NY. James oversaw environmental remediation proposed for several school development sites, including PS 312, P.S. 281 and PS 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, NJ. James designed and oversaw the 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 compound (VOC) 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, NY. Assistant Project Manager for oversight of the Environmental Remediation on-site. James implemented the construction plan for remediation of 20,000 cubic yards of LNAPL on the Site; he assisted in 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.

Manufactured Gas Plant, National Grid, Rockaway, NY. James aided in the design and implementation of the soil characterization plan for MGP impacted sands. After delineation of the contamination plume, helped draft 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 provided assistance with design considerations on the installation of a waterloo barrier to be advanced to minus 80 feet below grade surface. James also helped with the design and permitting for the groundwater treatment system installed on-site.

Manufactured Gas Plant, Con Edison, New York, NY. 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, NY. James performed O&M and reporting on the Site's Potassium Permanganate Injection system, which was on a timed system; maintained 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, NY. James designed installed and maintained 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, Various Locations, NY. James designed installed and maintained 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). 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-foot 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.

EPA Superfund Site, Newtown Creek Superfund, Brooklyn, NY. James 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 set up. Operated and Maintained groundwater/LNAPL extraction systems on-site and performed monthly site gauging as part of the O&M plan.

MARI C. CONLON

Project Manager

EDUCATION

M.S., Geology, Boston College
B.S., 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, and will focus her time at Haley & Aldrich serving the environmental and real estate markets. 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.

DIE FU, P.E., CHMM

Assistant Project Manager

EDUCATION

M.S., Environmental Engineering, New York University
B.E., Environmental Engineering, Beihang University

PROFESSIONAL REGISTRATIONS

2019/ NY: Professional Engineer (Reg. No. 107103)
Certified Hazardous Materials Manager (CHMM), #18249

PROFESSIONAL SOCIETIES

American Society of Civil Engineers (ASCE), Member, 2012-2014
Long Island Association of Professional Geologists (LIAPG), 2012 - 2015
Chinese Environmental Professional and Scholarship Network, Board Member, 2011 to present

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour OSHA Hazardous Waste Worker Refresher Training (29 CFR 1910.120)
8-Hour OSHA HAZWOPER Refresher Training
10-Hour OSHA Construction

Die is an environmental engineer with 8 years of experience in waste management, construction environmental consulting, and soil beneficial reuse and remediation. She is skilled in environmental due diligence, soil/waste characterization, multi-stream construction waste management, site investigation, environmental permitting and compliance, beneficial soil reuse, brownfield remediation, environmental data evaluation and interpretation, AutoCAD, MATLAB, ArcGIS.

RELEVANT PROJECT EXPERIENCE

Airports

Port Authority of New York/New Jersey, LaGuardia Airport Central Terminal Building Redevelopment, Queens, New York. As the key engineer in the waste management consultant team, Die managed over 1.5 million tons of soil and various types of wastes generated during the construction. Responsible for waste material testing results audit review, hazardous waste delineation sampling oversight, disposal/reuse option selection and coordination, waste segregation plan design, and field oversight assistance for plan implementation.

Infrastructure

New York State Department of Environmental Conservation (NYSDEC) and Nassau County, Shafts and Microtunnel Construction, Bay Park Conveyance Project, Nassau, New York. As the key engineer in the waste management consultant team, Die was in charge of waste and surplus soils classification sampling design and field implementation, disposal/reuse option selection and coordination, waste segregation plan design, and Beneficial Use Determination (BUD) application for surplus soils beneficial reuse.

New York City Department of Environmental Protection (NYCDEP), Shafts Construction, Shaft 17B-1 and Shaft 18B-1, Queens, New York. As the key engineer in the waste management consultant team, Die managed over 100,000 cubic yards of surplus materials in waste material testing results audit review, hazardous waste delineation sampling oversight, disposal/reuse option selection and coordination, waste segregation plan design.

New York City Department of Design and Construction (DDC), City Park, Starlight Park Phase II Stage 2, Bronx, New York. As the construction environmental consultant, Die designed and drafted the Contaminated Material Handling Plan, Field Sampling Plan, and HASP. Field implementation and documentation of subsurface soil and hazardous waste sampling events. Designed site waste management plan for each grid and assigned beneficial reuse/disposal facilities.

New York City Transit Authority (NYCTA), Subway Station Upgrades, MTA 59th Street Three Elevators, Brooklyn, New York. As the construction environmental consultant, Die designed and drafted the Environmental Anticipatory Boring Plan (EABP), Health and Safety Plan (HASP), and Community Air Monitoring Plan (CAMP). Field implementation and documentation of subsurface soil and hazardous waste sampling events. Designed site waste management plan for each grid and assigned beneficial reuse/disposal facilities.

Real Estate Development

Joseph Moinian and Boston Properties, Office Skyscraper, 3 Hudson Blvd, New York, New York. As the key engineer in the waste management consultant team, Die designed, implemented, and documented the subsurface soil/waste characterization sampling for 32,000 cubic yards of excess materials. Designed site waste management plan for each grid and assigned beneficial reuse/disposal facilities.

Extell Development Company, Residential, Riverside Center Building 1, New York, New York. As the key engineer in the waste management team, Die was responsible for waste disposal segregation plan design, supplemental soil characterization sampling design and implementation, disposal and/or beneficial reuse facilities coordination.

SARAH COMMISSO

Staff Geologist

EDUCATION

B.S., Geological Sciences with a minor in Chemistry, Binghamton University

SPECIAL STUDIES AND COURSES

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

Sarah is a geologist with experience in remedial site investigations, subsurface investigations, geotechnical drilling investigations, preparation of technical reports, and data collection and analysis. She also has extensive experience with conducting Phase I Environmental Site Assessments and Phase II Environmental Site Assessments, and other forms of environmental due diligence. She has performed soil, groundwater, and soil vapor sampling events, geotechnical drilling projects, and has drafted site investigation plans and reports. Sarah regularly utilizes computer programs such as Microsoft Excel, Microsoft Word, and Adobe Acrobat DC in her daily job functions.

