REMEDIAL ACTION WORK PLAN

556 BALTIC STREET SITE
NYSDEC BCP SITE C224375
556 BALTIC STREET
BROOKLYN, NEW YORK

PREPARED FOR

159 THIRD REALTY LLC, 159 THIRD RESIDENCE LLC AND BALTIC RESIDENCE LLC
199 LEE AVENUE
BROOKLYN, NEW YORK

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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).

Final Submission Will Be Certified

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

Executive Summary

This draft Remedial Action Work Plan (RAWP) was developed by H & A of New York LLP, d/b/a Haley & Aldrich of New York (Haley & Aldrich) on behalf of 159 Third Realty LLC, 159 Third Residence LLC, and Baltic Residence LLC for the 556 Baltic Street Site located at 556 Baltic Street, formerly referred to as 151-169 Third Avenue (Block 407 Lot 1), within the Gowanus neighborhood of Brooklyn, NY (the Site). 159 Third Realty LLC, 159 Third Residence LLC and Baltic Residence LLC applied to and were accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as Volunteers. A Brownfield Cleanup Agreement (BCA) was executed by the NYSDEC and 159 Third Realty LLC, 159 Third Residence LLC and Baltic Residence LLC (the "Volunteers") on 15 December 2022 (BCP Site No. C224375). The Volunteers propose to remediate the Site for mixed-use commercial and residential purposes.

This RAWP summarizes the nature and extent of contamination on the Site as determined from data gathered during the Remedial Investigation (RI) completed at the Site in February 2023. The RAWP provides an evaluation of a Track 1 cleanup (Alternative I), a Track 2 cleanup (Alternative II) and a Track 4 cleanup (Alternative III), their associated costs, and a recommendation for a preferred remedy. The preferred Track 2 remedy is consistent with the procedures defined in DER-10 and complies with applicable federal, state, and local laws, regulations, and requirements.

SITE DESCRIPTION AND SITE HISTORY

The Site, identified as Section 3, Block 407, Lot 1 on the New York City tax map, is approximately 11,800-square feet in size. The Site is bound to the north by Baltic Street followed by a multi-story residential building, to the west by Third Avenue followed by a single-story commercial/manufacturing building, to the east by a four-story residential building and a Cube Smart storage facility, and to the south by Butler Street followed by a hotel. The Site location is shown on Figure 1, a Site plan is shown on Figure 2, and a Site survey is provided in Appendix A.

The Site is located within a residential and manufacturing zoning district (M1-4/R7X). The Site is in an urban area surrounded by commercial and industrial properties served by municipal water. The Volunteers plan to redevelop the Site for mixed-use commercial and residential purposes (including affordable housing) consistent with current zoning.

The Site is listed with an environmental E-Designation (E-601) for hazardous materials, noise, and air quality (heating, ventilation, and air conditioning [HVAC] limited to natural gas and exhaust stack location limitations) resulting from a City Environmental Quality Review (CEQR) effective March 2019 CEQR # 19DCP157K). Satisfaction of the E-Designation requirements is subject to review and approval by the New York City Mayor's Office of Environmental Remediation (OER) prior to redevelopment.

The Site was developed in the 1920s with multiple four-story commercial stores. The Site operated as a gasoline service station, auto rental and car wash from the 1970s until the Site became vacant in December 2022.

Properties immediately surrounding the Site are within the recently approved Gowanus Neighborhood Plan (rezoning) and are now zoned for residential, commercial and transportation use.

SUMMARY OF REMEDIAL INVESTIGATION FINDINGS

The RI was completed in accordance with Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375, DER-10 and the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates) and the Remedial Investigation Work Plan, dated 13 January 2023 (RIWP). The objective of the RI was to determine the nature and extent of contamination in Site soil, groundwater, and soil vapor. The RI was completed between 1 February and 27 February 2023 and between 2 June and 8 June 2023.

The RI consisted of the following:

- Performance of a ground penetrating radar (GPR) survey to identify the presence of any utilities, USTs, or any other anomalies that may be present in the subsurface;
- Advancement of twenty-one soil borings to depths ranging from 20 to 25 ft below ground surface (bgs), with samples collected from the 2 to 4 ft bgs, 6 to 8 ft bgs, 10 to 12 ft bgs, and 14 to 16 ft bgs, and additional soil samples were collected in borings HA-19 and HA-21 from 20 to 22 ft bgs below where petroleum impacts were observed. A total of 86 soil samples were collected, plus QA/QC samples, for laboratory analysis;
- Lead and mercury delineations were conducted on-site at locations where elevated concentrations of lead and mercury were detected during previous investigations;
- To investigate the potential for the presence of non-aqueous phase liquid/grossly contaminated material (NAPL/GCM), two soil borings (HA-22 and HA-23,) were advanced to 100 ft bgs. NAPL/GCM was not identified in either boring and therefore soil samples were not collected for laboratory analysis;
- Installation of nine two-inch permanent groundwater monitoring wells to 20 ft bgs and collection of groundwater samples (plus QA/QC samples) from each monitoring well;
- Completion of a survey by a licensed surveyor in the State of New York and gauging of monitoring wells to determine groundwater elevation and flow direction; and
- Installation of ten soil vapor probes to a depth of approximately 12 to 13 ft bgs and collection of ten soil vapor samples.

A summary of environmental findings of the RI includes the following:

1. The Site is underlain by a layer of fill consisting of mainly brown to gray fine to medium sand and silty fine sand with gravel and fragments of asphalt, concrete, brick, glass, cinders, and wood. The depth of fill material varies across the Site extending to a maximum depth of approximately 25 feet (ft) below ground surface (bgs). The fill is underlain by a fine sand with varying amounts of fine- and coarse-grained sediments, an organic clay at a depth of about 30 to 32 ft bgs, followed by a gray to brown silty fine sand grading to a red brown to brown fine sand with varying amounts of medium and coarse sand with fine to coarse gravels and cobbles.

2. Depth to groundwater ranged from 14.49 to 15.69 ft bgs with groundwater elevation ranging from 5.9 to 7.13 ft. No light aqueous phase liquid (LNAPL) was detected in any of the monitoring wells.
3. Groundwater flow beneath the Site is estimated to be northwest to southeast.
4. Soil analytical results were compared to 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs), Restricted Residential Soil Cleanup Objectives (RRSCOs) and Protection of Groundwater SCOs (PGWSCOs) where applicable. Results include the following:

    - One VOC, n-propylbenzene, was detected above the RRSCO (100 mg/kg) at a maximum concentration of 160 milligrams per kilogram (mg/kg) in HA-19 (14-16'). In addition, acetone, benzene, ethylbenzene, naphthalene, toluene, total xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene, and sec-butylbenzene exceeded UUSCOs of 0.05 mg/kg, 0.06 mg/kg, 1 mg/kg, 12 mg/kg, 0.7 mg/kg, 0.26 mg/kg, 3.6 mg/kg, 8.4 mg/kg, 12 mg/kg, and 11 mg/kg, respectively, but did not exceed RRSCOs. VOCs were compared to PGWSCOs for compounds detected in groundwater samples. VOCs including benzene, ethylbenzene, total xylenes, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and n-propylbenzene (detected in groundwater samples collected from MW-02 and MW-03) were found to exceed the PGWSCOs.
    - Seven SVOCs, specifically PAHs, were detected above the RRSCOs in multiple soil samples with maximum concentrations in soil sample HA-03 (10-12'). These include benzo(a)anthracene (RRSCO of 1 mg/kg) at a maximum concentration of 20 mg/kg, benzo(a)pyrene (RRSCO of 1 mg/kg) at a maximum concentration of 15 mg/kg, benzo(b)fluoranthene (RRSCO of 1 mg/kg) at a maximum concentration of 16 mg/kg, benzo(k)fluoranthene (RRSCO of 3.9 mg/kg) at a maximum concentration of 4 mg/kg, chrysene (RRSCO of 3.9 mg/kg) at a maximum concentration of 18 mg/kg, dibenz(a,h)anthracene (RRSCO of 0.33 mg/kg) at a maximum concentration of 1.8 m/kg, and indeno(1,2,3-cd)pyrene (RRSCO of 0.5 mg/kg) at a maximum concentration of 8.6 mg/kg. In addition, 3-Methylphenol/4-methylphenol exceeded the UUSCO of 0.33 mg/kg in three soil samples but did not exceed RRSCOs. SVOCs were compared to PGWSCOs for compounds detected in groundwater samples. SVOCs including benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene (detected in groundwater samples collected from MW-02 and MW-03) were found to exceed the PGWSCOs.
    - Pesticides were not detected in any soil sample above RRSCOs. However, 4,4-DDD', 4,4'-DDE, 4,4'-DDT, and dieldrin exceeded UUSCOs of 0.0033 mg/kg, 0.0033 mg/kg, 0.0033 mg/kg, and 0.005 mg/kg, respectively, but did not exceed RRSCOs.
    - Five metals were detected above the RRSCOs in multiple soil samples collected. These include arsenic (RRSCO of 16 mg/kg) at a maximum concentration 51 mg/kg in HA-02 (6-8'), barium (RRSCO of 400 mg/kg) at a maximum concentration of 676 mg/kg in HA-07 (10-12'), copper (RRSCO of 270 mg/kg) at a maximum concentration of 324 mg/kg in HA-18 (10-12'), lead (RRSCO of 400 mg/kg) at a maximum concentration of 5,320 mg/kg in HA-11 (10-12'), and mercury (RRSCO of 0.81 mg/kg) at a maximum concentration of 15.4 mg/kg in HA-19 (10-12'). In addition, nickel, selenium, silver, and zinc exceeded UUSCOs of 30 mg/kg, 3.9 mg/kg, 2 mg/kg, and 109 mg/kg, respectively, but did not exceed RRSCOs.

- PCBs were not detected in any soil sample above RRSCOs. However, total PCBs exceeded the UUSCO of 0.1 mg/kg but did not exceed RRSCOs.
- The emerging contaminant, 1,4-dioxane was not detected above laboratory detection limits in any soil samples collected at the Site. Per- and polyfluoroalkyl substances (PFAS) were not detected in any soil samples above RRSCOs. However, perfluorooctanesulfonic acid (PFOS) and Perfluorooctaneic acid (PFOA) exceeded the UUSCOs of 0.88 nanograms per gram (ng/g) and 0.66 ng/g, respectively, but did not exceed RRSCOs. Total PFOS and PFOA ranged from non-detect to a maximum concentration of 4.17 ng/g in HA-20 (10-12').

5. Groundwater analytical results were compared to 6 NYCRR Part 703.5 Class GA groundwater quality standards (AWQS) and NYSDEC guidance set forth in Technical and Operational Guidance Series (TOGS) 1.1.1 (specifically, "June 1998 NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards (AWQS) and Guidance Values, Class GA for the protection of a source of drinking water modified per the April 2000 addendum") (TOGS 1.1.1). Results include the following:

    - Thirteen VOCs were identified in up to three groundwater samples (MW-02, MW-03, and MW-07) at concentrations exceeding the AWQS. The VOCs, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were detected in one groundwater sample, MW-03, above the AWQS at concentrations of 33 µg/L and 13 µg/L, respectively. Benzene (170 µg/L), isopropylbenzene (140 µg/L), naphthalene (13 µg/L), sec-butylbenzene (22 µg/L), and MTBE (12 µg/L) were detected above the AWQS in MW-02, only. Cis-1,2-DCE was detected above the AWQS in one groundwater sample, MW-07, at a concentration of 5.3 µg/L. The VOC, 1,2,4,5-tetramethylbenzene (maximum concentration 63 µg/L in MW-02), ethylbenzene (maximum concentration 19 µg/L in MW-02), n-butylbenzene (maximum concentration 19 µg/L in MW-02), n-propylbenzene (maximum concentration 220 µg/L in MW-02), and p/m-xylene (maximum concentration 13 µg/L in MW-03) were each detected above the AWQS in two groundwater samples (MW-02 and MW-03).
    - Phenol was detected at an estimated concentration in one groundwater sample, MW-02, above the AWQS at an estimated concentration of 1.5 µg/L. Six SVOCs, specifically PAHs, were detected in multiple groundwater samples above the AWQS at reportable or estimated concentrations including benzo(a)anthracene (maximum concentration of 0.14 µg/L in MW-03 and MW-05), benzo(a)pyrene (maximum concentration of 0.13 µg/L in MW-03), benzo(b)fluoranthene (maximum concentration of 0.16 µg/L in MW-05), benzo(k)fluoranthene (maximum concentration of 0.05 µg/L in MW-03 and MW-05), chrysene (maximum concentration of 0.13 µg/L in MW-3), and indeno(1,2,3-cd)pyrene (maximum concentration of 0.08 µg/L in MW-03 and MW-05).
    - Three metals were detected in multiple groundwater samples all at maximum concentrations in MW-01 including total iron (maximum concentration of 11,200 µg/L), total manganese (maximum concentration of 1,092 µg/L), and total sodium (maximum concentration of 591,000 µg/L). These metals are naturally occurring and are not site-specific contaminants of concern (not to be addressed by the remedy).
    - Three dissolved metals were detected in multiple groundwater samples above the AWQS including dissolved iron (maximum concentration of 1,560 µg/L in MW-04), dissolved

manganese (maximum concentration of 1,043 µg/L in MW-01), and dissolved sodium (maximum concentration of 559,000 µg/L in MW-01). These metals are naturally occurring and are not site-specific contaminants of concern (not to be addressed by the remedy).

- The emerging contaminant, 1,4-dioxane was detected in multiple groundwater samples above the NYSDEC GV at a maximum concentration of 1.23 µg/L in MW-08. Emerging contaminants PFOA/PFAS were compared to the February 2023 NYSDEC GVs. PFOA was detected above the NYSDEC GV in eight of the nine groundwater samples at a maximum concentration of 67.5 ng/L in MW-03. PFOS was detected above the NYSDEC GV in each groundwater sample at a maximum concentration of 108 ng/L in MW-05. The concentration of total PFOS and PFOA compounds ranged from 23.5 ng/L in MW-07 to a maximum concentration of 149 ng/L in MW-05. An on-site source area for emerging contaminants was not identified at the site.

6. Soil vapor analytical results include the following:

    - Total VOC concentrations in soil vapor samples ranged from 691 µg/m3 in VP-09 to 260,178 µg/m3 in VP 02. Total BTEX concentrations ranged from 23.8 µg/m3 in sample VP-10 to 708 µg/m3 in sample VP 02.
    - PCE was detected in nine of the ten soil vapor samples above laboratory detection limits at a maximum concentration of 464 µg/m3 in VP-03. However, the sample collected from VP-02 required elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample, further described in the laboratory report narrative. The detection limit for PCE was reported at 1,120 µg/m3.
    - No other chlorinated VOCs were detected above laboratory detection limits in any soil vapor sample collected on the Site. 1,1-dichloroethane was detected in one offsite soil vapor sample, VP-09, above laboratory method detection limits at a concentration of 0.967 µg/m3.
    - Multiple petroleum-related VOCs were detected at elevated concentrations in several soil vapor samples, all at maximum concentrations in soil vapor sample VP-02, including 2,2,4-trimethylpentane (maximum concentration 251,000 µg/m3), cyclohexane (maximum concentration 3,130 µg/m3), n-heptane (maximum concentration 2,020 µg/m3), hexane (maximum concentration 3,320 µg/m^3), and toluene (maximum concentration 708 µg/m^3).

SUMMARY OF THE REMEDY

The preferred remedy, Alternative II Track 2 remedy, will include the following:

1. Development and implementation of a Construction Health & Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
2. Design and construction of a support-of-excavation (SOE) system to facilitate remedial excavation to 15 ft bgs on the northern portion of the Site and to 18 ft bgs on the southern, former gasoline station, portion of the Site.
3. Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
4. Removal of the existing pavement and miscellaneous debris from the Site.
5. Decommissioning of on-site monitoring wells in accordance with NYSDEC CP-43 Policy.
6. Excavation, stockpiling, off-Site transport, and disposal of approximately 6,900 cubic yards total, including approximately 5,050 cubic yards of historical fill and solid waste and 1,850 cubic yards of petroleum-impacted soil that exceeds PGWSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will extend to 15 ft bgs on the northern portion of the Site (approximately 9,025 square foot [sq ft] area) and to 18 ft bgs on the southern, former gasoline station, portion of the Site (approximately 2,775 sq ft area). Refer to Figure 9 for anticipated areas of excavation. For development purposes, excavations are proposed to approximately 14 ft bgs throughout the Site footprint and a 500 sq ft elevator pit to approximately 18 ft bgs.
7. Removal of two 4,000-gallon underground storage tanks (USTs) associated with former gasoline service station operations, as well as any unknown USTs encountered, and/or associated appurtenances (e.g., fill lines, vent lines, and electrical conduits) as well as 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.
8. 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 localized dewatering with containerization, classification, and disposal at an approved receiving facility. Collection of dewatering influent samples to document groundwater quality at the Site during remediation.
9. Screening for indications of contamination (by visual means, odor, and monitoring photoionization detectors [PIDs]) of excavated material during intrusive site work.
10. Implementation of a preliminary waste characterization to facilitate off-site disposal of excavated soil/fill. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots will be completed to facilitate off-site disposal of excavated soil/fill.
11. Appropriate off-site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
12. Backfill the Site as needed for the development with certified-clean fill/soil (i.e., meeting the Allowable Constituent Levels for Imported Fill or Soil as per unrestricted use defined in DER-10 Appendix 5), RCA, or virgin, native crushed stone.

13. Upon completion of remedial excavation and backfilling in former gasoline filling station portion of the Site, sodium and potassium persulfate activated using ferrous sulfide (TSI-FSA™), an *in situ* chemical oxidation (ISCO) reagent produced by Terra Systems, Inc., will be mixed *in situ* at within the backfill material at the groundwater interface at 14 to 16 ft bgs providing contact with the groundwater impacted with VOCs.
14. Collection and analysis of confirmation soil samples at the proposed remediation depths in accordance with DER-10 to document post-excavation conditions and confirm Track 2 RRSCOs were achieved.
15. A Track 2 remedy would include the construction of a composite cover system consisting of a 4-inch subbase (RCA or DEC-approved equivalent), a waterproofing/vapor barrier (minimum of 20-mil barrier), and a 6-inch concrete slab.
16. Completion of a Soil Vapor Intrusion (SVI) Evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy.
17. Development of a Site Management Plan (SMP) for long term management of residual contamination as required by an Environmental Easement, including plans for: (1) Institutional Controls; (2) monitoring; and (3) reporting.
18. Recording of an Environmental Easement to restrict use of the Site and require compliance with the SMP.