She will focus her time at Haley & Aldrich serving the Building and Infrastructure markets with performing site reconnaissance to observe existing conditions and features, monitor subsurface exploration activities to collect soil, bedrock, groundwater, as well as other pertinent information for project design, and assist in the development of remedial work plans.

RELEVANT PROJECT EXPERIENCE

Environmental Experience

Confidential Environmental Client, 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 New York City Office of Environmental Remediation. 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 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.

Confidential Environmental Client, Former NuHart Plastics Manufacturing Plant, Brooklyn, New York. Sarah worked as a field geologist for multiple monitoring events which consisted of the removal of light non-aqueous-phase liquid (LNAPL) performed in compliance with the site-specific, New York State Department of Environmental Conservation (NYSDEC)-approved Operation, Maintenance, and Monitoring Plan (OM&M Plan) for the product recovery system. Additionally, she assisted in drafting a Supplemental Remedial Investigation Work Plan to address remaining contamination at the Site and determine a course for remedial action.

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

Confidential Environmental Clients, Excavation Oversight and CAMP Monitoring, Various Sites, Bronx and Brooklyn, New York. Sarah served as field geologist for several projects under the NYC Mayor's Office of Environmental Remediation (NYCOER) program and New York State Brownfield Cleanup Program (NYSBCP). Her responsibilities included performing excavation oversight, air monitoring, vapor barrier installation oversight, and logging trucks for off-site disposal.

Multiple Clients, Phase I Environmental Site Assessments (ESAs) and Due Diligence, Multiple Locations in New York, New Jersey, 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, and Massachusetts. She has experience conducting site reconnaissance and reviewing historical site documentation to identify recognized environmental conditions 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 off 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 augur 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.

APPENDIX D

Health and Safety Plan

HALEY & ALDRICH, INC.

SITE-SPECIFIC SAFETY PLAN

FOR

2864 Atlantic Avenue Redevelopment
Speedway Site #7823
Brooklyn, New York

Project/File No. 0203563

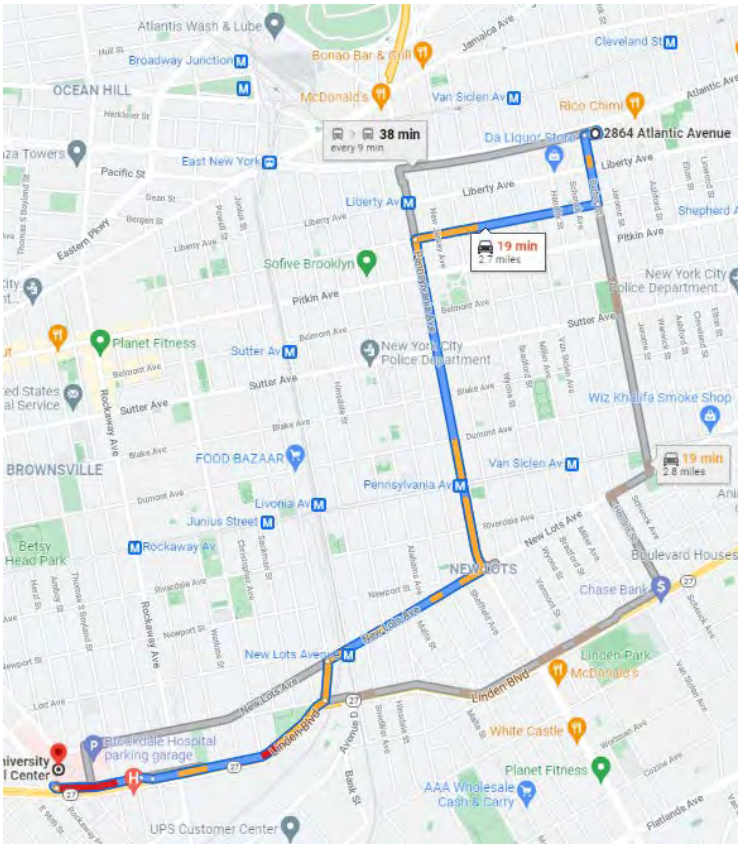
Prepared By: Scheuerman, Elizabeth	**Date: 10-27-2021**
Revised By: Conlon, Mari Cate	**Date:**

EMERGENCY INFORMATION

Project Name: 2864 Atlantic Avenue	**H&A File No:** 0203563-001-03
Location: 2864 Atlantic Avenue, Brooklyn, New York	
Client/Site Contact: Office Phone Number:	2864 Atlantic Realty LLC Mr. Joel and Mr. Jacob Kohn 718.963.0536
Contractor: **Superintendent:** Phone Number:	Eastern Environmental Solutions Hamarich, Scott 631.727.2700
H&A Project Manager: Office Phone Number: Cell Phone Number:	Conlon, Mari Cate 646.277.5688 347.271.1521
Field Safety Manager: Office Phone Number: Cell Phone Number:	Ferguson, Brian 617.886.7439 617.908.2761
Nearest Hospital: Address: (see map on next page) Phone Number:	**The Brookdale University Hospital and Medical Center** 1 Brookdale Plaza Brooklyn, NY 11212 718.240.5000
Nearest Occ. Health Clinic: Address: (see map on next page) Phone Number:	**CityMD Crown Heights Urgent Care - Brooklyn** 256 Utica Avenue Brooklyn, NY 11213 718.571.9355
Liberty Mutual Claim Policy	**WC6-Z11-254100-031**
Other Local Emergency Response Number:	911
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	911

Emergency Hospital

The Brookdale University Hospital and Medical Center
1 Brookdale Plaza
Brooklyn, NY 11212
718.240.5000



2864 Atlantic Ave
Brooklyn, NY 11207

Follow Barbey St and Glenmore Ave to Granville Payne Ave/Pennsylvania Ave
6 min (0.7 mi)

- Head south
  58 ft
- Turn right toward Barbey St
  190 ft
- Turn left onto Barbey St
  0.2 mi
- Turn right onto Glenmore Ave
  0.4 mi

Drive along Linden Blvd
10 min (1.9 mi)