Table of Contents

List of Tables

List of Figures

List of Acronyms and Abbreviations

A	
AOC	Area of Concern
ASP	Analytical Services Protocol
AWQS	Ambient Water Quality Standards
B	
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BTEX	Benzene, toluene, ethylbenzene, xylenes
C	
CAMP	Community Air Monitoring Plan
CHASP	Construction Health & Safety Plan
COC	Contaminant of Concern
CP-51	Commissioners Policy-51 *(specifically "October 2010 NYSDEC Commissioners Policy 51")*
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CSM	Conceptual Site Model
D	
d/b/a	Doing Business As
DER-10	Division of Environmental Remediation-10 *(specifically "May 2010 NYSDEC Technical Guidance for Site Investigation and Remediation")*
DOT	Department of Transportation
DUSR	Data Usability Summary Report
E	
ECs	Engineering Controls
EE	Environmental Easement
ELAP	Environmental Laboratory Approval Program
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
F	
FER	Final Engineering Report
ft bgs	feet below ground surface
G	
GWQS	Groundwater Quality Standard
H	
Haley & Aldrich	Haley & Aldrich of New York
HAZWOPER	Hazardous Waste Operations and Emergency Response

List of Acronyms and Abbreviations (Continued)

I

ICs	Institutional Controls
ISCO	*In situ* chemical oxidation

M

mg/kg	milligrams per kilogram
MS	Matrix Spike
MSD	Matrix Spike Duplicate
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter

N

ng/L	nanograms per liter
NTU	Nephelometric Turbidity Unit
NYCRR	New York Codes, Rules and Regulations
NYCDEP	New York City Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health

O

OSHA	Occupational Health and Safety Administration

P

PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene/Tetrachloroethene
PGWSCO	Protection of Groundwater Soil Cleanup Objective
PHFxA	Perfluorohexanoic Acid
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PID	Photoionization Detector
PPE	Personal Protective Equipment
PVC	Polyvinyl chloride

Q

QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QHHEA	Qualitative Human Health Exposure Assessment

List of Acronyms and Abbreviations (Continued)

R	
RA	Remedial Action
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
R	
RA	Remedial Action
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Remediation Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RRSCO	Restricted Residential Soil Cleanup Objective
S	
SCG	Standards, Criteria, and Guidelines
SCO	Soil Cleanup Objective
SDS	Safety Data Sheet
Site	556 Baltic Street, Brooklyn, New York
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOE	Support-of-Excavation
SPDES	State Pollutant Discharge Elimination System
Sq	Square
SVOC	Semi-Volatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
T	
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS 1.1.1	Technical and Operational Guidance Series 1.1.1 *(Specifically "June 1998 NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values, Class GA for the protection of a source of drinking water modified per the April 2000 addendum")*
U	
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objective
V	
VOC	Volatile Organic Compound

1. Introduction

This draft Remedial Action Work Plan (RAWP) was developed by H & A of New York LLP, d/b/a Haley & Aldrich of New York (Haley & Aldrich) on behalf of 159 Third Realty LLC, 159 Third Residence LLC, and Baltic Residence LLC for the 556 Baltic Street Site located at 556 Baltic Street, formerly referred to as 151-169 Third Avenue (Block 407 Lot 1), within the Gowanus neighborhood of Brooklyn, New York (the Site). 159 Third Realty LLC, 159 Third Residence LLC and Baltic Residence LLC applied to and were accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as Volunteers. A Brownfield Cleanup Agreement (BCA) was executed by the NYSDEC and 159 Third Realty LLC, 159 Third Residence LLC and Baltic Residence LLC (the "Volunteers") on 15 December 2022 (BCP Site No. C224375). The Volunteers propose to remediate the Site for mixed-use commercial and residential purposes.

This RAWP summarizes the nature and extent of contamination on the Site as determined from data gathered during the Remedial Investigation (RI) completed at the Site in March 2023. The RAWP provides an evaluation of Track 1 (Alternative I), Track 2 (Alternative II), and Track 4 (Alternative III) cleanups, their associated costs, and a recommendation for a preferred remedy. The preferred Track 2 remedy is consistent with the procedures defined in DER-10 and complies with applicable federal, state, and local laws, regulations, and requirements.

1.1 SITE LOCATION AND DESCRIPTION

The Site, identified as Section 3, Block 407, Lot 1 on the New York City tax map, is approximately 11,800-square feet in size. The Site is bound to the north by Baltic Street followed by a multi-story residential building, to the west by Third Avenue followed by a single-story commercial/manufacturing building, to the east by a four-story residential building and a Cube Smart storage facility, and to the south by Butler Street followed by a hotel. The Project Locus is shown on Figure 1, a site plan is shown on Figure 2, and a site survey is provided in Appendix A.

The Site is located within a residential and manufacturing zoning district (M1-4/R7X). The Site is in an urban area surrounded by commercial and industrial properties served by municipal water. The Volunteer plans to redevelop the Site for mixed-use commercial and residential purposes (including affordable housing) consistent with current zoning.

The Site is listed with an environmental E-Designation (E-601) for hazardous materials, noise, and air quality (Heating, ventilation, and air conditioning [HVAC] limited to natural gas and exhaust stack location limitations) resulting from a City Environmental Quality Review (CEQR) effective March 2019 CEQR # 19DCP157K). Satisfaction of the E-Designation requirements is subject to review and approval by the New York City Mayor's Office of Environmental Remediation (OER) prior to redevelopment.

1.2 REDEVELOPMENT PLAN

The development will consist of constructing an 11-story new mixed-use (residential and commercial), mixed-income building that will provide affordable housing pursuant to 421-a. The new development is anticipated to include a cellar that will encompass the entire lot requiring excavation to 14 ft bgs and a 500 sq ft elevator pit to approximately 18 ft bgs. Redevelopment plans are included in Appendix B.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located along Third Avenue between Butler Street and Baltic Street in an urban area identified as the Gowanus neighborhood in the Borough of Brooklyn. The Site is bound to the north by Baltic Street followed by a 1 & 2 family residential building, to the east by a Cube Smart storage facility and a 1 & 2 family residential building, to the south by Butler Street followed by a commercial building, and to the west by Third Avenue followed by industrial-use buildings. Adjoining and surrounding property uses are further detailed below:

Direction	Adjoining properties	Surrounding Properties
North	Baltic Street followed by a 1 & 2 family residential building	1 & 2 family residential, mixed-use, institutional, and industrial buildings
South	Butler Street followed by a commercial building	Mixed-use and industrial buildings
East	Cube Smart storage facility	1 & 2 family residential, parking, and industrial buildings
West	Butler Street followed by a commercial building	Industrial and commercial buildings and vacant lots

Additionally, the following sensitive receptors are located within a 500 ft radius including day care centers and a health care facility listed below:

No.	Name (Approximate Distance from Site)	Address
1	Alonzo A Daughtry Day Care Center (175 ft east)	565 Baltic Street, #1704, Brooklyn, New York, 11217
2	Fresnius Kidney Care (500 ft south)	595 Degraw Street, Brooklyn, New York, 11217
3	Renaissance Home Health Care Services (Bumble Bee) (235 ft west)	267 Douglass Street, 3rd Floor, Brooklyn NY 11217

1.4 SITE HISTORY

The Site was developed in the 1920s with multiple four-story commercial stores. The Site operated as a gasoline service station, auto rental and car wash from the 1970s until the Site became vacant in December 2022. Two 4,000-gallon gasoline Underground Storage Tanks (USTs) were installed in 1972 and reportedly a 550-gallon tank was installed in 1974 and closed but not removed in 1997. There are three previously closed spill cases reported for the Site including two that were reportedly the result of failed tank tightness testing and a third case pertaining to impacted groundwater on the Site and the neighboring property across Third Avenue.

1.5 PREVIOUS ENVIRONMENTAL REPORTS

To date the following reports were prepared for the Site prior to submission of this draft RAWP:

1. November 2006 Investigation Summary Report Prepared by Impact Environmental;
2. February 2007 Update to Subsurface Investigation Report Prepared by Impact Environmental;

3. 2017-2019 Quarterly Groundwater Monitoring Reports Spill #95-06588 Prepared by Berninger Environmental Inc.;
4. September 2021 Phase I Environmental Site Assessment, Prepared by GEI Consultants;
5. December 2021 Limited Phase II Environmental Site Investigation Report, Prepared by Haley & Aldrich of New York; and
6. March 2022 Remedial Investigation Report, Prepared by Haley & Aldrich of New York.

Prior investigation findings are included in Appendix A of the RIWP, dated 13 January 2023. Investigation findings from work conducted prior to the 2023 RI informed preparation of the RIWP, but were not relied upon for this RAWP, which is based upon the 2023 RI findings. Previous environmental reports and summaries are included in the Remedial Investigation Report provided in Appendix C.

2. Description of Remedial Investigation Findings

The RI was completed in accordance with Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375, DER-10, the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates), and the RIWP, dated 13 January 2023. The objective of the RI was to determine the nature and extent of contamination in soil, groundwater, and soil vapor. The RI was completed between 1 February and 27 February 2023 and between 2 June and 8 June 2023.

2.1 REMEDIAL INVESTIGATION

The RI consisted of the following:

- Advancement of twenty-one soil borings to depths ranging from 20 to 25 ft bgs, with samples collected from the 2 to 4 ft bgs, 6 to 8 ft bgs, 10 to 12 ft bgs, and 14 to 16 ft bgs, and additional soil samples were collected in borings HA-19 and HA-21 from 20 to 22 ft bgs below where petroleum impacts were observed. A total of 86 soil samples were collected, plus QA/QC samples, for laboratory analysis.
- Lead and mercury delineations were conducted on site at where elevated concentrations of lead and mercury were detected during previous investigations;
- To investigate the potential for the presence of non-aqueous phase liquid/grossly contaminated material (NAPL/GCM), two soil borings (HA-22 and HA-23) were advanced to 100 ft bgs;
- Installation of nine two-inch permanent groundwater monitoring wells to 20 ft bgs with groundwater samples collected from each monitoring well. A total of nine groundwater samples, plus QA/QC samples, were collected for laboratory analysis;
- Completion of a survey by a licensed surveyor in the State of New York and gauging of monitoring wells to determine groundwater elevation and flow direction; and
- Installation of ten soil vapor probes to a depth of approximately 12 to 13 ft bgs and collection of ten soil vapor samples.

2.1.1 Soil Investigation

Twenty-one borings (SB-1 through SB-21) were installed across the entire Site during the RI by Coastal Environmental Solutions, Inc. Soil borings were advanced by a track-mounted Eijkelkamp CRS-XL-140 Duo sonic drill rig or Geoprobe® models 6610DT and 420M drill rigs to depths ranging from 20 to 25 ft bgs. Samples were collected from acetate liners using a stainless-steel trowel or sampling spoon. The soil was screened for visual, olfactory, and instrumental evidence of environmental impacts and was visually classified for soil type, grain size, texture, and moisture content. Soils were logged continuously by an engineer. The presence of staining, odors, and photoionization detector (PID) response was noted.

A lead delineation was performed at boring location HA-24 (former December 2021 Limited Phase II boring location B-7). A mercury delineation was performed at boring locations HA-25 and HA-26, (former January 2022 Phase II soil boring location SB-7 and former December 2021 Limited Phase II boring location B-4, respectively). The locations of metals delineations completed at the site are referenced in the RIR.

The two NAPL/GCM investigation soil borings (HA-22 and HA-23) were advanced to 100 ft bgs with shake tests performed from intervals 38 to 40 ft, 58 to 60 ft, 68 to 70 ft, 78 to 80 ft, 88 to 90 ft, and 98 to 100 ft in HA-22 and 30 to 31 ft, 37 to 38 ft, 50 to 51 ft, 59 to 60 ft, 90 to 91 ft, and 99 to 100 ft in HA-23. NAPL/GCM was not identified in either boring and therefore soil samples were not collected for laboratory analysis. The locations of these NAPL/GCM investigation borings are referenced in the RIR.

2.1.2 Groundwater Investigation

Nine, two-inch diameter permanent monitoring wells (MW-1 through MW-9) were installed to 20 ft bgs. Each monitoring well was constructed using 2-inch diameter polyvinyl chloride (PVC) riser pipe with 10-ft-long, 10 slot (0.01-inch) slotted screens. Each monitoring well was backfilled with #0 certified clean sand fill, followed by bentonite plug and sealed at grade with steel flush-mount covers. Monitoring well screens were installed to straddle the water table. Wells were screened to straddle the water table. Groundwater was encountered at approximately 14.49 ft to 15.69 ft bgs. Monitoring wells were developed by surging a pump in the well several times to pull fine-grained material from the well. Development was not completed until the water turbidity was 50 nephelometric turbidity units (NTU) or less, or 10 well volumes were removed, if possible. The well casings were surveyed by a New York State licensed surveyor on 16 February 2023. Groundwater generally flows from northwest to southeast. Groundwater contours are provided in Figure 3.

2.1.3 Soil Vapor Investigation

NYSDEC DER-10 requires an assessment of soil vapor for contaminated sites to evaluate the health risk associated with potential exposure to VOCs through vapor intrusion into occupied spaces. Six soil vapor probes were installed to assess soil vapor conditions.

Ten soil vapor probes (SG-1 through SG-8) were installed by Coastal using track-mounted Eijkelkamp CRS-XL-140 Duo sonic drill rig or Geoprobe® model 6610DT to advance the stainless-steel probes to a depth of approximately 12 to 13 ft bgs. The stainless-steel soil vapor probes were sealed with bentonite, and a tracer gas was used in accordance with NYSDOH protocols to serve as a QA/QC measure to verify the integrity of the soil vapor probe seal. In addition, one to three implant volumes were purged prior to the collection of the soil vapor samples. Sampling occurred for the duration of two hours. At the conclusion of the sampling round, tracer monitoring was performed a second time to confirm the integrity of the probe seals.

2.2 SAMPLES COLLECTED

During the February 2023 RI, soil samples representative of Site conditions were collected at 21 locations widely distributed across the Site. Samples were collected from 2 to 4 ft bgs, 6 to 8 ft bgs, 10 to 12 ft bgs, and 14 to 16 ft bgs, and additional soil samples were collected in borings HA-19 and HA-21 from 20 to 22 ft bgs below where petroleum impacts were observed. Haley & Aldrich collected 86 soil samples (plus QA/QC samples) for laboratory analysis.

Lead and mercury delineations were conducted on site where elevated concentrations of lead and mercury were detected during previous investigations. A lead delineation was performed at boring

location HA-24 (former December 2021 Limited Phase II boring location B-7). From this location 5-ft step out borings (DB-01 through DB-03) were advanced in three directions with samples collected from 0 to 2 ft bgs, 2 to 4 ft bgs, and 4 to 6 ft bgs, and analyzed for total and Toxicity Characteristic Leachate Procedure (TCLP) lead. A mercury delineation was performed at boring locations HA-25 and HA-26, (former January 2022 Phase II soil boring location SB-7 and former December 2021 Limited Phase II boring location B-4, respectively). From HA-25, 5-ft step out borings (DB-04 through DB-06) were advanced in three directions with samples collected from 10 to 12 ft bgs, 12 to 14 ft bgs, and 14 to 16 ft bgs, and analyzed for total and TCLP mercury. From HA-26, 5-ft step out borings (DB-07 and DB-09) were advanced in two directions with samples collected from 11 to 13 ft bgs, 13 to 15 ft bgs, and 15 to 17 ft bgs, and analyzed for total and TCLP mercury. DB-08 could not be completed due to the presence of the existing USTs identified with the GPR survey.

A total of nine groundwater samples, one from each monitoring well, were collected for laboratory analysis. A field blank, trip blank, matrix spike/matrix spike duplication (MS/MSD) sample, and a duplicate sample were also collected. Groundwater monitoring wells were sampled using low-flow sampling methods. Monitoring wells were purged, and physical and chemical parameters stabilized before samples were collected.

A total of ten soil vapor samples were collected for laboratory analysis, one from each soil vapor probe. Samples were collected in appropriately sized Summa canisters that were certified clean by the laboratory. Sampling occurred for the duration of two hours.

Soil, groundwater, and soil vapor samples were submitted for laboratory analysis to Alpha Analytical Inc., a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory located in Westborough, Massachusetts.

2.3 CHEMICAL ANALYSIS

The laboratory analyses performed on the soil, groundwater, and soil vapor samples are summarized below.

Soil samples were analyzed for the following parameters:

- Target Compound List (TCL) VOCs using EPA Method 8260B
- TCL SVOCs using EPA Method using 8270C
- Total Metals using EPA Method 6010
- Total PCBs using EPA Method 8082
- TCL Pesticides using EPA Method 8081B
- Per- and polyfluoroalkyl substances (PFAS) using EPA Method 1633
- 1,4-dioxane using EPA Method 8270 SIM

Groundwater samples collected were analyzed for the following parameters:

- TCL VOCs using EPA Method 8260B
- TCL SVOCs using EPA Method 8270C
- Total Metals using EPA Methods 6010/7471

- Dissolved Metals using EPA Method 6010/7471
- PCBs using USEPA method 8082A
- TCL Pesticides using EPA Method 8081B
- PFAS using EPA Method 1633
- 1,4-dioxane using EPA Method 8270 SIM

Soil vapor samples were analyzed for the following parameters:

- VOCs using USEPA Method TO-15

2.4 REMEDIAL INVESTIGATION FINDINGS SUMMARY

A summary of environmental findings of the RI includes the following:

1. The Site is underlain by a layer of fill consisting of mainly brown to gray fine to medium sand and silty fine sand with gravel and fragments of asphalt, concrete, brick, glass, cinders, and wood. The depth of fill material varies across the Site extending to a maximum depth of approximately 25 feet (ft) below ground surface (bgs). The fill is underlain by a fine sand with varying amounts of fine- and coarse-grained sediments, an organic clay at a depth of about 30 to 32 ft bgs, followed by a gray to brown silty fine sand grading to a red brown to brown fine sand with varying amounts of medium and coarse sand with fine to coarse gravels and cobbles.
2. Depth to groundwater ranged from 14.49 to 15.69 ft bgs with groundwater elevation ranging from 5.9 to 7.13 ft. No light aqueous phase liquid (LNAPL) was detected in any of the monitoring wells.
3. Groundwater flow beneath the Site is estimated to be northwest to southeast.
4. Soil analytical results were compared to 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs), Restricted Residential Soil Cleanup Objectives (RRSCOs) and Protection of Groundwater SCOs (PGWSCOs) where applicable. Results include the following:

    - One VOC, n-propylbenzene, was detected above the RRSCO (100 mg/kg) at a maximum concentration of 160 milligrams per kilogram (mg/kg) in HA-19 (14-16'). In addition, acetone, benzene, ethylbenzene, naphthalene, toluene, total xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, n-butylbenzene, and sec-butylbenzene exceeded UUSCOs of 0.05 mg/kg, 0.06 mg/kg, 1 mg/kg, 12 mg/kg, 0.7 mg/kg, 0.26 mg/kg, 3.6 mg/kg, 8.4 mg/kg, 12 mg/kg, and 11 mg/kg, respectively, but did not exceed RRSCOs. VOCs were compared to PGWSCOs for compounds detected in groundwater samples. VOCs including benzene, ethylbenzene, total xylenes, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and n-propylbenzene (detected in groundwater samples collected from MW-02 and MW-03) were found to exceed the PGWSCOs.
    - Seven SVOCs, specifically PAHs, were detected above the RRSCOs in multiple soil samples with maximum concentrations in soil sample HA-03 (10-12'). These include benzo(a)anthracene (RRSCO of 1 mg/kg) at a maximum concentration of 20 mg/kg, benzo(a)pyrene (RRSCO of 1 mg/kg) at a maximum concentration of 15 mg/kg, benzo(b)fluoranthene (RRSCO of 1 mg/kg) at a maximum concentration of 16 mg/kg,

benzo(k)fluoranthene (RRSCO of 3.9 mg/kg) at a maximum concentration of 4 mg/kg, chrysene (RRSCO of 3.9 mg/kg) at a maximum concentration of 18 mg/kg, dibenz(a,h)anthracene (RRSCO of 0.33 mg/kg) at a maximum concentration of 1.8 m/kg, and indeno(1,2,3-cd)pyrene (RRSCO of 0.5 mg/kg) at a maximum concentration of 8.6 mg/kg. In addition, 3-Methylphenol/4-methylphenol exceeded the UUSCO of 0.33 mg/kg in three soil samples but did not exceed RRSCOs. SVOCs were compared to PGWSCOs for compounds detected in groundwater samples. SVOCs including benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene (detected in groundwater samples collected from MW-02 and MW-03) were found to exceed the PGWSCOs.

- Pesticides were not detected in any soil sample above RRSCOs. However, 4,4-DDD', 4,4'-DDE, 4,4'-DDT, and dieldrin exceeded UUSCOs of 0.0033 mg/kg, 0.0033 mg/kg, 0.0033 mg/kg, and 0.005 mg/kg, respectively, but did not exceed RRSCOs.
- Five metals were detected above the RRSCOs in multiple soil samples collected. These include arsenic (RRSCO of 16 mg/kg) at a maximum concentration 51 mg/kg in HA-02 (6-8'), barium (RRSCO of 400 mg/kg) at a maximum concentration of 676 mg/kg in HA-07 (10-12'), copper (RRSCO of 270 mg/kg) at a maximum concentration of 324 mg/kg in HA-18 (10-12'), lead (RRSCO of 400 mg/kg) at a maximum concentration of 5,320 mg/kg in HA-11 (10-12'), and mercury (RRSCO of 0.81 mg/kg) at a maximum concentration of 15.4 mg/kg in HA-19 (10-12'). In addition, nickel, selenium, silver, and zinc exceeded UUSCOs of 30 mg/kg, 3.9 mg/kg, 2 mg/kg, and 109 mg/kg, respectively, but did not exceed RRSCOs.
- PCBs were not detected in any soil sample above RRSCOs. However, total PCBs exceeded the UUSCO of 0.1 mg/kg but did not exceed RRSCOs.
- The emerging contaminant, 1,4-dioxane was not detected above laboratory detection limits in any soil samples collected at the Site. Per- and polyfluoroalkyl substances (PFAS) were not detected in any soil samples above RRSCOs. However, perfluorooctanesulfonic acid (PFOS) and Perfluorooctaneic acid (PFOA) exceeded the UUSCOs of 0.88 nanograms per gram (ng/g) and 0.66 ng/g, respectively, but did not exceed RRSCOs. Total PFOS and PFOA ranged from non-detect to a maximum concentration of 4.17 ng/g in HA-20 (10-12').

5. Groundwater analytical results were compared to 6 NYCRR Part 703.5 Class GA groundwater quality standards (AWQS) and NYSDEC guidance set forth in Technical and Operational Guidance Series (TOGS) 1.1.1 (specifically, "June 1998 NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards (AWQS) and Guidance Values, Class GA for the protection of a source of drinking water modified per the April 2000 addendum") (TOGS 1.1.1). Results include the following:

    - Thirteen VOCs were identified in up to three groundwater samples (MW-02, MW-03, and MW-07) at concentrations exceeding the AWQS. The VOCs, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene were detected in one groundwater sample, MW-03, above the AWQS at concentrations of 33 µg/L and 13 µg/L, respectively. Benzene (170 µg/L), isopropylbenzene (140 µg/L), naphthalene (13 µg/L), sec-butylbenzene (22 µg/L), and MTBE (12 µg/L) were detected above the AWQS in MW-02, only. Cis-1,2-DCE was detected above the AWQS in one groundwater sample, MW-07, at a concentration of 5.3 µg/L. The VOC, 1,2,4,5-tetramethylbenzene (maximum concentration 63 µg/L in MW-02), ethylbenzene

(maximum concentration 19 µg/L in MW-02), n-butylbenzene (maximum concentration 19 µg/L in MW-02), n-propylbenzene (maximum concentration 220 µg/L in MW-02), and p/m-xylene (maximum concentration 13 µg/L in MW-03) were each detected above the AWQS in two groundwater samples (MW-02 and MW-03).

- Phenol was detected at an estimated concentration in one groundwater sample, MW-02, above the AWQS at an estimated concentration of 1.5 µg/L. Six SVOCs, specifically PAHs, were detected in multiple groundwater samples above the AWQS at reportable or estimated concentrations including benzo(a)anthracene (maximum concentration of 0.14 µg/L in MW-03 and MW-05), benzo(a)pyrene (maximum concentration of 0.13 µg/L in MW-03), benzo(b)fluoranthene (maximum concentration of 0.16 µg/L in MW-05), benzo(k)fluoranthene (maximum concentration of 0.05 µg/L in MW-03 and MW-05), chrysene (maximum concentration of 0.13 µg/L in MW-3), and indeno(1,2,3-cd)pyrene (maximum concentration of 0.08 µg/L in MW-03 and MW-05).
- Three metals were detected in multiple groundwater samples all at maximum concentrations in MW-01 including total iron (maximum concentration of 11,200 µg/L), total manganese (maximum concentration of 1,092 µg/L), and total sodium (maximum concentration of 591,000 µg/L). These metals are naturally occurring and are not site-specific contaminants of concern (not to be addressed by the remedy).
- Three dissolved metals were detected in multiple groundwater samples above the AWQS including dissolved iron (maximum concentration of 1,560 µg/L in MW-04), dissolved manganese (maximum concentration of 1,043 µg/L in MW-01), and dissolved sodium (maximum concentration of 559,000 µg/L in MW-01). These metals are naturally occurring and are not site-specific contaminants of concern (not to be addressed by the remedy).
- The emerging contaminant, 1,4-dioxane was detected in multiple groundwater samples above the NYSDEC GV at a maximum concentration of 1.23 µg/L in MW-08. Emerging contaminants PFOA/PFAS were compared to the February 2023 NYSDEC GVs. PFOA was detected above the NYSDEC GV in eight of the nine groundwater samples at a maximum concentration of 67.5 ng/L in MW-03. PFOS was detected above the NYSDEC GV in each groundwater sample at a maximum concentration of 108 ng/L in MW-05. The concentration of total PFOS and PFOA compounds ranged from 23.5 ng/L in MW-07 to a maximum concentration of 149 ng/L in MW-05. An on-site source area for emerging contaminants was not identified at the site.

6. Soil vapor analytical results include the following:

    - Total VOC concentrations in soil vapor samples ranged from 691 µg/m^3 in VP-09 to 260,178 µg/m^3 in VP 02. Total BTEX concentrations ranged from 23.8 µg/m^3 in sample VP-10 to 708 µg/m^3 in sample VP 02.
    - PCE was detected in nine of the ten soil vapor samples above laboratory detection limits at a maximum concentration of 464 µg/m^3 in VP-03. However, the sample collected from VP-02 required elevated detection limits due to the dilution required by the elevated concentrations of target compounds in the sample, further described in the laboratory report narrative. The detection limit for PCE was reported at 1,120 µg/m^3.
    - No other chlorinated VOCs were detected above laboratory detection limits in any soil vapor sample collected on the Site. 1,1-dichloroethane was detected in one offsite soil vapor sample, VP-09, above laboratory method detection limits at a concentration of 0.967 µg/m^3.

- Multiple petroleum-related VOCs were detected at elevated concentrations in several soil vapor samples, all at maximum concentrations in soil vapor sample VP-02, including 2,2,4-trimethylpentane (maximum concentration 251,000 µg/m^3), cyclohexane (maximum concentration 3,130 µg/m^3), n-heptane (maximum concentration 2,020 µg/m^3), hexane (maximum concentration 3,320 µg/m^3), and toluene (maximum concentration 708 µg/m^3).

2.5 SIGNIFICANT THREAT

The NYSDEC and NYSDOH have not yet determined whether this Site poses a significant threat to human health and the environment.

2.6 GEOLOGY AND HYDROGEOLOGY

2.6.1 Historical Fill Material

The Site is underlain by a layer of fill consisting of mainly brown to gray fine to medium sand and silty fine sand with gravel and fragments of asphalt, concrete, brick, glass, cinders, and wood. The depth of fill material varies across the Site extending to a maximum depth of approximately 25 ft bgs.

2.6.2 Native Soil

A native layer consisting of a fine sand with varying amounts of fine- and coarse-grained sediments, an organic clay at a depth of about 30 to 32 ft bgs, followed by a gray to brown silty fine sand to a red brown to brown fine sand with varying amounts of medium and coarse sand with fine to coarse gravels and cobbles to a maximum boring depth of 100 ft bgs.

2.6.3 Bedrock

Bedrock was not encountered during the RI. Depth to bedrock is anticipated to be greater than 100 ft bgs. According to the USGS Bedrock and Engineering Geologic, Maps of New York County and Parts of Kings and Queens Counties, New York, dated 1994, bedrock beneath the Site consists of muscovite-biotite-quartz schist.

2.6.4 Hydrogeology

Groundwater was encountered at 14.49 to 15.69 ft bgs, and groundwater flow beneath the Site is generally to the southeast. A groundwater contour map is included as Figure 3.

2.7 CONTAMINANT CONDITIONS

2.7.1 Conceptual Site Model

A conceptual site model (CSM) was developed based on the findings of the RI performed under the BCP program. The CSM focused primarily the presence of significant quantities of historic fill, and on historical use of the Site as a gasoline service station and car wash from the 1970s until the Site became vacant in

December 2022, and provides a framework for distribution of impacted materials sitewide and potential migration/exposure pathways.

2.7.2 Potential Sources of Contamination

Based on the analytical results of the RI, the primary contaminants of concern for the Site are VOCs, specifically petroleum-related VOCs, SVOCs (specifically PAHs), and heavy metals in soil, and in some areas PCBs and pesticides; petroleum related VOCs, SVOCs, and metals in groundwater; and VOCs in soil vapor.

Based on the identified contaminants, the source of contamination in soil, groundwater, and soil vapor is likely the result of the historical retail petroleum operations at the Site, the former car wash operations at the Site and the presence of fill material.

Specifically, PCE was detected sitewide in soil vapor samples collected on the Site during the Remedial Investigation. Detections ranged from 204 ug/m^3 to 464 ug/m^3. PCE was detected in soil samples at low concentrations below the applicable UUSCO of 1.3 mg/kg, but above the laboratory detection limits. CVOCs degrade over time into daughter products and due to the volatile nature of the compounds, they partition from soil and groundwater into soil vapor. This is typically indicated by elevated CVOC concentrations in soil vapor and low, but detected, concentrations in soil. PCE was detected in five boring locations in sample intervals ranging from 2-4 ft to 14-16 ft. Locations with observed PCE detections include HA-07, HA-09, HA-10, HA-11 and HA-12, which are located in the vicinity of the former car wash on the northern portion of the Site. Due to observance of PCE detections in soil extending down to just above the groundwater table, this indicates there is an onsite source and the former car wash operations are likely the source of CVOCs impacts.

Elevated petroleum related VOCs were also detected in soil vapor at the site, including benzene, toluene, ethylbenzene and xylenes (BTEX) which are known contaminants of concern relating to auto related and gasoline filling station operations. Elevated BTEX concentrations were observed in soil vapor throughout the Site but with the highest combined concentrations in VP-02 (708 ug/m^3) which was installed downgradient from the underground storage tank (UST) field on the southern portion of the Site. In addition, 2,2,4-trimethylpentane, which is associated with the manufacturing, use and disposal of products associated with the petroleum and gas industry, was observed at the highest concentration south of the UST field in VP-02 (251,000 ug/m^3). The petroleum related VOCs observed throughout the Site are the result of the former auto related and gasoline filling station operations with the source being the former gasoline filling facility and tank field.

Offsite soil vapor samples installed to the northwest of the Site and northeast of the Site detected PCE above the laboratory detection limits but below concentrations identified on the Site, further indicating an onsite source exists but there are potentially additional offsite impacts to soil vapor that are attributed to historical uses of neighboring properties such as welding, wrecking, auto repair/filling stations and coal yards.

2.7.3 Description of AOCs

Based on Site observations, Site development history, and the findings of the previous environmental reports, five areas of concern (AOCs) were identified.

AOC 1 – Site-Wide Urban Fill in Subsurface Soils

Subsurface soils are impacted with elevated concentrations of metals, SVOCs, and in some areas, pesticides. These findings are consistent with characteristics of fill found throughout the New York City area. Fill material varies in depth throughout the Site extending to depths as great as 25 ft bgs.

AOC 2 – Metals Impacts in Subsurface Soils

Subsurface soils up to at least 22 ft bgs are impacted with elevated concentration of metals, specifically lead, mercury, and arsenic above UUSCOs, RRSCOs, and PGWSCOs. Elevated concentrations of metals are likely attributable to fill material and impacts from former operations at the Site.

AOC 3 – VOC Impacts to Groundwater

Several petroleum-related VOCs were detected above the AWQS in three of the nine groundwater samples collected at the Site. The greatest concentrations of petroleum-related VOCs were detected in MW-2. VOC impacts to groundwater are likely attributable to former gasoline service station operations at the Site.

AOC 4 – Soil Vapor Impacts

Based on a review of analytical data collected during this RI, VOCs have partitioned from soil and/or groundwater into the vapor phase.

AOC 5 – USTs in the Southern Portion of the Site

There are currently two USTs present in the southern portion of the Site. There are exceedances of SVOCs, specifically PAHs, petroleum-related VOCs, metals, and pesticides in soil samples collected adjacent to this area (HA-19, HA-20, and HA-21).

2.8 QUALITATIVE HUMAN EXPOSURE ASSESSMENT

A qualitative exposure assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human and ecological resource populations), identifying exposure pathways, and evaluating chemical fate and transport. An exposure pathway describes the means by which an individual or ecological resource may be exposed to contaminants originating from a site. An exposure pathway has the following five elements:

1. Receptor population
2. Contaminant source
3. Contaminant release and transport mechanism
4. Point of exposure
5. Route of exposure

An exposure pathway is complete when all five elements of an exposure pathway are documented; a potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is not documented but could reasonably occur. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway does not exist in the present and will not exist in the future.

2.8.1 Receptor Population

The receptor population includes the people who are or may be exposed to contaminants at a point of exposure. The identification of potential human receptors is based on the characteristics of the Site, the surrounding land uses, and the probable future land uses. The Site is currently vacant, covered with an impervious surface (concrete and/or asphalt), and secured with locked fencing at Site entrances. Since the Site is currently vacant and most recently operated as a gasoline service station, individual receptors would currently only include construction/maintenance workers that may be employed to perform work on the property.

The Site owner plans to redevelop the property for residential and commercial purposes, consistent with surrounding property use and zoning. Exposed receptors under the future use scenario may include residents of the future building, indoor employees, outdoor employees (e.g., groundskeepers or maintenance staff), and construction workers who may be employed at or perform work on the property. Site visitors may also be considered receptors; however, their exposure would be similar to that of the indoor employees but at a lesser frequency and duration.

2.8.2 Contaminant Sources

The source of contamination is defined as either the source of contaminant release to the environment (such as a waste disposal area or point of discharge) or the impacted environmental medium (soil, air, water) at the point of exposure. Section 2.7 discusses the COCs present in the Site media at elevated concentrations above background levels. In general, these are VOCs, SVOCs (specifically PAHs), heavy metals, and in some areas PCBs and pesticides in soil; petroleum related VOCs, SVOCs, and metals in groundwater; and VOCs in soil vapor.

2.8.3 Contaminant Release and Transport

Contaminant release and transport mechanisms carry contaminants from the source to points where people may be exposed; they are specific to the type of contaminant and Site use. For VOCs (including petroleum-related VOCs) present in groundwater, the potential exists for exposure through pathways associated with soil vapor migration. This would include the indoor vapor intrusion pathway also referred to as “soil vapor intrusion.” Additional pathways could include skin contact, inhalation, and incidental ingestion of VOCs present in soil and groundwater when and where construction workers are involved in subsurface activities where volatiles are present at elevated concentrations.

2.8.4 Exposure Routes and Mechanisms

The point of exposure is a location where actual or potential human contact with a contaminated medium may occur. Based on the exceedances of RRSCOs for VOCs, PAHs, and heavy metals in soil, exceedances of the AWQS for VOCs, SVOCs, PFAS, and metals in groundwater, and detections of VOCs in soil vapor, the point of exposure is defined as the entire Site.

The route of exposure is the manner in which a contaminant actually enters or contacts the human body (e.g., ingestion, inhalation, dermal absorption). Based on the types of receptors and points of exposure identified above, potential routes of exposure are listed below:

Current Use Scenario: The Site is currently vacant and most recently operated as a gasoline service station, covered with an impervious surface (concrete and/or asphalt), and secured with locked gates at Site entrances. The risk of exposure to contaminated soil and contaminated groundwater is therefore very low, other than during subsurface investigations or other activities that disturb the impervious Site cover and reach the subsurface. Release and transport mechanisms include contaminated surface soil transported as dust, contaminated groundwater flow, and volatilization of contaminants from soil and/or groundwater into vapor phase. Persons at risk of exposure, via the indicated exposure routes, are noted below.

- Occupant/Employee/Visitor – skin contact, inhalation, and incidental ingestion
- Construction/Utility Worker – skin contact, inhalation, and incidental ingestion

Construction/Remediation Scenario: In the continued absence of institutional controls, there will be continued exposure pathways during construction/remediation primarily related to Site soil. Planned construction/remedial activities include removal of the impervious Site cover, excavation and off-site disposal of soil, and dewatering of impacted groundwater to facilitate the installation of the foundation elements. Release and transport mechanisms include disturbed and exposed soil during excavation, contaminated soil transported as dust, contaminated groundwater flow (dewatering, if required), and volatilization of contaminants from soil and/or groundwater into vapor phase. Persons at risk of exposure, via the indicated exposure routes, are noted below.

- Construction/Utility Worker – skin contact, inhalation, and incidental ingestion
- Public Adjacent to the Site - inhalation

Future Use Scenario: The anticipated future use as a redeveloped mixed-use building that will cover most of the Site and prevent most release and transport mechanisms. In the absence of remedial removal of impacted material these include migration of contaminated groundwater and volatilization of contaminants from soil and/or groundwater into the vapor phase. Routes of future exposure include cracks in the foundation or slab or emergency repairs to the foundation walls or slab, and future construction beneath the foundation slab. Persons at risk of exposure, via the indicated exposure routes, are noted below:

- Construction/Utility Worker – skin contact, inhalation, and incidental ingestion
- Occupant/Employee/Visitor – inhalation
- Public Adjacent to the Site – inhalation

Soil vapor intrusion is a relevant transport mechanism under the current and future use scenario. Concerning skin contact, inhalation, and incidental ingestion of volatile organics present in soil and groundwater, the potential is low for exposure to VOCs for construction workers involved in subsurface activities where volatiles are present at elevated concentrations, given the results of the RI.

2.8.5 Exposure Assessment

Based on the above, we determine the following Qualitative Human Health Exposure Assessment (QHHEA) conclusions for current conditions, construction/remediation conditions and future use conditions as listed below.

Current Use Scenario

Potential exposure pathways exist for each contaminant during the construction/remediation phase. The overall risk will be minimized by the implementation of a Site-Specific Construction Health and Safety Plan (CHASP), localized monitoring of organic vapors, community air monitoring on the Site perimeter for particulates and VOCs, vapor and dust suppression techniques, installation of a stabilized entrance, cleaning truck tires and undercarriages, and use of appropriate personal protective equipment (PPE). Additionally, the Site will be remediated under this RAWP which includes a Soil/Materials Management Plan that highlights measures for PPE, covering of stockpiles, housekeeping, suppression techniques (particulates and vapor), and measures to prevent off-Site migration of contaminants. In addition, the Site will be secured and inaccessible to the public during remedial construction.