- Turn left onto Granville Payne Ave/Pennsylvania Ave
  0.8 mi
- Turn right onto New Lots Ave
  0.4 mi
- Turn left onto Junius St
  Pass by Burger King (on the right)
  499 ft
- Slight right onto Gregory "Jocko" Jackson Blvd/Linden Blvd
  Continue to follow Linden Blvd
  0.5 mi

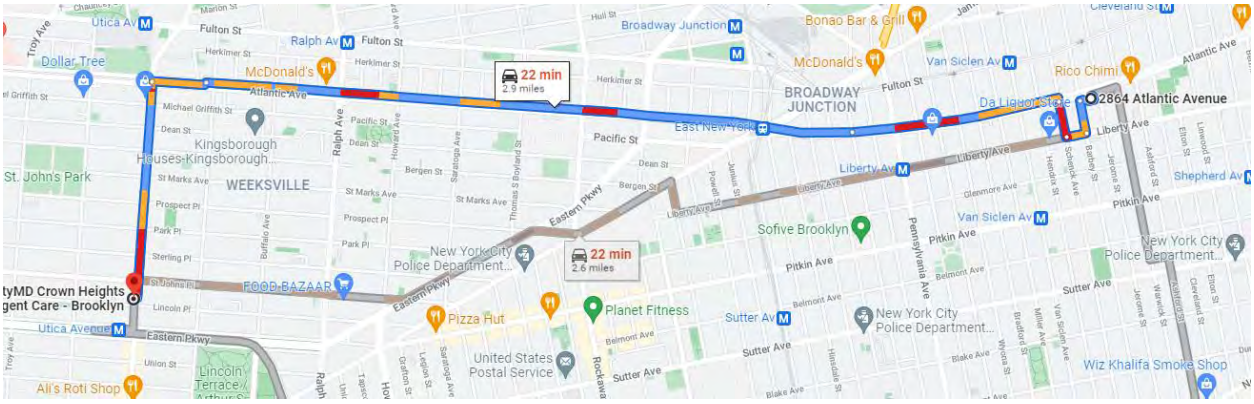
Take Linden Blvd to Rockaway Pkwy
2 min (0.2 mi)

- Slight right toward Linden Blvd
  148 ft
- Slight left onto Linden Blvd
  0.2 mi
- Turn right onto Rockaway Pkwy
  Destination will be on the right
  16 s (46 ft)

Brookdale University Hospital and Medical Cent
1 Brookdale Plaza, Brooklyn, NY 11212

Clinic

CityMD Crown Heights Urgent Care - Brooklyn
256 Utica Avenue
Brooklyn, NY 11213
718.571.9355



2864 Atlantic Ave
Brooklyn, NY 11207

- Take Barbey St to Liberty Ave
  2 min (0.1 mi)
  - Head south
    56 ft
  - Turn right toward Barbey St
    190 ft
  - Turn left onto Barbey St
    413 ft
- Follow Atlantic Ave to Utica Ave
  1.8 min (2.8 mi)
  - Turn right onto Liberty Ave
    259 ft
  - Turn right at the 1st cross street onto Schenck Ave
    449 ft
  - Turn left onto Atlantic Ave
    Pass by Advance Auto Parts (on the left in 0.3 mi)
    0.5 mi
  - Keep left to stay on Atlantic Ave
    1.5 mi
  - Turn left onto Center underpass to Rochester Ave
    0.1 mi
  - Turn left onto Utica Ave
    Pass by AutoZone Auto Parts (on the right)
    Destination will be on the right
    0.5 mi

CityMD Crown Heights Urgent Care - Brooklyn
256 Utica Ave, Brooklyn, NY 11213

STOP WORK

In accordance with H&A Stop Work Policy (OP1035), any individual has the right to refuse to do work that they believe to be unsafe and they have the obligation and responsibility to stop others from working in an unsafe manner without fear of retaliation. STOP Work Policy is the stop work policy for all personnel and subcontractors on the Site. When work has been stopped due to an unsafe condition, H&A site management (e.g., Project Manager, Site Safety Manager) and the H&A Senior Project Manager will be notified immediately. Reasons for issuing a stop work order include, but are not limited to:

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

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

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Project Name	2864 Atlantic Avenue	**Project Number**	0203563-001-03
Project Start Date	11/1/2021	**Project End Date**	5/1/2022
Client Site/Contact:	2864 Atlantic Realty LLC/Mr. Joel Kohn and Mr. Jacob Kohn		
Office Phone Number:	718.963.0536		
H&A Project Manager:	Conlon, Mari Cate		
Office Phone Number:	646.277.5688		
Cell Phone Number:	347.271.1521		
H&A Site Safety Officer:	Simmel, Zach		
Office Phone Number:	646.277.5690		
Cell Phone Number:	646.787.7669		
Subcontractor:	Eastern Environmental Solutions Inc.		
Phone:	631.727.2700		
Emergency Phone number:	631.774.9821		

APPROVALS: The following signatures constitute approval of this Health & Safety Plan

Electronic Signatures

Date

Project Manager – Mari Cate Conlon

Corporate Health & Safety – Brian Ferguson Date

This document is valid for a maximum time period of one year after completion. The document must be reviewed if the scope of work or nature of site hazards changes and must be updated as warranted.

PROJECT INFORMATION

Site Overview/History

Site Classification:	Petroleum Retail Station (Commercial)	**Site Status:**	Active	**Regulatory Authority:**	OSHA

Project Summary

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

Implementation of Remedial Investigation Work Plan (RIWP):
Advancement of soil borings and soil sampling; installation of permanent groundwater monitoring wells and groundwater sampling; and, installation of sub-slab/soil vapor probes and sub-slab/soil vapor sampling.

Implementation of Interim Remedial Measure Work Plan (IRMWP):
Removal of all existing building structures, pump islands, the overhead canopy and the USTs and associated impacted soils, in preparation of site-wide remediation.