Construction/Remediation Scenario:

Potential exposure pathways exists for each contaminant during the construction/remediation phase. The overall risk will be minimized by the implementation of a Site-Specific CHASP, localized monitoring of organic vapors, community air monitoring on the Site perimeter for particulates and VOCs, vapor and dust suppression techniques, installation of a stabilized entrance, cleaning truck tires and undercarriages, and donning of appropriate PPE. Additionally, the Site will be remediated under a RAWP which will include a Soil Materials Management Plan that will highlight measures for PPE, covering of stockpiles, housekeeping, suppression techniques (particulates and vapor), and measures to prevent off-site migration of contaminates. In addition, the Site will be secured and inaccessible to the public during remedial construction.

Future Use Scenario

Under the proposed future condition (after construction/remediation), residual contaminants may remain on-site depending on which remedy is achieved. The remaining contaminants would be those listed in the current conditions. If contaminants remain on-site after construction/remediation, the route of exposure will be mitigated by proper installation of engineering controls such as Site capping system foundation and implementation of institutional controls such as land use and groundwater use restrictions.

2.9 FISH AND WILDLIFE IMPACT ANALYSIS

NYSDEC DER-10 requires an on-site and offsite Fish and Wildlife Resource Impact Analysis (FWRIA) if the stipulated criteria are met. The Site, which was developed in the 1920s and operated as a gasoline service station, auto rental, and car wash from the 1970s until it became vacant in 2022, is located in the Gowanus neighborhood of Brooklyn, New York. The Site provides little or no wildlife habitat or food value and/or access to the detected subsurface contamination. No natural waterways are present on or adjacent to the Site. The proposed future use of the Site is for residential purposes. As such, no unacceptable ecological risks are expected under the current and future use scenario.

2.10 REMEDIAL ACTION OBJECTIVES

The following Remedial Action Objectives (RAOs) have been identified for the Site.

2.10.1 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with contaminated soil
- Prevent inhalation exposure to contaminants volatilizing from contaminated soil or contaminated soil in particulate form

RAOs for Environmental Protection:

- Prevent migration of contaminants that would result in groundwater or surface water contamination

2.10.2 Groundwater

RAOs for Public Health Protection:

- Prevent ingestion of groundwater with contamination levels exceeding drinking water standards
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater
- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent possible
- Remove the source of ground or surface water contamination

2.10.3 Soil Vapor

RAOs for Public Health Protection:

- Mitigate the risk of impact to public health resulting from existence of, or the potential for, soil vapor migration off-Site, or intrusion into the proposed development at the Site.

2.10.4 Protection of Human Health and the Environment

Alternative I – Remediating the Site to Track 1 standards would result in the removal of Site soil that exceeds UUSCOs. The remedy would significantly reduce the potential for each of the identified pathways of exposure to on-Site contaminated media. The existing and, if encountered, unknown USTs would be decommissioned, removed, and disposed off-site, and petroleum-impacted material, if encountered, would be excavated, and disposed off-Site. After remediation, the RAOs for public health and environmental protection would be met through the removal of contaminated media at the Site to meet UUSCOs, which would remove the potential for exposure pathways via possible ingestion, inhalation, or dermal contact.

Alternative II – Remediating the Site to Track 2 standards would result in the removal of Site soil that exceeds RRSCOs. The existing and, if encountered, unknown USTs would be decommissioned, removed, and disposed off-site, and petroleum-impacted material, if encountered, would be excavated, and disposed off-Site. The RAOs for public health and environmental protection would be met through the

removal of contaminated media at the Site to meet RRSCOs, which would significantly reduce the potential for exposure pathways via possible ingestion, inhalation, or dermal contact.

Construction of a composite cover system consisting of a 4-inch subbase (a NYSDEC-approved subbase), a waterproofing/vapor barrier (a minimum 20-mil thick barrier), and a 6-inch concrete slab to reduce the potential for a soil vapor exposure pathway. With the cover system and vapor mitigation system, this remedy is protective of human health and the environment.

Alternative III – A Track 4 contingency will provide similar overall protection to public health and the environment as Alternative II. Remediating the Site to Track 4 standards will result in the removal of Site soil that exceeds RRSCOs to the depth of 15 ft bgs. In the event that a Track 2 restricted residential use cleanup is not achieved (i.e. source material remaining below 15 ft bgs) the remedy will achieve a Track 4 Site-specific cleanup. The existing and, if encountered, unknown USTs would be decommissioned, removed, and disposed off-Site, and petroleum-impacted material, if encountered, would be excavated, and disposed off-Site. The RAOs for public health and environmental protection would be met through the removal of contaminated media at the Site to the depth of 15 ft bgs to meet RRSCOs and AWQS, which would significantly reduce the potential for exposure pathways via possible ingestion, inhalation, or dermal contact.

Construction of a composite cover system consisting of a 4-inch subbase (a NYSDEC-approved subbase), a waterproofing/vapor barrier (a minimum 20-mil thick barrier), and a 6-inch concrete slab to reduce the potential for a soil vapor exposure pathway. With the cover system and vapor mitigation system, this remedy is protective of human health and the environment.

Public health will be protected during remediation under each alternative by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures when needed.

3. Summary of Remedial Action

3.1 ALTERNATIVE I – TECHNICAL DESCRIPTION

Alternative I, a Track 1 remedy, would include the following:

1. Development and implementation of a Construction Health & Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
2. Design and construction of a support-of-excavation (SOE) system to support excavation of all Site soils that exceed UUSCOs.
3. Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
4. Removal of the existing pavement and miscellaneous debris from the Site.
5. Decommissioning of on-site monitoring wells, as necessary, in accordance with NYSDEC CP-43 Policy.
6. Excavation, stockpiling, off-Site transport, and disposal of approximately 15,300 cubic yards total, including approximately 13,450 cubic yards of historical fill and solid waste and 1,850 cubic yards of petroleum-impacted soil that exceeds UUSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will extend to 35 ft bgs. Refer to Fig 8 for anticipated areas of the Track 1 excavation..
7. Removal of two 4,000-gallon USTs associated with former gasoline service station operations, as well as any unknown USTs encountered, and/or associated appurtenances (e.g., fill lines, vent lines, and electrical conduits) as well as 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.
8. Dewatering, characterization, and treatment of water accumulated in excavations prior to discharge to a NYSDEC approved sewer/sanitary line (pending permits), or localized dewatering with containerization, classification, and disposal at an approved receiving facility. Collection of dewatering influent samples to document groundwater quality at the Site during remediation.
9. Screening for indications of contamination (by visual means, odor, and monitoring photoionization detectors [PIDs]) of excavated material during intrusive site work.
10. Implementation of a preliminary waste characterization to facilitate off-site disposal of excavated soil/fill. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots will be completed to facilitate off-site disposal of excavated soil/fill.
11. Appropriate off-site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
12. Backfill the Site as needed for the development with certified-clean fill/soil (i.e., meeting the Allowable Constituent Levels for Imported Fill or Soil as per unrestricted use defined in DER-10 Appendix 5), RCA, or virgin, native crushed stone.

13. Collection and analysis of confirmation soil samples at the proposed remediation depths in accordance with DER-10 to confirm a Track 1 remedy was achieved. If the proposed confirmation sample exceeds Track 1 UUSCOs, over excavation and additional confirmation sampling may be performed to ensure all impacted material has been removed from the Site.
14. Completion of an SVI Evaluation in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy.

The requirements for each of the Alternative I tasks are described below.

On-Site Worker, Public Health, and Environmental Protection

A Site-specific CHASP is appended to this RAWP (Appendix D) and would be implemented during excavation and foundation construction to protect on-Site workers from accidents and acute and chronic exposures to the identified contaminated media. Public health would be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP would include continuous perimeter monitoring of dust and organic vapor using DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. Field personnel representatives of the Remedial Engineer would monitor Site perimeters for visible dust and odors.

Support of Excavation

An SOE system would be installed to accommodate removal of soil that exceeds Track 1 UUSCOs. The SOE elements would be designed and installed as per New York City Department of Building (NYCDOB) Code. Excavations are anticipated to be completed at the water table in the northern portion of the Site and below the water table in the southern portion of the Site.

Fill and Soil Removal

VOCs, PAHs, and metals were detected in fill and petroleum-impacted material at concentrations that exceed the UUSCOs. To achieve Track 1, soil removal and disposal is expected to extend to 35 ft bgs. The Alternative I excavation plan is shown in Figure 8.

The estimated volume of material requiring removal and off-Site disposal for a Track 1 cleanup is approximately 15,300 cubic yards. All excavated soil would be screened for visual, olfactory, and instrumental evidence of environmental impacts.

Waste Characterization

Waste characterization would be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC results would be reported. Data available for excavated material to be disposed of at a given facility would be submitted to the disposal facility with suitable explanation prior to shipment and receipt. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots would be completed to facilitate off-site disposal of excavated soil/fill.

If encountered, hazardous soil would be managed in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of hazardous fill material is subject to USEPA and the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations. The excavated material would be segregated in the field and temporarily placed in stockpiles, or direct loaded, and transported by Part 364-permitted trucks to a facility permitted by the Resource Conservation and Recovery Act (RCRA) to accept hazardous waste.

UST Removal

Based on historical Site information, there are currently two 4,000-gallon USTs present on the Site associated with former gasoline service station operations. These two USTs as well as any unknown USTs, if encountered, and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) would be decommissioned in accordance with applicable NYSDEC tank closure requirements, including those defined in DER-10 Section 5.5 and 6 NYCRR Part 613.9, and NYSDEC CP-51. USTs and/or associated appurtenances will be registered and administratively closed with the NYSDEC Petroleum Bulk Storage (PBS) unit. Petroleum-impacted soil would be excavated and disposed off-Site at a permitted disposal facility in accordance with applicable regulations. Closure documentation, such as Contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, would be provided as appendices in the Final Engineering Report (FER).

Fluids Management

Liquids removed from the Site, including dewatering fluids, would be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Fluids would not be recharged back to the land surface or subsurface. Liquids discharged into the New York City sewer system will be addressed through approval by New York City Department of Environmental Protection (NYCDEP). Based on the depth to water, dewatering is anticipated to facilitate excavation of material that exceeds the UUSCOs and construction of foundation components. No dewatering discharge would commence prior to NYCDEP approval.

Dewatering influent would be sampled once per month during active dewatering. Influent would be analyzed for VOCs to document groundwater quality at the Site. If the groundwater samples consistently meet groundwater criteria, a Track 1 remedy will be achieved.

Backfill

As required for construction purposes, imported material would consist of clean fill that meets the Allowable Constituents Levels of Imported Fill or Soil defined in DER-10 Appendix 5 or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the Site, it would come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities would not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete. NYSDEC Request to Import/Reuse forms will be submitted, and a template is provided in Appendix J.

Confirmation Soil Sampling

Per NYSDEC DER-10, confirmation soil samples would be collected from the bottom of the proposed remedial excavation at a frequency of one per 900 sq ft to confirm the attainment of UUSCOs and Protection of Groundwater SCOs. An estimated 14 confirmation soil samples (14 bottom confirmation samples), plus QA/QC samples, would be collected. Confirmation soil samples will be analyzed for the Part 375 list of VOCs, SVOCs, pesticides, PCBs, metals, PFAS and 1,4-dioxane.

Post-Remedy Soil Vapor Intrusion Evaluation

The SVI Evaluation will include a provision for evaluation of the potential for SVI for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to SVI. Several petroleum-related VOCs and PCE were detected at elevated concentrations in soil vapor samples. Following remedial actions and prior to occupancy, a SVI Evaluation would be conducted to determine whether engineering controls would be required to address potential soil vapor intrusion at the Site and submitted to NYSDEC and NYSDOH. Because the building slab will be installed to within two feet of the groundwater table, the SVI Evaluation would not include soil vapor sampling, as soil vapor samples will be influenced by proximity to the water table, but will include up to three indoor air samples within the cellar level. Should the SVI Evaluation indicate soil vapor intrusion, a potential remedial alternative/element would be proposed. If vapor intrusion is indicated and requires the use of engineering controls, the remedy would be considered a Track 2 remedy.

3.2 ALTERNATIVE II – TECHNICAL DESCRIPTION

Alternative II, a Track 2 remedy, will include the following:

1. Development and implementation of a Construction Health & Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
2. Design and construction of a support-of-excavation (SOE) system to support excavation of soil that exceeds RRSCOs to 15 ft bgs on the northern portion of the Site and to 18 ft bgs on the southern, former gasoline station, portion of the Site..
3. Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
4. Removal of the existing pavement and miscellaneous debris from the Site.
5. Decommissioning of on-site monitoring wells in accordance with NYSDEC CP-43 Policy.
6. Excavation, stockpiling, off-Site transport, and disposal of approximately 6,900 cubic yards total, including approximately 5,050 cubic yards of historical fill and solid waste and 1,850 cubic yards of petroleum-impacted soil that exceeds RRSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will extend to 15 ft bgs on the northern portion of the Site (approximately 9,025 sq ft area) and to 18 ft bgs on the southern, former gasoline station, portion of the Site (approximately 2,775 sq ft area). Refer to Figure 9 for anticipated areas of excavation. For development purposes, excavations are proposed to approximately 14 ft bgs throughout the Site footprint and a 500 sq ft elevator pit to approximately 18 ft bgs.

7. Removal of two 4,000-gallon USTs associated with former gasoline service station operations, as well as any unknown USTs encountered, and/or associated appurtenances (e.g., fill lines, vent lines, and electrical conduits) as well as 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.
8. 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 localized dewatering with containerization, classification, and disposal at an approved receiving facility. Collection of dewatering influent samples to document groundwater quality at the Site during remediation.
9. Screening for indications of contamination (by visual means, odor, and monitoring photoionization detectors [PIDs]) of excavated material during intrusive site work.
10. Implementation of a preliminary waste characterization to facilitate off-site disposal of excavated soil/fill. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots would be completed to facilitate off-site disposal of excavated soil/fill.
11. Appropriate off-site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
12. Backfill the Site as needed for the development with certified-clean fill/soil (i.e., meeting the Allowable Constituent Levels for Imported Fill or Soil as per unrestricted use defined in DER-10 Appendix 5), RCA, or virgin, native crushed stone.
13. Upon completion of remedial excavation and backfilling in former gasoline filling station portion of the Site, sodium and potassium persulfate activated using ferrous sulfide (TSI-FSA™), an *in situ* chemical oxidation (ISCO) reagent produced by Terra Systems, Inc., will be mixed *in situ* at within the backfill material at the groundwater interface at 14 to 16 ft bgs providing contact with the groundwater impacted with VOCs.
14. Collection and analysis of confirmation soil samples at the proposed remediation depths in accordance with DER-10 to document post-excavation conditions and confirm Track 2 RRSCOs were achieved.
15. A Track 2 remedy would include the construction of a composite cover system consisting of a 4-inch subbase (RCA or DEC-approved equivalent), a waterproofing/vapor barrier (which will exceed the specifications of a 20-mil vapor barrier), and a 6-inch concrete slab.
16. Completion of an SVI Evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy.
17. Development of a Site Management Plan (SMP) for long term management of residual contamination as required by an Environmental Easement, including plans for: (1) Institutional Controls; (2) monitoring; and (3) reporting.
18. Recording of an Environmental Easement to restrict use of the Site and require compliance with the SMP.

The requirements for each of the Alternative II tasks are described below.

On-Site Worker, Public Health, and Environmental Protection

A Site-specific CHASP is appended to this RAWP (Appendix D) and would be implemented during excavation and foundation construction to protect on-Site workers from accidents and acute and chronic exposures to the identified contaminated media. Public health would be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP would include continuous perimeter monitoring of dust and organic vapor using DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. Field personnel would monitor Site perimeters for visible dust and odors.

Support of Excavation

An SOE system will be installed to accommodate removal of soil that exceeds RRSCOs. The SOE elements will be designed and installed as per New York City Department of Building (NYCDOB) Code. Excavations are anticipated to be completed at the water table in the northern portion of the site and below the water table in the southern portion of the site.

Fill and Soil Removal

VOCs, PAHs, and metals were detected in fill and petroleum-impacted material at concentrations that exceed the RRSCOs. To achieve Track 2, soil removal and disposal would extend to 15 ft bgs on the northern portion of the Site (approximately 9,025 sq ft area) and to 18 ft bgs on the southern, former gasoline station, portion of the Site (approximately 2,775 sq ft area). In the northern portion of the Site, the Track 2 remedy would excavate material to 15 ft bgs, leaving underlying historic fill material not considered source material to depths reaching 25 ft bgs. In the southern portion of the Site formerly operated as a gasoline station, the Track 2 remedy would excavate material to 18 ft bgs to remove source material, which is comprised of soils with petroleum related VOC impacts above the PWGSCOs. VOC analytical results in confirmation samples in the 18 ft bgs excavation area will comply with PGWSCOs. If results of aforementioned confirmation samples do not comply with the PGWSCOs, over-excavation would be completed as practical to achieve a Track 2 remedy and additional endpoint samples would be collected of the over-excavation area. The Alternative II excavation plan is shown in Figure 9.

The estimated volume of material requiring removal and off-Site disposal for a Track 2 cleanup is approximately 6,900 cubic yards. All excavated soil will be screened for visual, olfactory, and instrumental evidence of environmental impacts. For development purposes, a 500 sq ft elevator pit would be excavated to approximately 18 ft bgs.

UST Removal

Based on historical Site information, there are currently two 4,000-gallon USTs present on the Site associated with former gasoline service station operations. These two USTs as well as any unknown USTs, if encountered, and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) would be decommissioned in accordance with applicable NYSDEC tank closure requirements, including those defined in DER-10 Section 5.5 and 6 NYCRR Part 613.9, and NYSDEC CP-51. USTs and/or associated appurtenances will be registered and administratively closed with the NYSDEC PBS unit. Petroleum-

impacted soil would be excavated and disposed off-Site at a permitted disposal facility in accordance with applicable regulations. Closure documentation, such as Contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, would be provided as appendices in the FER.

Waste Characterization

Waste characterization would be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC results will be reported. Data available for excavated material to be disposed of at a given facility will be submitted to the disposal facility with suitable explanation prior to shipment and receipt. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots would be completed to facilitate off-site disposal of excavated soil/fill.

If encountered, hazardous soil would be managed in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of hazardous fill material is subject to USEPA and the OSHA HAZWOPER regulations. The excavated material would be segregated in the field and temporarily placed in stockpiles, or direct loaded, and transported by Part 364-permitted trucks to a facility permitted by the RCRA to accept hazardous waste.

Fluids Management

Liquids removed from the Site, including dewatering fluids, would be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Fluids would not be recharged back to the land surface or subsurface. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP. Based on the depth to water, localized dewatering is anticipated to facilitate excavation of material that exceeds the RRSCOs and construction of foundation components. No dewatering discharge would commence prior to NYCDEP approval.

Dewatering influent will be sampled once per month during active dewatering. Influent will be analyzed for VOCs to document groundwater quality at the Site.

Backfill

As required for construction purposes, imported material would consist of clean fill that meets the Allowable Constituents Levels of Imported Fill or Soil defined in DER-10 Appendix 5 or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the Site, it would come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities would not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete. NYSDEC Request to Import/Reuse forms would be submitted, and a template is provided in Appendix J.

Groundwater Remediation

Upon completion of remedial excavation and backfilling in former gasoline filling station portion of the Site, sodium and potassium persulfate, an ISCO reagent produced by Terra Systems, Inc., will be mixed *in situ* at within the backfill material at the groundwater interface at 14 to 16 ft bgs providing contact with the groundwater impacted with VOCs. The footprint of the ISCO reagent application area (2,775 sq ft) is included in Figure 9. Sodium or potassium persulfate activated with TSI-FSA™ is applied to the subsurface to produce an in-situ mixture of reactants to destruct compounds including BTEX, methyl tert-butyl ether, petroleum hydrocarbons, PAHs, CVOCs, 1-4-dioxane and pesticides.

The soils used for persulfate activated with TSI-FSA™ cover shall meet UUSCOs and applicable geotechnical criteria. Persulfate activated with TSI-FSA™ will be applied dry to the soil material directly in the excavation as per manufacturer's directions, and based on the geochemical conditions in the subsurface, at 1% weight percent so as not to result in soil bulking. Assuming the 14 to 16 ft depth will include *in situ* soil mixing in the former gasoline filling station (2,775 sq ft), approximately 3 tons of reagent will be applied to the base of the excavation at development depth in one-foot lifts and mixed with an excavator bucket. The persulfate activated with TSI-FSA™ will be handled properly in accordance with instructions for use and the safety data sheet included in Appendix K.

To confirm viability of the groundwater remedy described above, groundwater quality will be monitored via collection of influent dewatering samples on a monthly basis. Influent samples will be analyzed for VOCs via EPA method 8260 and included in the monthly status update report to NYSDEC.

Confirmation Soil Sampling

Per NYSDEC DER-10, confirmation soil samples would be collected from the bottom of the proposed remedial excavation at a frequency of one per 900 sq ft to confirm the attainment of RRSCOs and Protection of Groundwater SCOs. An estimated 14 confirmation soil samples, plus QA/QC samples, would be collected. Confirmation soil samples would be analyzed for the Part 375 list of VOCs, SVOCs, pesticides, PCBs, metals, PFAS and 1,4-dioxane. Table 1 summarizes the RRSCOs for a Track 2 remedy.

Composite Cover and Waterproofing/Vapor Barrier System

A composite cover system would be installed, consisting of a 4-inch subbase (RCA or DEC-approved equivalent), a waterproofing/ vapor barrier (a minimum 20-mil thick barrier), and a 6-inch concrete slab, to reduce the potential for a soil vapor exposure pathway.

Post-Remedy Soil Vapor Intrusion Evaluation

The SVI Evaluation will include a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion. Several VOCs were detected at elevated concentrations in soil vapor samples. Following remedial actions and prior to occupancy, a SVI Evaluation will be conducted to determine whether additional engineer controls would be required to address potential soil vapor intrusion at the Site and submitted to NYSDEC and NYSDOH. Should the SVI Evaluation indicate soil vapor intrusion, a potential remedial alternative/element would be proposed.

The SVI Evaluation will include a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion. Several petroleum-related VOCs and PCE were detected at elevated concentrations in soil vapor samples. Following remedial actions and prior to occupancy, a SVI Evaluation would be conducted to determine whether engineering controls would be required to address potential soil vapor intrusion at the Site and submitted to NYSDEC and NYSDOH. Because the building slab will be installed to within two feet of the groundwater table, the SVI Evaluation would not include soil vapor sampling, as soil vapor samples will be influenced by proximity to the water table, but will include up to three indoor air samples within the cellar level. Should the SVI Evaluation indicate soil vapor intrusion, a potential remedial alternative/element would be proposed.

Site Management Plan (SMP) and Environmental Easement (EE)

An EE would be recorded referencing ICs that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property.

The SMP would identify all use restrictions and ECs and long-term monitoring and maintenance requirements to ensure the ICs and/or ECs remain in place and are effective. The SMP would include, but may not be limited to:

1. An Institutional Control and Engineering Control plan that includes:
    a. Descriptions of the provisions of the ICs including any land use, and/or groundwater use restrictions
    b. Provisions for the management and inspection of the identified ICs and ECs
    c. Provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the Site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion
    d. Maintaining Site access controls and NYSDEC notification
    e. The steps necessary for the periodic reviews and certification of the ICs and/or ECs
    f. An Excavation Work Plan which details the provisions for management of future excavations in areas of remaining contamination
    g. Media-specific implementation plans including, but not limited to cap system management, installation/operation etc.
    h. Health and Safety Plan (HASP) and CAMP.
2. A Monitoring Plan to assess the performance and effectiveness of the remedy. The Monitoring plan would include, but may not be limited to:
    a. Monitoring for vapor intrusion for any buildings developed on the Site, as may be required by the Institutional and Engineering Control Plan discussed above
    b. A schedule of monitoring and frequency of submittals to NYSDEC
3. An Operation and Maintenance Plan as may be required by the Engineering Control Plan discussed above.

3.3 ALTERNATIVE III – TECHNICAL DESCRIPTION

Alternative III, a Track 4 remedy, will include the following:

1. Development and implementation of a CHASP and CAMP for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
2. Design and construction of a SOE system to support removal of impacted soil that exceeds Track 4 site-specific SCOs, to a depth of 15 ft bgs site-wide.
3. Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.
4. Removal of the existing pavement and miscellaneous debris from the Site.
5. Decommissioning of on-site monitoring wells, as necessary, in accordance with NYSDEC CP-43 Policy.
6. Excavation, stockpiling, off-Site transport, and disposal of approximately 6,600 cubic yards total, including approximately 5,000 cubic yards of historical fill and solid waste and 1,600 cubic yards of petroleum-impacted soil that exceeds Track 4 site-specific SCOs. Excavation will extend to 15 ft bgs sitewide. Refer to Figure 10 for anticipated areas of a Track 4 excavation. For development purposes, excavations are proposed to include excavation for a 500 sq ft elevator pit to approximately 18 ft bgs.
7. Removal of two 4,000-gallon USTs associated with former gasoline service station operations, as well as any unknown USTs encountered, and/or associated appurtenances (e.g., fill lines, vent lines, and electrical conduits) as well as 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.
8. Dewatering, characterization, and treatment of water accumulated in excavations prior to discharge to a NYSDEC approved sewer/sanitary line (pending permits), or localized dewatering with containerization, classification, and disposal at an approved receiving facility. Collection of dewatering influent samples to document groundwater quality at the Site during remediation.
9. Screening for indications of contamination (by visual means, odor, and monitoring photoionization detectors [PIDs]) of excavated material during intrusive site work.
10. Implementation of a preliminary waste characterization to facilitate off-site disposal of excavated soil/fill. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots would be completed to facilitate off-site disposal of excavated soil/fill.
11. Appropriate off-site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
12. Backfill the Site as needed for the development with certified-clean fill/soil (i.e., meeting the Allowable Constituent Levels for Imported Fill or Soil as per unrestricted use defined in DER-10 Appendix 5), RCA, or virgin, native crushed stone.
13. Collection and analysis of confirmation soil samples at the proposed remediation depths in accordance with DER-10 document post-excavation conditions and confirm Track 2 RRSCOs were achieved.

14. A Track 4 remedy would include the construction of a composite cover system consisting of a 4-inch subbase (RCA or DEC-approved equivalent), a waterproofing/vapor barrier (a minimum 20-mil thick barrier), and a 6-inch concrete slab.

15. Completion of an SVI Evaluation to assess indoor air in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy.

16. Development of a SMP for long term management of residual contamination as required by an Environmental Easement, including plans for: (1) Institutional Controls; (2) monitoring; and (3) reporting.

17. Recording of an Environmental Easement to restrict use of the Site and require compliance with the SMP.

The requirements for each of the Alternative III tasks are described below.

On-Site Worker, Public Health, and Environmental Protection

A Site-specific CHASP is appended to this RAWP (Appendix D) and would be enforced during excavation and foundation construction to protect on-Site workers from accidents and acute and chronic exposures to the identified contaminated media. Public health would be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP would include continuous perimeter monitoring of dust and organic vapor using DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. Field personnel would monitor Site perimeters for visible dust and odors.

Support of Excavation

An SOE system would be installed to accommodate removal of soil that exceeds the site-specific SCOs. The SOE elements will be designed and installed as per New York City Department of Building (NYCDOB) Code. Excavations are anticipated to be completed at the water table in the northern portion of the Site and below the water table in the southern portion of the Site.

Fill and Soil Removal

VOCs, PAHs, and metals were detected in fill and petroleum-impacted material at concentrations that exceed the RRSCOs. To achieve Track 4, soil removal and disposal would extend to 15 ft bgs on the northern portion of the Site (approximately 9,025 sq ft area) and to 15 ft bgs on the southern, former gasoline station, portion of the Site (approximately 2,775 sq ft area). The Alternative III excavation plan is shown in Figure 10.

The estimated volume of material requiring removal and off-Site disposal for a Track 4 cleanup is approximately 6,600 cubic yards. The soil would be screened for visual, olfactory, and instrumental evidence of environmental impacts. For development purposes, a 500 sq ft elevator pit would be excavated to approximately 18 ft bgs. All excavated soil will be screened for visual, olfactory, and instrumental evidence of environmental impacts.

UST Removal

Based on historical Site information, there are currently two 4,000-gallon USTs present on the Site associated with former gasoline service station operations. These two USTs as well as any unknown USTs, if encountered, and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) would be decommissioned in accordance with applicable NYSDEC tank closure requirements, including those defined in DER-10 Section 5.5 and 6 NYCRR Part 613.9, and NYSDEC CP-51. USTs and/or associated appurtenances would be registered and administratively closed with the NYSDEC Petroleum Bulk Storage (PBS) unit. Petroleum-impacted soil would be excavated and disposed off-Site at a permitted disposal facility in accordance with applicable regulations. Closure documentation, such as Contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, would be provided as appendices in the FER.

Waste Characterization

Waste characterization would be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC results would be reported. Data available for excavated material to be disposed of at a given facility would be submitted to the disposal facility with suitable explanation prior to shipment and receipt. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots would be completed to facilitate off-site disposal of excavated soil/fill.

If encountered, hazardous soil would be managed in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of hazardous fill material is subject to USEPA and the OSHA HAZWOPER regulations. The excavated material would be segregated in the field and temporarily placed in stockpiles, or direct loaded, and transported by Part 364-permitted trucks to a facility permitted by the RCRA to accept hazardous waste.

Fluids Management

Liquids removed from the Site, including dewatering fluids, would be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Fluids would not be recharged back to the land surface or subsurface. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP. Based on the depth to water, dewatering is anticipated to facilitate excavation of material that exceeds the RRSCOs and construction of foundation components. No dewatering discharge will commence prior to NYCDEP approval.

Dewatering influent will be sampled once per month during active dewatering. Influent will be analyzed for VOCs to document groundwater quality at the Site.

Backfill

As required for construction purposes, imported material would consist of clean fill that meets the Allowable Constituents Levels of Imported Fill or Soil defined in DER-10 Appendix 5 or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the Site, it would come from

a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities would not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete. NYSDEC Request to Import/Reuse forms will be submitted, and a template is provided in Appendix J.

Confirmation Soil Sampling

Per NYSDEC DER-10, confirmation soil samples would be collected from the bottom of the proposed remedial excavation at a frequency of one per 900 sq ft to confirm the attainment of Site-specific SCOs. An estimated 14 confirmation soil samples, plus QA/QC samples, would be collected. Confirmation soil samples would be analyzed for the Part 375 list of VOCs, SVOCs, pesticides, PCBs, metals, PFAS and 1,4-dioxane.

Composite Cover and Waterproofing/Vapor Barrier System

A composite cover system would be installed, consisting of a 4-inch subbase (RCA or DEC-approved equivalent), a waterproofing/ vapor barrier (a minimum 20-mil thick barrier), and a 6-inch concrete slab, to reduce the potential for a soil vapor exposure pathway.

Post-Remedy Soil Vapor Intrusion Evaluation

The SVI Evaluation will include a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion. Several petroleum-related VOCs and PCE were detected at elevated concentrations in soil vapor samples. Following remedial actions and prior to occupancy, a SVI Evaluation would be conducted to determine whether engineering controls would be required to address potential soil vapor intrusion at the Site and submitted to NYSDEC and NYSDOH. Because the building slab will be installed to within two feet of the groundwater table, the SVI Evaluation would not include soil vapor sampling, as soil vapor samples will be influenced by proximity to the water table, but will include up to three indoor air samples within the cellar level. Should the SVI Evaluation indicate soil vapor intrusion, a potential remedial alternative/element would be proposed.

Site Management Plan (SMP) and Environmental Easement (EE)

An EE would be recorded referencing ICs that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property.

The SMP would identify all use restrictions and ECs and long-term monitoring and maintenance requirements to ensure the ICs and/or ECs remain in place and are effective. The SMP will include, but may not be limited to:

4. An Institutional Control and Engineering Control plan that includes:
    a. Descriptions of the provisions of the ICs including any land use, and/or groundwater use restrictions

b. Provisions for the management and inspection of the identified ICs and ECs

c. Provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the Site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion

d. Provisions to add the environmental easement or deed restrictions

e. Maintaining site access controls and NYSDEC notification

f. The steps necessary for the periodic reviews and certification of the ICs and/or ECs

g. An Excavation Work Plan which details the provisions for management of future excavations in areas of remaining contamination

h. Media-specific implementation plans including, but not limited to cap system management, installation/operation, etc.

i. HASP and CAMP

5. A Monitoring Plan to assess the performance and effectiveness of the remedy. The Monitoring plan includes, but may not be limited to:

    a. Monitoring for vapor intrusion for any buildings developed on the Site, as may be required by the Institutional and Engineering Control Plan discussed above

    b. A schedule of monitoring and frequency of submittals to NYSDEC

6. An Operation and Maintenance Plan as may be required by the Engineering Control Plan discussed above.

3.4 EVALUATION OF REMEDIAL ALTERNATIVES

The following is an evaluation of the proposed remedy based on the BCP remedy evaluation criteria listed below. The first two criteria are considered “threshold criteria” and the remaining criteria are “balancing criteria.” A remedial alternative must meet the threshold criteria to be considered and evaluated further under the balancing criteria.

- Protection of human health and the environment
- Compliance with SCG
- Short-term effectiveness and impacts
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume of contaminated material
- Implementability
- Cost-effectiveness
- Community acceptance
- Land use

3.4.1 Protection of Human Health and the Environment

Alternative I remediation would provide the highest degree of protection to human health and the environment by removing all contaminated soils exceeding UUSCOs from the Site. Alternative II protects human health and the environment by removing from the Site all impacted material above 15 ft bgs that exceed the RRSCOs and impacted material to 18 ft bgs in the former gasoline station operating area. Both Alternative I and II address impacts to groundwater in the former gasoline filling station area via application of an *in situ* oxidant. Alternative III also protects human health and the environment by removing from the Site all impacted material above 15 ft bgs. Each alternative will maintain the protection of human health and the environment by implementing a Site-Specific CHASP and CAMP (details are discussed in Section 4.1). OSHA requirements for on-site construction safety will be followed by Site contractors performing work.

3.4.2 Compliance with Standards, Criteria, and Guidance

Each alternative would be in compliance with applicable standards, criteria, and guidance listed in Section 4.1 by removing Site sources of contamination to achieve the RAOs. While implementing either remedy, protection of public health and the environment would be maintained by enforcing a Site-specific CHASP and CAMP. OSHA requirements for on-site construction safety will be followed by Site contractors performing work.

3.4.3 Short-Term Effectiveness and Impacts

Alternative I – The most significant short-term adverse impacts and risks to the community will be the potential complications and risk involved with designing and constructing SOE and underpinning for the building and structures adjoining the Site. Potential impositions on roadway and pedestrian traffic associated with construction may be a result of the remedial excavation to achieve a Track 1 cleanup. Increased truck traffic and construction-related noise levels may be necessary to haul out soil that exceeds UUSCOs to achieve Track 1 standards.

The excavated soil and fill would require about 765, 20-cubic-yard truckloads. Implementing the Track 1 Remedy would require approximately 10 months of effort (assuming normal work hours). Truck traffic will be routed on the most direct course using major thoroughfares where possible, and flaggers will be used to protect pedestrians at Site entrances and exits. Waiting times associated with analysis of confirmation sampling and resampling may delay construction, leaving soil exposed for a longer time resulting in a potential increase in dust, odors, and/or organic vapor from the excavation and construction-related noise. The effects of these potential adverse impacts to the community, workers, and the environment will be minimized by implementing the respective control plans.

Alternatives II and III – Alternatives II and III would result in similar, short-term adverse impacts and risks to the community. The excavated soil and fill would require approximately 345 and 330 20-cubic-yard truckloads, respectively. Implementing the Alternative II concept would require approximately 6 months of effort and Alternative III concept would require approximately 5 months of effort (assuming normal work hours).

Under each alternative, dust will be controlled by the on-Site application of water spray as needed. Engineering controls, such as slowing the pace of work, applying foam and/or dust suppressant, and/or covering portions of the excavation will be used to suppress odors/dust when required. Work will be modified or stopped according to the action levels defined in the CAMP.

3.4.4 Long-Term Effectiveness and Performance

Alternative I would remove contaminated soils from the Site exceeding UUSCOs, Alternative II would remove contaminated soils from the Site exceeding RRSCOs and the Track 4 remedy will remove contaminated soils from the Site exceeding site-specific SCOs. Alternatives I and II requires addressing impacts to groundwater in the former gasoline filling station area via application of an *in situ* oxidant. Each alternative will require a post-construction SVI Evaluation to evaluate the potential for vapor intrusion into the newly constructed building. For both Alternatives II and III, engineering and institutional controls will be in place for long-term protection of human health and the environment.

3.4.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

Each alternative would permanently and significantly reduce the toxicity, mobility, and volume of contamination through removal of contaminated fill and buried solid waste and petroleum-impacted material through excavation and off-Site disposal.

3.4.6 Implementability

Alternatives I and II – Implementing a Track 1 remedy will be technically challenging because of SOE requirements associated with protection of the neighboring buildings and streets associated with a 35 ft excavation. Implementing a Track 2 remedy will also be technically challenging because of SOE requirements associated with protection of the neighboring buildings and streets; however, the SOE hardship is not significant as it will not extend beyond that which is required for construction. This remedy will consist primarily of excavation with standard bucket excavators. The availability of local contractors, personnel, and equipment suitable to working in a structurally challenging environment is high due to the frequency of this type of remediation in the region. It is not expected to require schedule extensions or additional costs associated with the excavation and SOE. However, if deeper contamination above RRSCOs is encountered, requiring unanticipated over-excavation, the cost is marginal compared to the benefit of achieving an unrestricted use remediation and elimination of long-term engineering and institutional controls. Additional coordination between trades may be required. This alternative is considered feasible.

Alternative III – The technical feasibility of implementing the Alternative III remedy is similar to Alternative I and II, as significant excavation is still required. This alternative will consist primarily of excavation with standard bucket excavators. The availability of local contractors, personnel, and equipment suitable to working in a structurally challenging environment is high due to the frequency of this type of remediation in the region. Additional coordination between trades may be required. This alternative is considered feasible.