The tasks are subject to Haley & Aldrich's oversight and/or conducting are listed below:

Task 001	**Task Name:** Drilling
Oversee installation of soil borings, permanent groundwater monitoring wells, and soil vapor implants by Eastern Environmental Solutions using a limited access Geoprobe drilling rig. Eastern Environmental Solutions will provide a one call mark out prior to drilling.	
Start Date: 11-1-2021	End Date: 5-1-2022
H&A Site Supervisor: Zach Simmel	Subcontractor: Eastern Environmental Solutions
Task 002	**Task Name: Soil, Groundwater & Sub-Slab/Soil Vapor Sampling**
Collect soil samples, groundwater samples, and sub-slab/soil vapor samples in laboratory provided containers as part of Remedial Instigation (RI) activities.	
Start Date: 11-1-2021	End Date: 5-1-2022
H&A Site Supervisor: Zach Simmel	Subcontractor: Eastern Environmental Solutions
Task 3	**Task Name: Remedial Oversight**
Perform remedial oversight during implementation of the approved remedy, per the IRMWP. Task includes soil disposal tracking, waste characterization soil sampling, confirmation soil sampling and implementation off Community Air Monitoring Program (CAMP).	
Start Date: 11-1-2021	End Date: 5-1-2022
H&A Site Supervisor: Zach Simmel	Subcontractor: N/A

HAZARD ASSESSMENT AND CONTROLS

The following site and task specific hazards have been identified. Associated controls have been defined and are also listed below.

Site Chemical Hazards

Potential contaminants of concern at the site include volatile organic compounds (VOCs) (i.e., benzene, ethylbenzene, xylenes and naphthalene).

Source of Information: Unknown contaminants/not well characterized, potential for contaminants based on urban fill and site knowledge.

COC	Location/Media	Concentration (Soil)	Concentration (Groundwater)
VOCs	**Groundwater**	**N/A**	**Ethylbenzene = 181 ug/L** **Xylenes = 171 ug/L** **Isopropyl benzene = 75.7 ug/L** **n-Propyl benzene = 216 ug/L** **1,2,4-Trimethylbenzene = 582 ug/L** **1,3,5-Trimethylbenzene = 29.5 ug/L** **n-Butylbenzene = 17.2 ug/L** **sec-Butylbenzene = 15 ug/L** **Naphthalene = 63.6 ug/L**

VOCs

VOCs include all organic compounds (substances made up of predominantly carbon and hydrogen) with boiling temperatures in the range of 50-260 degrees C, excluding pesticides. This means that they are likely to be present as a vapor or gas in normal ambient temperatures. Substances which are included in the VOC category include aliphatic hydrocarbons (such as hexane), aldehydes, aromatic hydrocarbons (such as benzene, toluene, and the xylenes or BTEX), and oxygenated compounds (such as acetone and similar ketones). The term VOC often is used in a legal or regulatory context and in such cases the precise definition is a matter of law.

VOCs are released from oil and gasoline refining, storage and combustion as well as from a wide range of industrial processes. Processes involving fuels, solvents, paints or the use of chemicals are the most significant sources. VOCs may also be emitted from cleaning products, degreasing products, fabrics, carpets, plastic products, glues, printed material, varnishes, wax, disinfectants, and cosmetics.

Typically, VOCs are present in gas or vapor and will enter the body by breathing contaminated air. Higher concentrations of VOCs may occur in areas of poor ventilation.

Site Hazards and Controls

Site Hazard Summary

Sun	Slips, Trips, Falls	Urban Fill
Cold Temperature		

SUN

Hazard Information

Acute excessive exposure to solar radiation may cause painful sunburn, and chronic exposure may contribute to eye damage and skin cancer. The average peak intensity of solar ultraviolet (UV) radiation is at midday. Most of the total daily UV is received between 10 AM and 2 PM. UV radiation can reflect off of water, concrete, light colored surfaces, and snow. Cloud cover can reduce UV levels, but overexposure may still occur.
Use the shadow test to determine sun strength: If your shadow is shorter than you are, the sun´s rays are at their peak, and it is important to protect yourself.

Controls

- Wear light-colored, closely woven clothing, which covers as much of the body as practicable.
- Use sunscreens with broad spectrum protection (against both UVA and UVB rays) and sun protection factor (SPF) values of 30 or higher. Ideally, about 1 ounce of sunscreen (about a shot glass or palmful) should be used to cover the arms, legs, neck, and face of the average adult. Sunscreen needs to be reapplied at least every 2 hours to maintain protection.
- Hats should be worn and should be wide brimmed, protecting as much of the face, ears, and neck as possible. Hats should also provide ventilation around the head. Sunscreen should be applied to areas around the head not protected by the hat (ears, lips, neck, etc.).
- Wear sunglasses while working outdoors. Sunglasses should allow no more than 5% of UVA and UVB penetration and must also meet the ANSI Z87.1 standard for safety glasses.
- Use natural or artificial shade, where possible.

URBAN FILL

Hazard Information

Urban Fill consists of historically placed soil materials commonly found in urban areas, and typically comprised of a heterogeneous mixture of granular and fine-grained solids containing various proportions of gravel and cobbles, construction and demolition debris, coal ash, wood ash or other deleterious materials. Urban fill usually contains anthropogenic levels of metals, petroleum hydrocarbons and/or polynuclear aromatic hydrocarbons (PAHs) due to non-point sources and/or which originated prior to placement.

Controls

- Physical Hazards: Urban fill can contain debris such as glass, ceramics, rebar, wire, wood, nails, and other objects that contain sharp edges. Personnel should use caution and wear appropriate gloves (e.g., leather) to prevent cuts associated with handling material containing sharp and abrasive edges.
- Personal Hygiene: Always wash hands prior to and after eating and drinking. Take off work boots prior to getting in your car and going home which will help prevent introducing potentially contaminated soils to your car and home. Wash work clothing separately from non-work clothes to prevent clothing impacted by soil from urban fill to be cross contaminated with other clothing. Use chemical resistant gloves when handling soil to prevent contact with skin.
- Control the dust from urban fill material. Measures should be taken to prevent dust, such as wetting the material or covering the stockpiles.