3.4.7 Cost-Effectiveness

Alternative I – Based on the assumptions detailed for Alternative I, the estimated remediation cost of a Track 1 cleanup is approximately $14,300,000. As the Site will reach Track 1 UUSCOs, there would not be cost for long term maintenance, site management, and monitoring activities upon completion of remedial activities. Table 2 details the individual cost components used to arrive this cost estimate.

Alternative II – Based on the assumptions detailed for Alternative II, the estimated remediation cost of a Track 2 cleanup is approximately $8,100,000. As the Site will reach Track 2 RRSCOs, there would be cost for long term maintenance, site management, and monitoring activities upon completion of remedial activities. Table 3 details the individual cost components used to arrive this cost estimate.

Alternative III – Based on the assumptions detailed for Alternative II, the estimated remediation cost of a Track 4 cleanup is approximately $7,900,000. Alternatives I and II are more cost effective in both the short-term and long-term as Alternative III. Table 4 details the individual cost components used to arrive this cost estimate.

3.4.8 Community Acceptance

Each alternative should be acceptable to the community because the potential exposure pathways to on-Site contamination will be addressed upon completion of the respective remedies and the Site will be remediated to allow for a higher-level use. Alternative I would cause the most logistical hardship to the community due to the extended project schedule required to achieve a Track 1 remedy. The selected remedy will be subject to a 45-day public comment period in accordance with the Citizen Participation Plan (CPP), included as Appendix E. Substantive public comments will be addressed before the remedy is approved.

3.4.9 Land Use

The current, intended, and reasonably anticipated future residential land use of the Site and its surroundings are compatible with each alternative. The planned project will consist of construction of a 11-story mixed-use commercial and residential building encompassing approximately 11,800 sq ft of the Site with a full cellar.

3.5 SELECTION PREFERRED REMEDY

Each alternative would be protective of human health and the environment and meet the remedy selection criteria. Alternative II is implementable and achieves the remedial action goals established for the redevelopment project and is effective in the short-term. Alternative II effectively reduces contaminant mobility and toxicity and reduces the contaminant toxicity and volume. Alternative II is more effective in the long-term because it achieves restricted residential land use. The excavation depths for both Alternatives II and II are comparable and have similar remedial costs whereas the cost for Alternative III is higher.

Alternative II is preferred over Alternative I due to implementability and cost effectiveness and preferred over Alternative III as it provides a greater overall protection to human health and the environment at a similar cost. Therefore, Alternative II is the recommended remedial alternative for this Site.

Figure 8 depicts the Alternative I excavation plan, Figure 9 depicts the Alternative II excavation plan, and Figure 10 depicts the Alternative III excavation plan. The extents of remedial excavation are based on data presented in the RIR.

3.5.1 Zoning

The land is currently zoned as M1-4/R7X manufacturing district within the Special Gowanus Mixed-Use District (MX-11) which allows for residential and non-residential (commercial, community facility, and light industrial) use. The reasonably anticipated future use conforms to applicable zoning laws and maps. A copy of Zoning Map 16c is included in Appendix F.

3.5.2 Applicable Comprehensive Community Master Plans or Land Use Plans

While there are no applicable comprehensive community master plans or land use plans associated with the Gowanus neighborhood, where the Site is located, development trends include the promotion of affordable housing preservation, encouragement of economic development and creation of pedestrian friendly streets. The proposed affordable housing components and redevelopment plan are consistent with the reasonably anticipated development patterns of the area. A copy of the zoning map is included in Appendix F.

3.5.3 Surrounding Property Uses

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy. The construction of a mixed-use commercial and residential development conforms to recent development patterns in the area and current zoning.

3.5.4 Environmental Justice Concerns

Per the Potential Environmental Justice Areas in Northern Brooklyn, Kings County, New York", the Site is not in a potential Environmental Justice area. NYSDEC's Office of Environmental Justice acts as an advocate on behalf of these areas, which are disproportionately affected by environmental burdens. The proposed future use is not expected to cause or increase a disproportionate burden on the community.

3.5.5 Land Use Designations

There are no federal or state land use designations.

3.5.6 Population Growth Patterns

The population growth patterns and projections support the current and anticipated future land use.

3.5.7 Accessibility to Existing Infrastructure

The Site is accessible to existing infrastructure.

3.5.8 Proximity to Cultural Resources

The Site is not in close proximity to a registered landmark. The nearest registered landmarks include American Society for the Prevention of Cruelty to Animals (ASPCA) Brooklyn Office, Shelter, and Garage, located at 233 Butler Street between Nevins Street and Bond Street, Brooklyn, NY (approximately 0.17-mile north-northwest of the Site) and the Gowanus Canal Flushing Tunnel Pumping Station and Gatehouse, located at 196 Butler Street, Brooklyn, NY (approximately 0.18-mile west of the Site), and Public Bath No. 7, located at 227 4th Avenue, Brooklyn, NY (approximately 0.27-mile south of the Site).

3.5.9 Proximity to Natural Resources

The Site is not located in close proximity to important federal, state, or local natural resources including waterways, wildlife refuges, wetlands, and critical habitats of endangered or threatened species. The nearest ecological receptor is the Gowanus Canal, which is located approximately 0.17-mile west-west of the Site.

3.5.10 Off-Site Groundwater Impacts

Municipal water supply wells are not present in this area of New York City; therefore, groundwater from the Site does not affect municipal water supply wells or recharge areas.

3.5.11 Proximity to Floodplains

According to the FEMA Preliminary Flood Insurance Rate Map (FIRM) dated 5 September 2007 (Map Number 3604970211F), the Site is not within a floodplain.

3.5.12 Geography and Geology of the Site

The Site geology is described in Section 2.6.

3.5.13 Current Institutional Controls

There are currently no institutional controls being implemented at the Site.

3.6 SUMMARY OF THE SELECTED REMEDIAL ACTION

Alternative II, a Track 2 remedy, will include the following:

1. Development and implementation of a Construction Health & Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, community/residents, and the environment during remediation and construction activities.
2. Design and construction of a SOE system to support excavation of soil that exceeds RRSCOs to 15 ft bgs on the northern portion of the Site and to 18 ft bgs on the southern, former gasoline station, portion of the Site.
3. Implementation of soil erosion, pollution, and sediment control measures in compliance with applicable laws and regulations.

4. Removal of the existing pavement and miscellaneous debris from the Site.
5. Decommissioning of on-site monitoring wells in accordance with NYSDEC CP-43 Policy.
6. Excavation, stockpiling, off-Site transport, and disposal of approximately 6,900 cubic yards total, including approximately 5,050 cubic yards of historical fill and solid waste and 1,850 cubic yards of petroleum-impacted soil that exceeds RRSCOs as defined by 6 NYCRR Part 375-6.8. Excavation will extend to 15 ft bgs on the northern portion of the Site (approximately 9,025 sq ft area) and to 18 ft bgs on the southern, former gasoline station, portion of the Site (approximately 2,775 sq ft area). Refer to Figure 9 for anticipated areas of excavation. For development purposes, excavations are proposed to approximately 14 ft bgs throughout the Site footprint and a 500 sq ft elevator pit to approximately 18 ft bgs..
7. Removal of two 4,000-gallon USTs associated with former gasoline service station operations, as well as any unknown USTs encountered, and/or associated appurtenances (e.g., fill lines, vent lines, and electrical conduits) as well as 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.
8. 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 localized dewatering with containerization, classification, and disposal at an approved receiving facility. Collection of dewatering influent samples to document groundwater quality at the Site during remediation.
9. Screening for indications of contamination (by visual means, odor, and monitoring PIDs) of excavated material during intrusive site work.
10. Implementation of a preliminary waste characterization to facilitate off-site disposal of excavated soil/fill. As part of waste characterization and for disposal purposes, a lateral and vertical delineation of elevated total lead hotspots will be completed to facilitate off-site disposal of excavated soil/fill.
11. Appropriate off-site disposal of material removed from the Site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal.
12. Backfill the Site as needed for the development with certified-clean fill/soil (i.e., meeting the Allowable Constituent Levels for Imported Fill or Soil as per unrestricted use defined in DER-10 Appendix 5), RCA, or virgin, native crushed stone.
13. Upon completion of remedial excavation and backfilling in former gasoline filling station portion of the Site, sodium and potassium persulfate activated using ferrous sulfide (TSI-FSA™), an ISCO reagent produced by Terra Systems, Inc., will be mixed *in situ* at within the backfill material at the groundwater interface at 14 to 16 ft bgs providing contact with the groundwater impacted with VOCs.
14. Collection and analysis of confirmation soil samples at the proposed remediation depths in accordance with DER-10 to document post-excavation conditions and confirm Track 2 RRSCOs were achieved.
15. A Track 2 remedy would include the construction of a composite cover system consisting of a 4-inch subbase (RCA or DEC-approved equivalent), a waterproofing/vapor barrier (a minimum 20-mil thick barrier), and a 6-inch concrete slab.

16. Completion of an SVI Evaluation to assess indoor air quality in accordance with DER-10 and NYSDOH Final Guidance on Soil Vapor Intrusion following remedial excavation activities and prior to occupancy.

17. Development of a SMP for long term management of residual contamination as required by an EE, including plans for: (1) Institutional Controls; (2) monitoring; and (3) reporting.

18. Recording of an EE to restrict use of the site and require compliance with the SMP.

Remedial activities will be performed in accordance with this RAWP and the Department-issued Decision Document under the oversight of a New York State-Licensed Professional Engineer. Deviations from the RAWP and/or Decision Document will be promptly reported to the NYSDEC for approval and explained in the FER.

4. Remedial Action Program

The primary documents governing the remedial action are summarized in this section.

4.1.1 Standards, Criteria and Guidance

The following standards, criteria, and guidance are typically applicable to Remedial Action projects in New York State, and will be consulted and adhered to as applicable:

- 29 Code of Federal Regulations (CFR) Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 364 – Waste Transporter Permits
- 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 – Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Part 376 – Land Disposal Restrictions
- 6 NYCRR Part 750 – State Pollutant Discharge Elimination System (SPDES) Permits
- Code of Federal Regulations (CFR) Title 29 Part 1910.120 - Hazardous Waste Operations and Emergency Response Standard
- CFR Title 29 Part 1926 - Safety and Health Regulations for Construction
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- NYSDEC Spill Response Guidance Manual
- NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances Under NYSDEC's Part 375 Remedial Programs (November 2022)
- CP-51 – Soil Cleanup Guidance (2010)
- DER-10 – Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March 2010)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Screening and Assessment of Contaminated Sediment (Division of Fish, Wildlife and Marine Resources, June 2014)

4.1.2 Site-Specific Construction Health & Safety Plan

A site-specific CHASP has been prepared (Appendix D). The CHASP will apply to remedial and construction-related work on Site. The CHASP provides a mechanism for establishing on-Site safe working conditions, safety organization, procedures, and PPE requirements during implementation of the remedy. The CHASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65, respectively). The CHASP includes, but is not limited to, the following components:

- Organization and identification of key personnel
- Training requirements
- Medical surveillance requirements
- List of Site hazards
- Excavation safety
- Drill rig safety
- Work zone descriptions and monitoring procedures
- Personal safety equipment and PPE requirements
- Decontamination requirements
- Standard operating procedures
- Contingency plan
- CAMP
- Safety data sheets (SDS)

The Volunteers and associated parties preparing the remedial documents submitted to the State and those performing the construction work are responsible for the preparation of a CHASP and for performance of the work according to the CHASP and applicable laws. The CHASP and requirements defined in this RAWP pertain to remedial and ground-intrusive work performed at the Site until the issuance of a Certificate of Completion. The Haley & Aldrich Safety Coordinator will be Brian Ferguson, a resume for whom is included in Appendix G. If required, confined space entry will comply with OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.3 Quality Assurance Project Plan

A Quality Assurance Project Plan (QAPP) has been prepared that describes the quality control components that will ensure that the proposed remedy accomplishes the remedial goals and RAOs and is completed in accordance with the design specifications. The QAPP is provided as Appendix H and includes:

- Responsibilities of key personnel and their organizations for the proposed remedy
- Qualifications of the quality assurance officer
- Sampling requirements including methodologies, quantity, volume, locations, frequency, and acceptance and rejection criteria
- Description of the reporting requirements for quality assurance activities including weekly quality assurance review reports.

4.1.4 Construction Quality Assurance Plan

A Construction Quality Assurance Plan (CQAP) has been prepared that describes the quality control components that will ensure that the proposed remedy accomplishes the remedial goals and RAOs and is completed in accordance with the design specifications. Because the remedy will be accomplished concurrently with building construction, the Contractor and construction manager will have the primary responsibility to provide construction quality. A list of engineering personnel involved in implementation of the CQAP and procedures that will be carried out by the remedial engineering team are listed in Section 4.2.1. Project personnel resumes are provided in Appendix G.

4.1.5 Soil/Materials Management Plan

A Soil/Materials Management Plan (SMMP) has been prepared that includes detailed plans for managing soils/materials that are disturbed at the Site, including excavation, handling, storage, transport, and disposal. The SMMP also includes controls that will be applied to these efforts to facilitate effective, nuisance-free performance in compliance with applicable federal, state, and local laws and regulations (see Section 5.4).

4.1.6 Stormwater Pollution Prevention Plan

Erosion and sediment controls will be implemented as necessary in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Best management practices for soil erosion and sediment control will be selected to minimize erosion and sedimentation off-Site from the onset of remediation to the completion of development. Stormwater pollution prevention will be implemented as described below in Section 5.4.9. A Stormwater Pollution Prevention Plan (SWPPP) is not necessary because the project will disturb less than one acre, and stormwater discharge will be to a combined sewer in accordance with the New York City generic SPDES permit.

4.1.7 Community Air Monitoring Program

Details of the CAMP are discussed in section 5.4.11.

4.1.8 Contractors Site Operations Plan

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 RAWP. The RE is responsible to ensure that later document submittals for this remedial project, including Contractor and subcontractor document submittals, are in compliance with this RAWP. Remedial documents, including Contractor and subcontractor document submittals, will be submitted to the NYSDEC and NYSDOH in a timely manner and prior to the start of work associated with the remedial document.

4.1.9 Citizen Participation Plan

Document repositories were established at the following locations and contain the applicable project documents:

Brooklyn Public Library
Pacific Branch
25 Fourth Street at Pacific Street
Brooklyn, NY 11217
Attn: Candace Vasquez
Phone: (718)-638-1531
Email: cvasquez@bklynlibrary.org
Hours: Mon/Wed/Fri 10am-6pm
Tues. 1pm-8pm
Thurs. 10am-8pm
Sat. 10am-5pm

Brooklyn Community Board 6
250 Baltic Street
Brooklyn, NY 11201
Attn: Michael Racioppo – District Manager
Peter D. Fleming – Chairperson
Hildegard Link – Environmental Protection Co-Chair
Angelica Ramdhari – Environmental Protection Co-Chair
Email: mike@bkcb6.org; infobkcb6@gmail.com
Phone: (718)-643-3027
Hours: Mon-Fri 9am-5pm

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

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

The following project personnel are anticipated for oversight of the RAWP implementation. Project personnel resumes are provided in Appendix G.

NYSDEC Case Manager	Ruth Curley
NYSDOH Case Manager	Christopher Budd
Remediation Engineer	Scott Underhill, P.E.
Principal/Qualified Environmental Professional	Mari Conlon, P.G.
Project Manager/ Field Support and Coordination	Luke McCartney, P.G.
Haley & Aldrich Health & Safety Director	Brian Fitzpatrick, CHMM
Health & Safety Officer	Brian Ferguson
Field Team Leader/Quality Assurance Officer	Sarah Commisso

Haley & Aldrich personnel, under the direct supervision of the Qualified Environmental Professional and the RE, will be on-Site during implementation of the RAWP to monitor particulates and organic vapor in accordance with the CAMP. CAMP results that exceed specified action levels will be reported to the NYSDEC and NYSDOH.

Haley & Aldrich personnel will meet with the Construction Superintendent daily to discuss the plans for that day and schedule upcoming activities. Field personnel will document remedial activities. Field activities will be forwarded to the Field Team Leader and Project Manager daily and to the Qualified Environmental Professional and the RE on a weekly basis. Daily reports will also be submitted to the NYSDEC and NYSDOH case managers by noon the following business day.

Field personnel will screen excavations with a PID during ground-intrusive work. PID readings, including specifically elevated readings, will be recorded in the project field book (or on separate logs) and reported to the NYSDEC and NYSDOH. Field personnel under the direct supervision of the RE and Qualified Environmental Professional will collect confirmation samples in accordance with this RAWP.

Field observations and laboratory tests will be recorded in the project field book or on separate logs. Recorded field observations may take the form of notes, charts, sketches, and/or photographs. A photo log will be kept to document construction activities during remediation.

The Field Team Leader will maintain original field paperwork during performance of the remedy. Remedial activities will be documented in the monthly BCP progress reports. The Project Manager will maintain the field paperwork after completion and will maintain submittal document files.

4.2.2 Remediation Engineer

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 FER that the remedial activities were observed by qualified environmental professionals under their supervision and that the remediation requirements set forth in this RAWP and other relevant provisions of ECL 27-1419 have been achieved in substantial conformance with the RAWP.

Under direction of the RE, the work of other contractors and subcontractors involved in aspects of the remedial construction will be documented, including soil excavation, stockpiling, confirmation 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 RAWP and will provide a certification in the FER. The RE will provide the certifications listed below in Section 8.1.

4.2.3 Remedial Action Construction Schedule

The remedial action construction schedule is discussed below in Section 9.0 and included in Appendix J. The NYSDEC will be promptly notified of proposed changes, delays, and/or deviations to the schedule.

4.2.4 Work Hours

The hours for operation of remedial construction will either conform to the requirements of the New York City Department of Buildings (NYCDOB) construction code or to a site-specific variance issued by the NYCDOB. The NYSDEC will be notified by the Volunteer of variances issued by the NYCDOB. The NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

Site access will be controlled by gate entrances to the property. The Site perimeter will be secured with gated, signed, plywood fencing with restricted points of entry in accordance with the NYCDOB and New York City Department of Transportation (NYCDOT) permits and requirements. The purpose of the fencing is to limit Site access to authorized personnel, protect pedestrians from Site activities, and maintain Site security.

4.2.6 Traffic Control

Site traffic will be controlled through designated points of access along Third Avenue and/or Baltic Street. Access points will be continuously monitored and if necessary, a flagging system will be used to protect workers, pedestrians, and authorized guests. Traffic will also be required to adhere to applicable local, state, and federal laws.

4.2.7 Contingency Plan

Contingency plans, as described below, have been developed to effectively deal with potential unexpected discovery of additional contaminated media or USTs.

4.2.8 Discovery of Additional Contaminated Soil

During remediation and construction, soil will be continuously monitored by the RE's field representatives via visual, olfactory, and instrumental field screening techniques to identify additional soil that may not be suitable for disposal at the NYSDEC-approved disposal facility. If such soil is identified, the suspected impacts will be confirmed by collecting and analyzing samples in accordance with the NYSDEC-approved facility's requirements. If the previously approved facility is not permitted to receive the impacted soil, the soil will be excavated and disposed of off-Site at a permitted facility that can receive the material.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive Site work will be promptly communicated to the NYSDEC Project Manager. These findings will be detailed in the monthly BCP progress report.