SLIPS AND TRIPS

Hazard Information

Slip and trip injuries are the most frequent injuries to workers. Both slips and trips result from some kind of unintended or unexpected change in the contact between the foot and the ground or walking surface. This shows that good housekeeping, quality of walking surfaces (flooring), awareness of surroundings, selection of proper footwear, and appropriate pace of walking are critical to preventing fall accidents.

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

Controls

- Take your time and pay attention to where you are going.
- Adjust your stride to a pace that is suitable for the walking surface and the tasks you are doing.
- Check the work area to identify hazards - beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Establish and utilize a pathway free of slip and trip hazards.
- Choose a safer walking route.
- Carry loads you can see over and are not so heavy as to increase your trip/slip probability.
- Keep work areas clean and free of clutter.
- Communicate hazards to on-site personnel and mitigate hazards as appropriate.

COLD TEMPERATURES

Hazard Information

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

Staff members should consult OP1003-Cold Stress for additional information on cold weather hazards.

Cold Stress Conditions

Frostbite: Localized injury resulting from cold is included in the generic term "frostbite. There are several degrees of damage.

Symptoms: Frost nip or incident frostbite; sudden blanching or whitening of the skin.

- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: Tissues are cold, pale, and solid; extremely serious injury.

Treatment:

- Bring the victim indoors and heat the areas quickly in water between 102° and 105° F.

    - Never place frostbitten tissue in hot water as the area will have a reduced heat awareness and such treatment could result in burns.
- Give the victim a warm drink (not coffee, tea, or alcohol).
    - The victim should not smoke or do anything that will inhibit blood circulation.
- Keep the frozen parts in warm water or covered with warm clothes for 30 minutes even though the tissue will be very painful as it thaws.
    - Elevate the injured area and protect it from injury.
    - Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas.
- Keep victim warm and get medical care immediately following first aid treatment.
- After thawing, the victim should try to move the injured areas slightly, but no more than can be done without assistance.

Do <u>NOT</u>:

- Rub the frostbitten area(s)
- Use ice, snow, gasoline, or anything cold on frostbite
- Use heat lamps or hot water bottles to rewarm the frostbitten area
- Place the frostbitten area near a hot stove

<u>Hypothermia:</u> Significant loss of body heat that is also a potential hazard during cold weather operations. Hypothermia is characterized as "moderate" or "severe".
Symptoms:

- Early hypothermia - Chills, pale skin, cold skin, muscle rigidity, depressed heart rate, and disorientation
- Moderate hypothermia - Any combination of severe shivering, abnormal behavior, slowing of movements, stumbling, weakness, repeated falling, inability to walk, collapse, stupor, or unconsciousness
- Severe hypothermia - Extreme skin coldness, loss of consciousness, faint pulse, and shallow, infrequent, or apparently absent respiration

Death is the ultimate result of untreated hypothermia. The onset of severe shivering signals danger to personnel; exposure to cold shall be immediately terminated for any severely shivering worker.
Treatment: Staff members should seek emergency medical treatment in the event of hypothermia. The following actions can be taken prior to obtaining medical treatment:

- Gently place patients in an environment most favorable to reducing further heat loss from evaporation, radiation, conduction, or convection.
- Remove wet clothing and replace it with dry blankets or sleeping bags.
- Initiate active external rewarming with heat packs (e.g., hot water bottles, chemical packs, etc.) placed in the areas of the armpits, groin, and abdomen.
- Be aware of the risk of causing body surface burns from excessive active external rewarming.

In dire circumstances, rescuers may provide skin-to-skin contact with patients when heat packs are unavailable and such therapy would not delay evacuation.

Controls

- Recognize the environmental and workplace conditions that may be dangerous.
    - When the temperature is below 41° F, workers should be aware that cold stress is a potential hazard.
- Learn signs of cold-induced illnesses and injuries and how to help affected staff members.
    - Observe fellow staff members for signs of cold stress and administer first aid, where necessary.
- Staff members should maintain a clothing level that keeps them warm but dry (not sweating).
    - Staff should wear thermal clothing including gloves and footwear and beneath chemical resistant clothing, when appropriate.
    - Workers should have a spare set of clothing in case work clothes are not warm enough or become wet.
    - If a worker begins to sweat, he/she should remove a layer.
    - If clothing becomes wet and temperatures are below 36° F, clothing must be immediately replaced with dry clothing.
- A warm area for rest breaks should be designated.
    - In cold temperatures, rotate shifts of workers with potential cold stress exposure or take periodic breaks to allow recovery from cold stress.
    - Do not go into the field alone when cold stress could occur.
- Avoid fatigue or exhaustion because energy is needed to keep muscles warm.
- Workers should drink warm liquids (non-alcoholic, non-caffeinated) periodically throughout their shifts so they do not get dehydrated.

Task Specific Hazards

Task 001 – Drilling – Drilling, such as associated with installation of soil borings, monitoring wells, and soil vapor probes is conducted for a range of services. Familiarity with basic drilling safety is an essential component of all drilling projects. Potential hazards related to drilling operations include but are not limited to encountering underground or overhead utilities, traffic, heavy equipment, hoisting heavy tools, steel impacts, open rotation entanglement, and the planned or unexpected encountering of toxic or hazardous substances. While staff members do not operate drilling equipment, they may work in close proximity to operating drilling equipment and may be exposed to many of the same hazards as the subcontractor. It is imperative that staff are aware of emergency stops and establish communication protocols with the drillers prior to the start of work. See OP 1002 Drilling Safety.

Potential Hazards

Overhead Utilities	Ground Disturbance	Underground Utilities	Noise
Heavy Equipment	Line of Fire	Ergonomics	Generated Waste

Task 002 – Soil, Groundwater & Sub-Slab/Soil Vapor Sampling – Soil sampling by H&A staff can be conducted in conjunction with a wide range of activities. These activities can include but are not limited to: drill spoil characterization and management during building foundation element installation, characterization of excavated soils for management/disposal/reuse during earthwork activities, and as part of environmental remedial activities such as delineation and confirmation sampling. Familiarity with basic heavy construction safety, site conditions (geotechnical and environmental), and potential soil contaminants are essential components of soil sampling performed on active sites. Potential hazards related to soil sampling at construction sites include but are not limited to: encountering site vehicle traffic and heavy equipment operations, manual lifting, generated waste, contact or exposure to impacted soil, and encountering unknown toxic or hazardous substances. Although soil sampling is commonly performed within active excavations, from stockpiles, or within trench excavations, sampling locations and situations will vary depending on site conditions. Care should be taken ensuring that the sampling area is not being actively accessed by construction equipment. Care should also be taken with handling of potentially environmentally impacted soil during sampling, with appropriate PPE identified and used. At no time during classification activities are personnel to reach for debris near machinery that is in operation, place any samples in their mouth, or come in contact with the soils without the use of gloves. Staff will have to carry and use a variety of sampling tools, equipment, containers, and potentially heavy sample bags. It is imperative that staff are aware of emergency / communication protocols with the Contractor prior to the start of work.

Potential Hazards			
Line of Fire	Ergonomics	Generated Waste	

Task 003 – Remedial Oversight –Remedial oversight may require working in close proximity to heavy equipment and may be exposed to many of the same hazards as the subcontractor. It is imperative that staff are aware of emergency stops and establish communication protocols with the drillers prior to the start of work. See OP 1002 Drilling Safety.

Potential Hazards			
Noise	Heavy Equipment	Ergonomics	Line of Fire
Ground Disturbance	SIMOPS	Congested Area	

Top Task Specific Hazards

Overhead Utilities

When work is undertaken near overhead electrical lines, the distance maintained from those lines shall also meet the minimum distances for electrical hazards as defined in Table 1 below. Note: utilities other than overhead electrical utilities need to be considered when performing work

Table 1 Minimal Radial Clearance Distances *

Normal System Voltage Kilovolts (kV)	Required Minimal Radial Clearance Distance (feet/meters)
0 – 50	10/3.05
51 – 100	12/3.66
101 – 200	15/4.57
201 – 300	20/6.1
301 – 500	25/7.62
501 – 750	35/10.67
750 – 1000	45/13.72

* For those locations where the utility has specified more stringent safe distances, those distances shall be observed.

Controls

- To prevent damage, guy wires shall be visibly marked, and work barriers or spotters provided in those areas where work is being conducted.
    - When working around guy wires, the minimum radial clearance distances for electrical power shall be observed.
- The PM shall research and determine if the local, responsible utility or client has more restrictive requirements than those stated in Table 1.
- If equipment cannot be positioned in accordance with the requirements established in Table 1 the lines need to be de-energized.

Ground Disturbance

Ground disturbance is defined as any activity disturbing the ground. Ground disturbance activities include, but are not limited to, excavating, trenching, drilling (either mechanically or by hand), digging, plowing, grading, tunneling and pounding posts or stakes.

Because of the potential hazards associated with striking an underground utility or structure, the operating procedure for underground utility clearance shall be followed prior to performing any ground disturbance activities.
See OP1020 Working Near Utilities

Controls

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

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

Underground Utilities

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

See OP1020 Work Near Utilities for complete information.

Controls

- Obtain as-built drawings for the areas being investigated from the property owner;
- Visually review each proposed soil boring location with the property owner or knowledgeable site representative;
- Perform a geophysical survey to locate utilities;
- Hire a private line locating firm to determine the location of utility lines that are present at the property;
- Identifying a no-drill or dig zone;
- Hand dig or use vacuum excavation in the proposed ground disturbance locations if insufficient data is unavailable to accurately determine the location of the utility lines.

Noise

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

See OP 1031 Hearing Conservation for additional information.

Controls

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

Heavy Equipment

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

See OP1052 Heavy Equipment for additional information.

Controls

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

Line of Fire

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

Controls

The following precautions should be observed for tension and pressure:

- Be aware and stay clear of tensioned lines such as cable, chain, and rope.
- Use only correct gripping devices. Select proper equipment based on size and load limit.
- Be cautious of torque stresses that drilling equipment and truck augers can generate. Equipment can rotate unexpectedly long after applied torque force has been stopped.
- Springs come in a variety of shapes and sizes, and can release tremendous energy if compression as tension is suddenly released.
- Ensure tanks are stored upright and are in good condition, and be aware of potential failures or pressurized lines and fittings
- Items under tension and pressure can release tremendous energy if it is suddenly released.

The following precautions should be observed for objects that can fall or roll:

- Not all objects may be overhead; be especially mindful of top-heavy items and items being transported by forklift or flatbed.
- Secure objects that can roll such as tools, cylinders, and pipes.
- Stay well clear of soil cuttings, soil stockpiles generated during drilling operations and excavations, be aware that chunks of dirt, rocks, and debris can fall or roll.
- Establish a drop zone that is free of any tools and/or debris.

The following precautions should be observed for working in proximity to vehicles and heavy equipment:

- Use parking brakes and wheel chocks for any vehicle or equipment parked on an incline.
- When working near moving, heavy equipment such as line trucks and cranes, remain in operator's full view. Obtain operator's attention prior to approaching equipment.
- Vacate the back of the bucket truck when the boom is being moved or cradled. Get the operator's attention if you must get into the back of the truck so he or she can stop boom movement.

Take precautions for all pedestrian and vehicle traffic when positioning vehicles and equipment at a job site.

Posture/Ergonomics

Most Work-related Musculoskeletal Disorders (WMSDs) are caused by Ergonomic Stressors. Ergonomic Stressors are caused by poor workplace practices and/or insufficient design, which may present ergonomic risk factors. These stressors include, but are not limited to, repetition, force, extreme postures, static postures, quick motions, contact pressure, vibration, and cold temperatures.

WMSDs are injuries to the musculoskeletal system, which involves bones, muscles, tendons, ligaments, and other tissues in the system. Symptoms may include numbness, tightness, tingling, swelling, pain, stiffness, fatigue, and/or redness. WMSD are usually caused by one or more Ergonomic Stressors. There may be individual differences in susceptibility and symptoms among employees performing similar tasks. Any symptoms are to be taken seriously and reported immediately.