4.2.9 UST Discovery

A total of two USTs (two 4,000-gallon USTs) associated with former gasoline service station operations are known to be present under the Site and will be decommissioned and removed as part of the Remedial Action. In the event additional USTs are discovered during excavation, they will also be decommissioned as per the 6 NYCRR part 612.2 and 613.9 and DER-10 Section 5.5. After removal of the tank and residual contents, confirmatory post-excavation soil samples will not be collected where the proposed excavation would extend below the UST. Post-excavation soil samples is not expected where the proposed excavation would extend below the UST, unless visual, olfactory, or instrumental field screening techniques indicate the potential for contamination. If petroleum impacted soils are encountered, they will be segregated, characterized, and disposed of at an appropriate offsite facility. Closure documentation including affidavits, bills of lading, and tank disposal receipts will be included in the FER. If necessary, the NYSDEC petroleum bulk storage registration will be updated.

In the event that additional USTs, outside of the two known 4,000-gallon tanks, are encountered during ground-intrusive activities, the NYSDEC Project Manager will be promptly notified. Pertinent information will be included in the monthly BCP progress report.

4.2.10 Worker Training and Monitoring

Worker training and monitoring will be conducted in accordance with the site-specific CHASP.

4.2.11 Agency Approvals

Permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction.

4.2.12 Pre-Construction Meeting with the NYSDEC

Prior to the start of remedial construction, a meeting will be held between the NYSDEC, RE, the Volunteer, Construction Manager, and remediation contractor to discuss project roles, responsibilities, and expectations associated with this RAWP.

4.2.13 Emergency Contact Information

An emergency contact sheet that states the specific project contacts (with names and phone numbers) for use by NYSDEC and NYSDOH in the case of an emergency is included in the CHASP.

4.2.14 Remedial Action Costs

A detailed summary of the total estimated costs of the Track 1, Track 2 and Track 4 remedies are included in Tables 2 through 4, respectively.

4.3 SITE PREPARATION

4.3.1 Mobilization

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;
- Constructing one or more stabilized construction entrances consisting of non-hazardous material at or near the Site exit, which takes into consideration the Site setting and Site perimeter;
- Constructing an equipment decontamination pad for trucks, equipment, and personnel that come into contact with impacted materials during remediation;
- Mark-out metals hot spots and other hot spot areas (if identified during the preliminary waste characterization sampling event)

4.3.2 Monitoring Well Decommissioning

Monitoring wells will be decommissioned in accordance with NYSDEC CP-43 by an experienced driller with oversight from Haley & Aldrich. Decommissioning documentation will be provided in the FER.

4.3.3 Erosion and Sedimentation Controls

Since the planned earthwork activities will be below the adjacent sidewalk grade, full-time erosion and sedimentation measures are not anticipated. Best management practices for soil erosion will be implemented to minimize erosion and sedimentation offsite.

4.3.4 Temporarily Stabilized Construction Entrance(s)

Temporary stabilized construction entrances will be installed at the existing curb cuts along Third Avenue and/or Baltic Street. 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 Site soil from the tires and undercarriages. The Contractor will protect and maintain the existing sidewalks and roadways at both Site access points.

4.3.5 Utility Marker and Easement Layouts

The Volunteers and their Contractors are solely responsible for the identification of utilities and/or easements that might be affected by work under this RAWP and implementation of the required, appropriate, or necessary health and safety measures during performance of the work under this RAWP. The Volunteers and their Contractors are solely responsible for safe execution of the work performed under this RAWP. The Volunteers and their Contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Approval of this RAWP by the NYSDEC does not constitute satisfaction of these requirements.

4.3.6 Excavation Support

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 Volunteers and their contractors are solely responsible for the safe execution of the work performed under this RAWP. The Volunteers and their Contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Additionally, the Volunteers and their Contractors are solely responsible for the implementation of the required, appropriate, or necessary health and safety measures during performance of work conducted under this RAWP.

4.3.7 Equipment and Material Staging

The Contractor will notify the RE and the Volunteer, in writing with receipt confirmed, at least 30 calendar days in advance of pending site work mobilization. During mobilization, construction equipment will be delivered to the Site, temporary facilities constructed, and temporary utilities installed. The Contractor will place and maintain temporary toilet facilities within the work areas for usage by Site personnel.

4.3.8 Truck-Inspection Station

An outbound-truck inspection station will be set up at or near the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. If observed, soil and debris will be removed. Brooms, shovels, and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary. The Contractor is responsible for collecting soil that is tracked immediately off-Site and returning the soil to the Site.

4.3.9 Site Fencing

The Site will be secured with a gated fence with appropriate signage maintained by the Contractor. The fence will limit access to authorized personnel and protect pedestrian from Site activities.

4.3.10 Demobilization

After remediation and construction is completed, the Contractor will be responsible for demobilizing equipment and materials not designated for off-site disposal. The RE's representative will document that the Contractor performs follow-up coordination and maintenance for the following activities:

- Removal of sediment and erosion control measures and disposal of materials in accordance with applicable rules and regulations
- Equipment decontamination
- Refuse disposal
- Removal of remaining contaminated material or waste.

4.4 REPORTING

Periodic reports and a FER will be required to document the remedial action. The RE, Scott Underhill, will be responsible for certifying the FER and is licensed to practice engineering in the State of New York. Should Mr. Underhill become unable to fulfill this responsibility, another suitably qualified NYS Professional Engineer will take their place. Field reports will be included as appendices to the FER. In addition to the periodic reports and the FER, copies of the relevant Contractor documents will be submitted to the NYSDEC.

4.4.1 Field Reports

Reports providing a summary of activities for each day of active remedial work will be emailed to the NYSDEC and NYSDOH project managers on a daily basis. These reports will include:

- The project number, statement of activities, an update of the progress made, locations of excavation, and other remedial work performed
- Quantities of material imported and exported from the Site
- Status of on-Site soil/fill stockpiles
- A summary of citizen complaints including relevant details (i.e., name, phone number, basis of complaint, actions taken)
- A summary of CAMP results noting exceedances
- Photographs of notable Site conditions and activities

Reports are not intended to be the primary mode of communication for notifying NYSDEC of emergencies, requests for changes to the RAWP, or time critical information. However, these conditions if to occur, will be included in the daily reports. Emergency conditions and changes to the RAWP will be directly communicated to the NYSDEC Project Manager.

4.4.2 Monthly Reports

Monthly reports will consist of a summary of remedial work performed at the Site throughout the month and will include:

- Investigative or remedial actions relative to the Site during the reporting period;
- Actions relative to the Site anticipated for the next reporting period;

- Approved changes of work scope or schedule, if applicable;
- Results of sampling or testing;
- Deliverables submitted during the reporting period;
- The approximate percentage of completion of the project at the Site;
- Unresolved delays encountered that may affect the schedule; and
- Community participation (CP) plan activities during this reporting period and activities anticipated in support of the CP plan for the next reporting period.

4.4.3 Photographs

Photographs of the remedial activities will be taken and included in the FER with provided descriptions of the representative photographs.

4.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other Site conditions will be addressed by notifying the NYSDEC of the complaint and investigating the cause/source of the issue. Records will be kept regarding the date and time of the complaint, the nature of the complaint, the type of communication (i.e., telephone, email, letter, etc.) and the name and contact information of the complaint provider. Corrective measures will then be formulated and put into place to address the complaint as soon as possible. Resolution will be documented and submitted to the NYSDEC. A representative of the Volunteer will reply within two weeks of receipt to the complaint provider to ensure resolution.

4.4.5 Deviations from the RAWP

Deviations from the RAWP will be communicated to and coordinated with the NYSDEC in advance. Notification will be provided to the NYSDEC by telephone and email for conditions requiring immediate action (e.g., conditions judged to be a danger to the surrounding community). Based on the significance of the deviation, an addendum to this RAWP may be necessary and will include:

- Reasons for deviating from the approved RAWP
- Approval process to be followed for changes/editions to the RAWP
- Effect of the deviations on the overall remedy

5. Remedial Action: Material Removal from the Site

Remediation will include the following material removal tasks:
Excavation, stockpiling, off-Site transport, and disposal of about 6,900 cubic yards of historical fill and solid waste that exceeds RRSCOs as defined by 6 NYCRR Part 375-6.8.

5.1 SOIL CLEANUP OBJECTIVES

SCOs for the Site will be the RRSCO concentrations listed in Table 1. Soil and materials management will be conducted in accordance with the SMMP as described below. Soil sample locations and results that exceed the RRSCOs are shown on Figure 4. UST closures will, at a minimum, conform to criteria defined in DER-10.

5.2 REMEDIAL PERFORMANCE EVALUATION (CONFIRMATION SAMPLING)

5.2.1 Soil Sampling Frequency

One confirmation soil sample will be collected for every 900 square feet of excavation base (15 ft below sidewalk grade (ft bsg) in the northern portion and 18 ft bsg in the southern former gasoline station area) or at an alternative frequency approved by NYSDEC.

A total of 14 confirmation samples from the bottom of the proposed remedial excavation depth based on an excavation footprint of 11,800 square feet, plus QA/QC samples, will be collected as shown on Figure 11. In the northern portion of the Site, the preferred Track 2 remedy will excavate material to 15 ft bgs, leaving underlying historic fill material not considered source to depths reaching 25 ft bgs. In the southern portion of the Site formerly operated as a gasoline station, the preferred Track 2 remedy will excavate material to 18 ft bgs to remove source material which is comprised of soils with petroleum related VOC impacts above the PGWSCOs. VOC analytical results in confirmation samples in the 18 ft bgs excavation area will comply with PGWSCOs. If results of Track 2 confirmation samples do not comply with the PGWSCOs, over-excavation will be completed as practical to achieve a Track 2 remedy and additional endpoint samples will be collected within the over-excavation area.

5.2.2 Methodology

Confirmation soil samples will be collected from the base of the excavation in accordance with NYSDEC DER-10 to document remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, pesticides, metals, PFAS, and 1,4-dioxane. Samples will be collected into laboratory-provided bottle-ware. VOCs will be collected into Terracore or Encores. Samples will be transported under chain of custody protocol to an ELAP certified laboratory. Should additional soil samples be deemed necessary (e.g., additional tank closure, unknown environmental condition through visual evidence of a remaining source, over-excavation of failed confirmation sample), confirmation sampling will be conducted in accordance with NYSDEC DER-10.

5.2.3 QA/QC

Quality control procedures for confirmation soil sampling are included in the QAPP (refer to Appendix H). 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.

5.2.4 Data Validation

ASP Category B deliverables will be prepared for remedial performance samples collected during implementation of this RAWP. Data Usability Summary Reports (DUSRs) will be prepared by a qualified data validator and the findings will be reported in the FER.

5.2.5 Reporting

Analytical laboratories that analyze confirmation soil samples, prepare results, and perform contingency sampling will be NYSDOH ELAP-certified.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

Excavation on-Site for the proposed redevelopment plan is anticipated to generate approximately 6,900 cubic yards of soil, including approximately 5,050 cubic yards of historical fill and solid waste and 1,850 cubic yards of petroleum-impacted soil.

5.4 SOIL/MATERIALS MANAGEMENT PLAN

This section presents the approach to management, disposal, and reuse of soil, fill, and materials excavated from the Site. This plan is based on the current knowledge of Site conditions and will be altered as necessary. Field personnel, under the direction of the RE, will monitor and document the handling and transport of material removed from the Site for disposal as a regulated solid waste. Field personnel, under the direction of the RE, will assist the remediation contractor in identifying impacted materials during remediation, determining materials suitable for direct load out versus temporary on-site stockpiling, selection of samples for waste characterization, if necessary, and determining the proper off-Site disposal facility. Separate stockpile areas will be constructed as needed for the various materials to be excavated or generated in order to avoid comingling impacted with nonimpacted soil.

5.4.1 Soil Screening Methods

Visual, olfactory, and instrumental soil screening and assessment will be performed during remediation and development-related ground intrusive activities into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include excavation and invasive work performed during the remedy and development, such as excavations for foundations and utility work.

5.4.2 Stockpile Methods

Stockpiles will be used as necessary to separate and stage excavated material pending loading or characterization sampling. Separate stockpile areas will be constructed 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 1,000 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 reduce the potential for a soil vapor exposure pathway.
- Stockpiles will be inspected at a minimum of once daily and after every storm event.
- If encountered, stockpiling hazardous-impacted material on-Site will be avoided as necessary, and material will be live-loaded into trucks permitted to transport hazardous waste.

5.4.3 Materials Excavation and Load Out

Field personnel, under the supervision of the RE, will monitor ground-intrusive work and 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 appropriate federal, state, and local requirements, including applicable transportation requirements (i.e., New York State Department of Transportation [NYSDOT] and NYCDOT requirements). Trucks hauling historical fill material will not be lined unless free liquids are present, or the material is grossly impacted.

An outbound truck-inspection and wash station will be operated on Site. Trucks will be washed, as necessary, before leaving the Site, and 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.

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 for structures that may be affected by excavations (such as building foundations and bridge footings).

The Volunteers and associated parties will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP. Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this RAWP. Mechanical processing of historical fill and contaminated soil on-site is prohibited unless otherwise approved by NYSDEC.

Primary contaminant sources (including, but not limited to, tanks and hotspots) identified during Site characterization, the RI, and implementation of the remedy 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 FER.

5.4.4 Materials Transport Off-Site

Transport of materials will be performed by licensed haulers in accordance with appropriate local, state, and federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. Trucks headed to disposal facilities will follow NYSDEC approved routes. Truck routes are shown on Figure 12.

Loaded trucks will exit in the vicinity of the Site using approved truck routes. These routes are the most appropriate route to and from the Site and consider the following:

- Limiting transport through residential areas and past sensitive sites;
- Use of city mapped truck routes;
- Prohibiting off-site queuing of trucks entering the facility;
- Limiting total distance to major highways;
- Promoting safety in access to highways;
- Overall safety in transport; and
- Community input (where necessary).

Trucks will be prohibited from excessive stopping and idling in the neighborhood outside of the Site. Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, or if material is hazardous , truck liners will be used.

5.4.5 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 Project Manager prior to off-Site transport and disposal of excavated material. About 6,900 cubic yards impacted soil will be excavated and disposed off-site. 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 6NYCRR Part 360), and federal regulations.

If disposal of soil/fill from this 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. Unregulated off-site management of materials from this Site is prohibited without formal

NYSDEC approval. Material that does not meet UUSCOs, such as non-hazardous historical 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 historical fill material and contaminated soil will be handled, at a minimum, as a solid waste per 6 NYCRR Part 360.

If hazardous soil is identified, it will be managed in accordance with applicable federal, state, and local regulations. As such, the handling, transport, and disposal of hazardous fill material is subject to USEPA and the OSHA HAZWOPER regulations. As such, the handling, transport, and disposal of this fill material is subject to USEPA and the OSHA HAZWOPER regulations. The presence of hazardous waste requires compliance with both federal and state regulations and the following requirements:

1. Hazardous waste disposal requires obtaining a United States USEPA RCRA generator ID number;
2. Hazardous waste must be transported to a facility permitted by RCRA to accept hazardous waste;
3. Hazardous waste must be segregated and cannot be comingled with other Site material; and
4. Hazardous waste must be transported and disposed by properly permitted (Part 364) transporters and facilities.

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

- A letter 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 letter will state that material to be disposed of is contaminated material generated at an environmental remediation site located in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported (including waste characterization and 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.

5.4.6 Materials Reuse On-Site

Materials reuse is not anticipated at the Site.

5.4.7 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 NYCDEP. Based on the depth to water, dewatering is anticipated to facilitate excavation of material and construction of foundation components.

A dewatering and treatment system will be designed by the Remediation Contractor's NYS-licensed Professional Engineer. The water table is encountered between 14.49 to 15.69 ft bgs across the Site. During excavation and installation of the foundation, groundwater management will be required to facilitate construction in the southern former gasoline station and north-central elevator pit areas of the Site. The excavation will extend below the water table in these areas; therefore, the Contractor will implement appropriate measures to assure that dewatering activities do not result in settling that may

damage adjacent structures. An on-Site dewatering system will be installed to collect the groundwater seepage during the excavation. Groundwater will be collected from within the active work area using sumps, trenches or well points. Pumps will be used to convey collected groundwater from the collection point(s) to a temporary on-Site treatment and/or collection system.

Prior to mobilization, analytical data will be distributed to facilities capable of handling, treating, and/or disposing of groundwater representative of the Site. If supplemental data is needed, a representative groundwater sample will be collected from an existing on-Site groundwater observation well. The primary treatment will consist of a temporary holding tank for the settling of fines prior to offloading, transportation, and disposal. The system's treatment processes may include equalization, oil/water separation, filtration, and carbon adsorption as required by the permit prior to discharge. At the start-up of the system, the effluent water will be sampled for analysis of the NYCDEP sewer discharge parameters, if discharging to a NYCDEP sewer or sanitary line, in order to assess if the system is effective in removing contaminants in the groundwater seepage. If there are exceedances of the NYCDEP criteria, the system will be taken off-line and adjusted to meet the discharge requirements. Once it is determined that the system meets the NYCDEP criteria, the system will be restarted, and effluent samples will be collected and analyzed as stipulated in the dewatering permit. Effluent waters will be containerized in the interim while awaiting analytical results. No dewatering discharge will commence prior to city approval.

Dewatered fluids will not be recharged back to the land surface or subsurface. Dewatering fluids will be managed off-site. Discharge of water generated during remedial construction to surface waters (i.e., a local pond, stream, and/or river) is prohibited without a SPDES permit.

Evaluation of the dewatering system design is ongoing, but at minimum will consist of either sumps or well points transferred to an on-Site oil water separator and carbon treatment system.

5.4.8 Backfill from Off-Site Sources

Materials proposed for import is anticipated as part of the Track 2 remedy. Documentation of the material will be provided to NYSDEC for approval prior to its use on Site. Imported soil for backfill 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 lesser of PGSCOs or RRSCOs. 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. Upon meeting these criteria, the 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 RAWP and NYSDEC approval of this RAWP should not be considered an approval for this purpose.

5.4.9 Stormwater Pollution Prevention

Silt fence or hay bales will be installed around the perimeter of the remedial construction area, as required. Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook maintained at the Site and available for inspection by the NYSDEC. Necessary repairs to silt fence and/or hay bales will be made immediately. Accumulated sediments will be removed as required to keep the barriers and hay bale checks functional. Manufacturer's recommendations will be followed for replacing silt fence damaged due to weathering. Erosion and sediment control measures identified in the RAWP will be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to the sewer system.

5.4.10 Contingency Plan

As discussed above in Section 4.2.7, if additional USTs or other previously unidentified contaminant sources are found during on-Site remedial excavation or development-related construction, sampling will be performed on product, if encountered, and surrounding subsurface materials (e.g., soil, stone). Chemical analyses will include Part 375 VOCs, SVOCs, PCBs, pesticides, and metals. Analyses will not be otherwise limited without NYSDEC approval. Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will also be detailed in the monthly BCP progress report.

5.4.11 Community Air Monitoring Plan

The Community Air Monitoring Plan will require real-time monitoring for particulates (i.e., dust) and VOCs at the upwind and downwind perimeters when ground intrusive activities, including soil/waste excavation, soil handling, test pit excavation and/or trenching, are in progress at the Site. The CAMP 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 PIDs, and particulates will be monitored using TSI DustTrak Environmental Monitor (DustTraks) equipment or other equivalent instruments. Readings will be recorded every 15-minutes at the Site by field personnel.