Controls

Recommended controls, including Administrative, Work Practice, and/or Engineering Controls, will be put in place based on the interview results and/or after an ergonomic assessment. H&S and/or HP will work with staff members and their staff managers to implement Administrative and Work Practice Controls to control risk associated with ergonomic stressors. In addition, simple Engineering Controls may be implemented, such as use of a keyboard and/or mouse tray, replacing a mouse with a more ergonomic model, and/or changing workstation set up.

Generated Waste

Excess sample solids, decontamination materials, rags, brushes, poly sheeting, etc. that are determined to be free of contamination through field or laboratory screening can usually be disposed into client-approved, on-site trash receptacles. Uncontaminated wash water may be discarded onto the ground surface away from surface water bodies in areas where infiltration can occur. Contaminated materials must be segregated into liquids or solids and drummed separately for off-site disposal.

All wastes generated shall be containerized in an appropriate container (i.e. open or closed top 55-gallon drum, roll-off container, poly tote, cardboard box, etc.) as directed by the PM. Prior to putting waste containers into service, the containers should be inspected for damages or defects. Waste containers should be appropriately labeled indicating the contents, date the container was filled, owner of the material (including address) and any unique identification number, if necessary. Upon completion of filling the waste container, the container should be inspected for leaks and an appropriate seal.

Congested Area

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

Simultaneous Operations (SIMOPS)

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

It is important that SIMOPS are identified at an early stage before operations commence to understand issues such as schedule clashes, physical clashes, maintenance activities, failure impacts, interferences between vessels, contracts and third part interfaces and environmental impacts.

SIMOPS can occur when H&A projects are executed at active facilities (e.g., installing a monitoring well in a parking lot of a manufacturing plant).

Controls

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

TASK PPE AND SAFETY EQUIPMENT

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

The purpose of PPE is to provide a barrier, which will shield or isolate staff members from the physical, biological, chemical, and/or radiological hazards that may be encountered during task activities.

Required PPE	TASK 001	TASK 002	TASK 003
Hard hat	X	X	X
Safety glasses	X	X	X
Hard-toed Boots	X	X	X
Gloves	X	X	X
Long pants and 4" long sleeve shirt	X	X	X
Safety vest (Class 2)	X	X	X
Hearing Protection	X		
Facial Covering	X	X	X
COVID-19 PPE & Supplies	X	X	X

TRAINING REQUIREMENTS

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

Task Specific Training	
Required Training: OSHA 40-hour HAZWOPER, 8-hour HAZWOPER Refresher, On Site training	**Task 001 and Task 002**
Required Training: OSHA 40-hour HAZWOPER, 8-hour HAZWOPER Refresher, On Site training, 10 hour OSHA Construction Training	**Task 003**

SITE CONTROL

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

Communication

Internal

H&A site personnel will communicate with other H&A staff member and/or subcontractors or contractors with:

- Face-to-Face Communication at a minimum of 6ft distance

External

H&S site personnel will use the following means to communicate with off-site personnel or emergency services.

- Cell Phones

Visitors

Project Site

Will visitors be required to check-in prior to accessing the project site?

- Yes
- All Visitors shall be briefed on COVID-19 protocols and PPE. Visitors not briefed, or that do not have the appropriate PPE will be asked to leave the site.

Visitor Access

Authorized visitors that require access to the project site need to be provided with known information with respect to the site operations and hazards as applicable to the purpose of their site visit. Authorized visitors must have the required PPE and appropriate training to access the project site.

Zoning

Work Zone

The work zone will be clearly delineated to ensure that the general public or unauthorized worker access is prevented. The following will be used:

- Flagging tape
- Cones
- Proper Signage

Project Site - Access

Work Hours

The following measure(s) will be used to control site entry and exit during site hours.

- Site is gated and fenced

After Hours

The following measure(s) will be used to control site entry and exit during hours that the site is not operating.

- None

Site Traffic Control

Is the work planned to be conducted on a public roadway or a public right-of-way?

- No

Restrooms

Available nearby restrooms include the following (COVID PPE to be worn and hand sanitization to occur before and after use of facilities)

- Speedway Gas Station (Site): 2864 Atlantic Avenue
- McDonald's: 1883 Atlantic Avenue
- Popeyes Louisiana Kitchen: 1994 Atlantic Avenue

SPILL CONTAINMENT

An evaluation was conducted to determine the potential for hazardous substance spills at this site. This evaluation indicates that there is no potential for a hazardous spill of sufficient size to require containment planning, equipment, and procedures.

DECONTAMINATION

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

Personal Hygiene Safeguards

The following minimum personal hygiene safeguards shall be adhered to:

1. No smoking or tobacco products on any Hazwoper project.
2. No eating or drinking in the exclusion zone.
3. It is required that personnel present on site wash hands before eating, smoking, taking medication, chewing gum/tobacco, using the restroom, or applying cosmetics and before leaving the site for the day.
4. It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

Personal Decontamination

Outer gloves and boots should be decontaminated periodically as necessary and at the end of the day. Brush off solids with a hard brush and clean with soap and water or other appropriate cleaner whenever possible. Remove inner gloves carefully by turning them inside out during removal. Wash hands and forearms frequently. It is good practice to wear work-designated clothing while on-site which can be removed as soon as possible. Non-disposable overalls and outer work clothing should be bagged onsite prior to laundering. If gross contamination is encountered on-site contact the Project Manager and Regional Health and Safety Manager to discuss proper decontamination procedures.
The steps required for decontamination will depend upon the degree and type of contamination but will generally follow the sequence below.

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

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

This decontamination procedure is applicable to Tasks: 002 and 003

Small Equipment Decontamination

Pretreatment of heavily contaminated equipment may be conducted as necessary:

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

Standard decontamination procedure:

1. Wash using a solution of Alconox and water
2. Rinse with potable water
3. Rinse with methanol
4. Rinse with distilled/deionized water

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

This decontamination procedure is applicable to Tasks: 002 and 003

Standard Disposal Methods for Contaminated Materials

Excess sample solids, decontamination materials, rags, brushes, poly sheeting, etc. that are determined to be free of contamination through field screening can usually be disposed into client-approved, on-site trash receptacles. Contaminated materials must be segregated into liquids or solids and drummed separately for off-site disposal as defined by and in accordance with applicable regulatory requirements.

Standard Disposal Methods for Contaminated Soils

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

EMERGENCY RESPONSE PLAN

Medical

If there is an injury or illness associated with an H&A staff member on the job-site, stop work, stabilize the situation, and secure the site. Assess the severity of the injury or illness to determine the appropriate course of action as listed below.

- First Aid Injury

  First aid will be addressed using the on-site first aid kit. H&A employees are not required or expected to administer first aid/CPR to any H&A staff member, Contractor, or Civilian personnel at any time and it is H&A´s position that those who do, are doing it on their behalf, and not as a function of their job.

- Injury or illness requiring clinic/hospital visit **WITHOUT** ambulance service

  Injuries or illnesses requiring hospital service without ambulance services include minor lacerations, minor sprains, etc. The following action will be taken:

  - The H&A SSO will ensure prompt transportation of the injured person to the clinic or hospital identified in the safety plan.
  - Another H&A staff member, or contractor on-site, will always drive the injured staff member to the medical facility and remain at the facility until the staff member has been discharged. Staff members will not self-transport to the clinic or hospital.
  - If the injured staff member is able to return to the job site the same day, he/she will bring with him/her a statement from the doctor containing such information as:
    - Date
    - Employee´s name
    - Diagnosis
    - Date he/she is able to return to work, regular or light duty
    - Date he/she is to return to doctor for follow-up appointment, if necessary
    - Signature and address of doctor

- Injury or illness requiring a hospital visit **WITH** ambulance service

  Injuries or illnesses requiring hospital service with ambulance services include severe head injuries, severe lacerations, heart attacks, heat stroke, etc. The following steps will be taken immediately:

  - Call for ambulance service and notify the H&A SSO.
  - Comfort the individual until ambulance service arrives.
  - While the injured employee is being transported, the H&A SSO will contact the medical facility to be utilized.
  - One designated representative will accompany the injured employee to the medical facility and remain at the facility until final diagnosis and other relevant information is obtained.

Notifications

For all injuries or illnesses notify the SSO and PM who in turn will contact Corporate H&S. Within 24 hours the injured staff member or PM will complete the H&S Reporting Form found on HANK. Minor cuts, scratches, and bruises shall also be reported through the H&S Reporting Form. Notify the client in accordance with their notification protocol. Depending on severity, Human Potential will as promptly as possible following an injury or illness, ensure appropriate notification has been made to the family of the individual involved.

Severe Weather

Where the threat of electrical storms and the hazard of lightning exist, staff shall ensure that there is the ability to detect when lightning is in the near vicinity and when there is a potential for lightning and to notify appropriate site personnel of these conditions. The weather forecast will be checked on a daily basis and communicated at the daily safety tailgate meetings.
When lightning is detected or observed the information will be communicated to all crews in the field for appropriate action. Field supervisors will make the decision to stay put or to leave the work site. A location will be identified to marshal field staff in the event that staff are required to leave the job site. A similar decision process will be used during heavy rain events.
Staff shall seek appropriate shelter and not stay in the open.

Evacuation Alarms

Verbal Communication will be used to communicate the evacuation alarm.

Emergency Services

Cellular phone will be used to contact Emergency Services.

Emergency Evacuation Plan

The site evacuation plan is as follows:

1. Establish a designated meeting area to conduct a head count in the event of an emergency evacuation.
2. If the work area is not near an emergency exit, exit via the closest route and meet at the designated meeting area.
3. Notify emergency response personnel (fire, police, and ambulance) of the number of missing or unaccounted for employees and their suspected location.
4. Administer first aid in the meeting area, as necessary.

Under no circumstances should any personnel re-enter the site area without the approval of the corporate H&S manager, the H&S coordinator, and the fire department official in charge.

ROLES AND RESPONSIBILITIES

FIELD SAFETY MANAGER (FSM)

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

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

PROJECT MANAGER (PM)

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

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

SITE SAFETY OFFICER

The SSO, Zach Simmel, is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SSO functions may include some or all:

- Act as H&A´s liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by H&A subcontractors.
- Oversee day-to-day implementation of the Safety Plan by H&A personnel on site.
- Interact with subcontractor project personnel on health and safety matters.
- Verify use of required PPE as outlined in the safety plan.
- Inspect and maintain H&A safety equipment, including calibration of air monitoring instrumentation used by H&A.
- Perform changes to HASP and document as needed and notify appropriate persons of changes.

- Investigate and report on-site accidents and incidents involving H&A and its subcontractors.
- Verify that site personnel are familiar with site safety requirements (e.g., the hospital route and emergency contact numbers).
- Report accidents, injuries, and near misses to the H&A PM and Field Safety Manager (FSM) as needed.

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

FIELD PERSONNEL

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

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

VISITORS

Authorized visitors (e.g., Client Representatives, Regulators, Haley & Aldrich management staff, etc.) requiring entry to any work location on the site will be briefed by the Site Supervisor on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer´s health and safety policies. In addition, this safety plan specifies the minimum acceptable qualifications, training and personal protective equipment which are required for entry to any controlled work area; visitors must comply with these requirements at all times. Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

HEALTH & SAFETY PLAN ACKNOWLEDGEMENT FORM

Note: Only H&A employees sign this page.

I hereby acknowledge receipt and briefing on this Health & Safety Plan prior to the start of on-site work and declare that I understand and agree to follow the provisions and procedures set forth herein while working on this site.

PRINTED NAME	SIGNATURE	DATE

APPENDICES

Appendix A – COVID-19 Fact Sheets and Forms

APPENDIX A
COVID-19 FACTSHEETS AND FORMS

APPENDIX B
JOB SAFETY ANAYLSES

KEY TASK :

Subtask Category	Potential Hazards	Controls
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