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

- If the downwind PM-10 particulate level is 100 µg/m^3 greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 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 upwind level, work will be stopped, and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

The following actions will be taken based on VOC monitoring:

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

5.4.12 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.

6. Residual Contamination to Remain On-Site

Upon completion of the Track 2 remedy, impacted soil considered source material will be removed from the Site but residual impacted soils will exist beneath the development footprint. In the northern portion of the Site, the preferred Track 2 remedy will excavate material to 15 ft bgs, leaving underlying historic fill material not considered source to depths reaching 25 ft bgs. In the southern portion of the Site formerly operated as a gasoline station, the preferred Track 2 remedy will excavate material to 18 ft bgs to remove source material which is comprised of soils with petroleum related VOC impacts above the PWGSCOs. VOC analytical results in confirmation samples in the 18 ft bgs excavation area will comply with PGWSCOs. If results of aforementioned confirmation samples do not comply with the PGWSCOs, over-excavation will be completed as practical to achieve a Track 2 remedy and additional endpoint samples will be collected of the over-excavation area.

With the Track 2 remedy, some residual contaminated material may exist beneath the Site after the remedy is complete. ECs and ICs, described in the following sections, will be implemented to protect public health and the environment by appropriately managing residual contamination. Long-term management of ECs and ICs, and of any residual contamination will be executed under a Site-specific NYSDEC-approved SMP that will be developed and included as an appendix of the FER.

7. Engineering Controls

Alternative II will include engineering controls and it is anticipated to achieve a Track 2 cleanup. The following engineering controls have been designed for incorporation into the remedial action.

7.1 COMPOSITE COVER AND VAPOR BARRIER SYSTEM

A composite cover system, consisting of 4 inches of subbase overlain by a 6-inch concrete slab and installation of a waterproofing/vapor barrier or equivalent, which is a requirement of the NYC Building Code of a 20-mil vapor barrier, which will reduce the potential for a soil vapor exposure pathway, will be installed throughout the Site footprint. The vapor barrier will be installed as per manufacturer specifications.

8. Final Engineering Report

A FER will be submitted to the NYSDEC following implementation of the remedy defined in this RAWP. The FER will be prepared in conformance with NYSDEC DER-10 and will include the following:

- Documentation that the remedial work required under this RAWP has been completed and has been performed in substantial conformance with this plan.
- A summary of the locations and characteristics of material removed from the Site including the surveyed map(s) of each area, as necessary.
- As-built drawings for constructed elements, certifications, manifests, and bills of lading.
- A description of the changes to the remedy from the elements provided in the RAWP and associated design documents, if any.
- A tabular summary of performance evaluation sampling results and material characterization results and other sampling and chemical analyses performed as part of the remedy.
- Written and photographic documentation of remedial work performed under this remedy.
- A summary of confirmation sampling results to show that remaining soil left on-Site meets the Track 2 RRSCOs.
- If necessary, a summary of remaining contamination that exceeds the Track 2 RRSCOs and an explanation for why the material was not removed as part of the remedy. A table and a map that shows remaining contamination in excess of the Track 2 RRSCOs would also be included.
- Documentation of treatment and/or disposal of material removed from the Site, including excavated contaminated soil, historical fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with the disposal of material must also include records and approvals for receipt of the material.
- Documentation of the origin and chemical quality of each material type imported onto the Site.

Before approval of the FER and issuance of a Certificate of Completion, the daily or weekly reports and monthly BCP progress reports must be submitted in digital format (i.e. PDF).

8.1 CERTIFICATIONS

The following certification will appear in front of the FER Executive Summary. The certification will be signed by the RE, Scott Underhill, who is a NYS-licensed Professional Engineer. The certification will be appropriately signed and stamped.

The certification will include the following statements:

I, _____, certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject remedial program, and I certify that the Remedial Work Plan was implemented and that all remediation activities were completed in substantial conformance with the DER-approved Remedial Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

If the Remedial Action Work Plan identifies time frames to be achieved by the remedial program, the certification will include: The data submitted to DER demonstrates that the remediation requirements set forth in the Remedial Work and all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in the work plan.

9. Schedule

Mobilization for implementation of the RAWP is expected to take about two to four weeks. Once mobilization is complete, remediation of the Site will proceed. The remedy, which will be implemented in accordance with this RAWP, is anticipated to take about six months to complete. A FER will be drafted following completion of the remedy and subsequently submitted to the NYSDEC for review and approval. A project schedule is included in Appendix I.

References

1. ASTM Phase I Environmental Site Assessment, 169 Third Avenue, Brooklyn, New York. Prepared by GEI Consultants, prepared for The Macchia Group, Inc., September 2021.

2. Brownfield Cleanup Program Application. 556 Baltic Street, Brooklyn, New York. Prepared by Haley & Aldrich of New York on behalf of 159 Third Realty LLC, 159 Third Residence LLC and Baltic Residence LLC, prepared for the New York State Department of Environmental Conservation. Submitted July 2022.

3. Investigation Summary Report, 169 Third Avenue, Brooklyn, New York. Prepared by Impact Environmental, prepared for ASTI Holding Corp, dated 28 November 2006.

4. New York State Department of Environmental Conservation, Part 375 of Title 6 of the New York Compilation of Codes, Rules, and Regulations, Effective December 14, 2006.

5. New York State Department of Environmental Conservation, Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), November 2022.

6. New York State Department of Health, Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

7. New York State Division of Water Technical and Operational Guidance Series (TOGS) (1.1.1) dated June 1998.

8. NYCOER Remedial Investigation Report (151-169 Third Avenue), March 2022. Prepared by Haley & Aldrich.

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

10. Quarterly Update Report prepared by Berninger Environmental, dated 31 March 2019.

11. Remedial Action Plan 169 Third Avenue, Brooklyn, New York. Prepared by Impact Environmental, prepared for ASTI Holding Corp, dated 21 April 2007.

12. United States Environmental Protection Agency, Low Flow Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, EQASOP-GW 001, September 19, 2017.

13. Update to Investigation Summary Report, 169 Third Avenue, Brooklyn, New York. Prepared by Impact Environmental, prepared for ASTI Holding Corp, dated 21 February 2007.

14. Remedial Action Plan 169 Third Avenue, Brooklyn, New York. Prepared by Impact Environmental, prepared for ASTI Holding Corp, dated 21 April 2007.

TABLES

Table 1. Track 2 Soil Cleanup Objectives
556 Baltic Street Site
556 Baltic Street, Brooklyn, New York
NYSDEC BCP Site No. C224375

PCBs/Pesticides (mg/kg)	RRSCOs
4,4'-DDD	13
4,4'-DDE	8.9
4,4'-DDT	7.9
Aldrin	0.097
alpha-BHC	0.48
alpha-Chlordane (cis)	4.2
beta-BHC	0.36
delta-BHC	100
Dieldrin	0.2
Endosulfan I	24
Endosulfan II	24
Endosulfan sulfate	24
Endrin	11
gamma-BHC (Lindane)	1.3
Heptachlor	2.1
SUM of PCBs	1

VOCs (mg/kg)	RRSCOs
1,1,1-Trichloroethane	100
1,1-Dichloroethane	26
1,1-Dichloroethene	100
1,2,4-Trimethylbenzene	52
1,2-Dichlorobenzene	100
1,2-Dichloroethane	3.1
1,3,5-Trimethylbenzene	52
1,3-Dichlorobenzene	49
1,4-Dichlorobenzene	13
1,4-Dioxane	13
2-Butanone (Methyl Ethyl Ketone)	100
2-Phenylbutane (sec-Butylbenzene)	100
Acetone	100
Benzene	4.8
Carbon tetrachloride	2.4
Chlorobenzene	100
Chloroform (Trichloromethane)	49
cis-1,2-Dichloroethene	100
Ethylbenzene	41
Methyl Tert Butyl Ether (MTBE)	100
Methylene chloride (Dichloromethane)	100
Naphthalene	100
n-Butylbenzene	100
n-Propylbenzene	100
tert-Butylbenzene	100
Tetrachloroethene	19
Toluene	100
trans-1,2-Dichloroethene	100
Trichloroethene	21
Vinyl chloride	0.9
Xylene (Total)	100

SVOCs (mg/kg)	RRSCOs
1,2-Dichlorobenzene	100
1,3-Dichlorobenzene	49
1,4-Dichlorobenzene	13
1,4-Dioxane	13
2-Methylphenol (o-Cresol)	100
3&4-Methylphenol	100
Acenaphthene	100
Acenaphthylene	100
Anthracene	100
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(g,h,i)perylene	100
Benzo(k)fluoranthene	3.9
Chrysene	3.9
Dibenz(a,h)anthracene	0.33
Dibenzofuran	59
Fluoranthene	100
Fluorene	100
Hexachlorobenzene	1.2
Indeno(1,2,3-cd)pyrene	0.5
Naphthalene	100
Pentachlorophenol	6.7
Phenanthrene	100
Phenol	100
Pyrene	100

Metals (mg/kg)	RRSCOs
Arsenic	16
Barium	400
Beryllium	72
Cadmium	4.3
Copper	270
Lead	400
Manganese	2000
Mercury	0.81
Nickel	310
Selenium	180
Silver	180
Zinc	10000

Notes:
1. Criteria are 6 NYCRR Part 375 Restricted Use Soil Cleanup Objectives - Residential (RRSCOs)

2. mg/kg: milligrams per kilogram

Table 2. Alternative I Remedial Cost Estimate

556 Baltic Street Redevelopment

556 Baltic Street, Brooklyn, NY

BCP Site No. C224375

Consulting/Engineering Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Waste Characterization Sampling and Analysis	1	$ 1,250	20	$ 25,000
2	Program Management (NYSDEC/NYSDOH Correspondence, Daily/Weekly/Monthly Reporting, etc.)	Month	$ 34,000	10	$ 340,000
3	Remedial Oversight	Month	$ 34,000	10	$ 340,000
4	Confirmation Sampling	Sample	$ 2,000	16	$ 32,000
5	Soil Vapor Intrusion Evaluation	Lump Sum	$ 5,500	1	$ 5,500
6	Soil Vapor Intrusion Reporting	Lump Sum	$ 9,500	1	$ 9,500
7	Final Engineering Report and COC Coordination	Allowance	$ 100,000	1	$ 100,000
8	Annual Site Management (engineering control monitoring, reporting)	Year	$ 20,000	0	$ -
				Consulting/Engineering Subtotal	$ 852,000
Contractor Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Mobilization/Demobilization, Site Maintenance, Security, etc.	Allowance	$ 350,000	1	$ 350,000
2	Waste Characterization Drilling	Lump Sum	$ 5,000	10	$ 50,000
3	Truck Wash Station	Month	$ 25,000	6	$ 150,000
4	Side-wide Dewatering	Lump Sum	$ 500,000	1	$ 500,000
5	Management/Handling Contaminated Material	Cubic Yard	$ 40	15,300	$ 612,000
6	Support of Excavation (with double the amount of walers)	Linear Foot	$ 16,000	566	$ 9,056,000
7	Clean UST System, dispose of residuals (assume 3,000 gallons wastewater), PBS closure paperwork	Lump Sum	$ 25,000	1	$ 25,000
8	Transport and Disposal of Urban Fill	Ton	$ 46	13,425	$ 617,550
9	Transport and Disposal of Non-Hazardous Petroleum Impacted Fill Material	Ton	$ 55	1,875	$ 103,125
10	Transport and Disposal of Hazardous Material (F Listed and/or Lead)	Ton	$ 275	0	$ -
11	Backfill Procurement, Placement and Compaction	Cubic Yard	$ 28	1350	$ 37,125
12	Underground Storage Tank (Contingency Budget)	Allowance	$ 75,000	1	$ 75,000
13	Composite Cover System (inc. vapor barrier/waterproofing membrane)	Allowance	$ 350,000	0	$ -
				Contractor Subtotal	$ 11,575,800
				Total	$ 12,427,800
				15% Contingency	$ 1,864,170
				Estimated Total (Rounded to the nearest $1,000)	$ 14,292,000

Notes:

1. Assuming a Track 1 Remedy with site management, requiring excavation to approximately 35 ft bgs across the site to remove soil exceeding UUSCOs.

2. Assumes density of 1.5 tons per cubic yard of fill/soil.

3. Assumes residual soil will meet Track 1 Unrestricted Use Soil Cleanup Objectives.

4. SOE costs are based on secant walls and sheet piles.

5. Costs are estimated and subject to change. Costs do not include new building construction.

6. RAWP implementation is assumed to take 10 months.

7. This cost estimate was prepared to compare various remedial alternatives as was based on available information at the time of preparation. The estimate may be +/- 30-50% of the actual cost. This estimate was not prepared for financial or legal consulting purposes and was not intended for use regarding compliance with financial reporting requirements or liability services.

8. This estimate does not include legal fees associated with attorneys involved in the project, insurance fees or outside consulting fees.

Table 3. Alternative II Remedial Cost Estimate

556 Baltic Street Redevelopment

556 Baltic Street, Brooklyn, NY

BCP Site No. C224375

Consulting/Engineering Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Waste Characterization Sampling and Analysis	1	$ 1,250	9	$ 11,250
2	Program Management (NYSDEC/NYSDOH Correspondence, Daily/Weekly/Monthly Reporting, etc.)	Month	$ 34,000	6	$ 204,000
3	Remedial Oversight	Month	$ 34,000	6	$ 204,000
4	Confirmation Sampling	Sample	$ 2,000	16	$ 32,000
5	Soil Vapor Intrusion Evaluation	Lump Sum	$ 5,500	1	$ 5,500
6	Soil Vapor Intrusion Reporting	Lump Sum	$ 9,500	1	$ 9,500
7	Final Engineering Report and COC Coordination	Allowance	$ 100,000	1	$ 100,000
8	Annual Site Management (engineering control monitoring, reporting)	Year	$ 10,000	5	$ 50,000
				Consulting/Engineering Subtotal	$ 616,250
Contractor Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Mobilization/Demobilization, Site Maintenance, Security, etc.	Allowance	$ 350,000	1	$ 350,000
2	Waste Characterization Drilling	Lump Sum	$ 5,000	5	$ 25,000
3	Truck Wash Station	Month	$ 25,000	6	$ 150,000
4	Side-wide Dewatering/Groundwater Remedy	Lump Sum	$ 250,000	1	$ 250,000
5	Management/Handling Contaminated Material	Cubic Yard	$ 40	6,900	$ 276,000
6	Support of Excavation	Linear Foot	$ 8,000	566	$ 4,528,000
7	Clean UST System, dispose of residuals (assume 3,000 gallons wastewater), PBS closure paperwork	Lump Sum	$ 25,000	1	$ 25,000
8	Transport and Disposal of Urban Fill	Ton	$ 46	5,050	$ 232,300
9	Transport and Disposal of Non-Hazardous Petroleum Impacted Fill Material	Ton	$ 55	1,850	$ 101,750
10	Transport and Disposal of Hazardous Material (F Listed and/or Lead)	Ton	$ 275	0	$ -
11	Backfill Procurement, Placement and Compaction	Cubic Yard	$ 28	450	$ 12,375
12	Underground Storage Tank (Contingency Budget)	Allowance	$ 75,000	1	$ 75,000
13	Composite Cover System (inc. vapor barrier/waterproofing membrane)	Allowance	$ 350,000	1	$ 350,000
				Contractor Subtotal	$ 6,375,425
				Total	$ 6,991,675
				15% Contingency	$ 1,048,751
				Estimated Total (Rounded to the nearest $1,000)	$ 8,040,000

Notes:

1. Assuming a Track 2 Remedy with site management, requiring excavations to approximately 15 ft bgs across the northern area of the site and to 18 ft bgs in the southern former gasoline station area of the site to remove soil exceeding RRSCOs.

2. Assumes density of 1.5 tons per cubic yard of fill/soil.

3. Assumes residual soil will meet Track 2 Restricted Residential Use Soil Cleanup Objectives.

4. SOE costs are based on secant walls and sheet piles.

5. Costs are estimated and subject to change. Costs do not include new building construction.

6. RAWP implementation is assumed to take 6 months.

7. This cost estimate was prepared to compare various remedial alternatives as was based on available information at the time of preparation. The estimate may be +/- 30-50% of the actual cost. This estimate was not prepared for financial or legal consulting purposes and was not intended for use regarding compliance with financial reporting requirements or liability services.

8. This estimate does not include legal fees associated with attorneys involved in the project, insurance fees or outside consulting fees.

Table 4. Alternative III Remedial Cost Estimate
556 Baltic Street Redevelopment
556 Baltic Street, Brooklyn, NY
BCP Site No. C224375

Consulting/Engineering Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Waste Characterization Sampling and Analysis	1	$ 1,250	9	$ 11,250
2	Program Management (NYSDEC/NYSDOH Correspondence, Daily/Weekly/Monthly Reporting, etc.)	Month	$ 34,000	5	$ 170,000
3	Remedial Oversight	Month	$ 34,000	5	$ 170,000
4	Confirmation Sampling	Sample	$ 2,000	16	$ 32,000
5	Soil Vapor Intrusion Evaluation	Lump Sum	$ 5,500	1	$ 5,500
6	Soil Vapor Intrusion Reporting	Lump Sum	$ 9,500	1	$ 9,500
7	Final Engineering Report and COC Coordination	Allowance	$ 100,000	1	$ 100,000
8	Annual Site Management (engineering control monitoring, reporting)	Year	$ 25,000	5	$ 125,000
				Consulting/Engineering Subtotal	$ 623,250
Contractor Costs					
Task	**Description**	**Unit**	**Unit Cost**	**Quantity**	**Total Cost**
1	Mobilization/Demobilization, Site Maintenance, Security, etc.	Allowance	$ 350,000	1	$ 350,000
2	Waste Characterization Drilling	Lump Sum	$ 5,000	5	$ 25,000
3	Truck Wash Station	Month	$ 25,000	5	$ 125,000
4	Side-wide Dewatering	Lump Sum	$ 150,000	1	$ 150,000
5	Management/Handling Contaminated Material	Cubic Yard	$ 40	6,600	$ 264,000
6	Support of Excavation	Linear Foot	$ 8,000	566	$ 4,528,000
7	Clean UST System, dispose of residuals (assume 3,000 gallons wastewater), PBS closure paperwork	Lump Sum	$ 25,000	1	$ 25,000
8	Transport and Disposal of Urban Fill	Ton	$ 46	5,000	$ 230,000
9	Transport and Disposal of Non-Hazardous Petroleum Impacted Fill Material	Ton	$ 55	1,600	$ 88,000
10	Transport and Disposal of Hazardous Material (F Listed and/or Lead)	Ton	$ 275	0	$ -
11	Backfill Procurement, Placement and Compaction	Cubic Yard	$ 28	200	$ 5,500
12	Underground Storage Tank (Contingency Budget)	Allowance	$ 75,000	1	$ 75,000
13	Composite Cover System (inc. vapor barrier/waterproofing membrane)	Allowance	$ 350,000	1	$ 350,000
				Contractor Subtotal	$ 6,215,500
				Total	$ 6,838,750
				15% Contingency	$ 1,025,813
				Estimated Total (Rounded to the nearest $1,000)	$ 7,865,000

Notes:

1. Assuming a Track 4 Remedy with site management, requiring excavation to approximately 15 ft bgs across the site.

2. Assumes density of 1.5 tons per cubic yard of fill/soil.

3. Assumes residual soil will meet Track 4 Soil Cleanup Objectives.

4. SOE costs are based on secant walls and sheet piles.

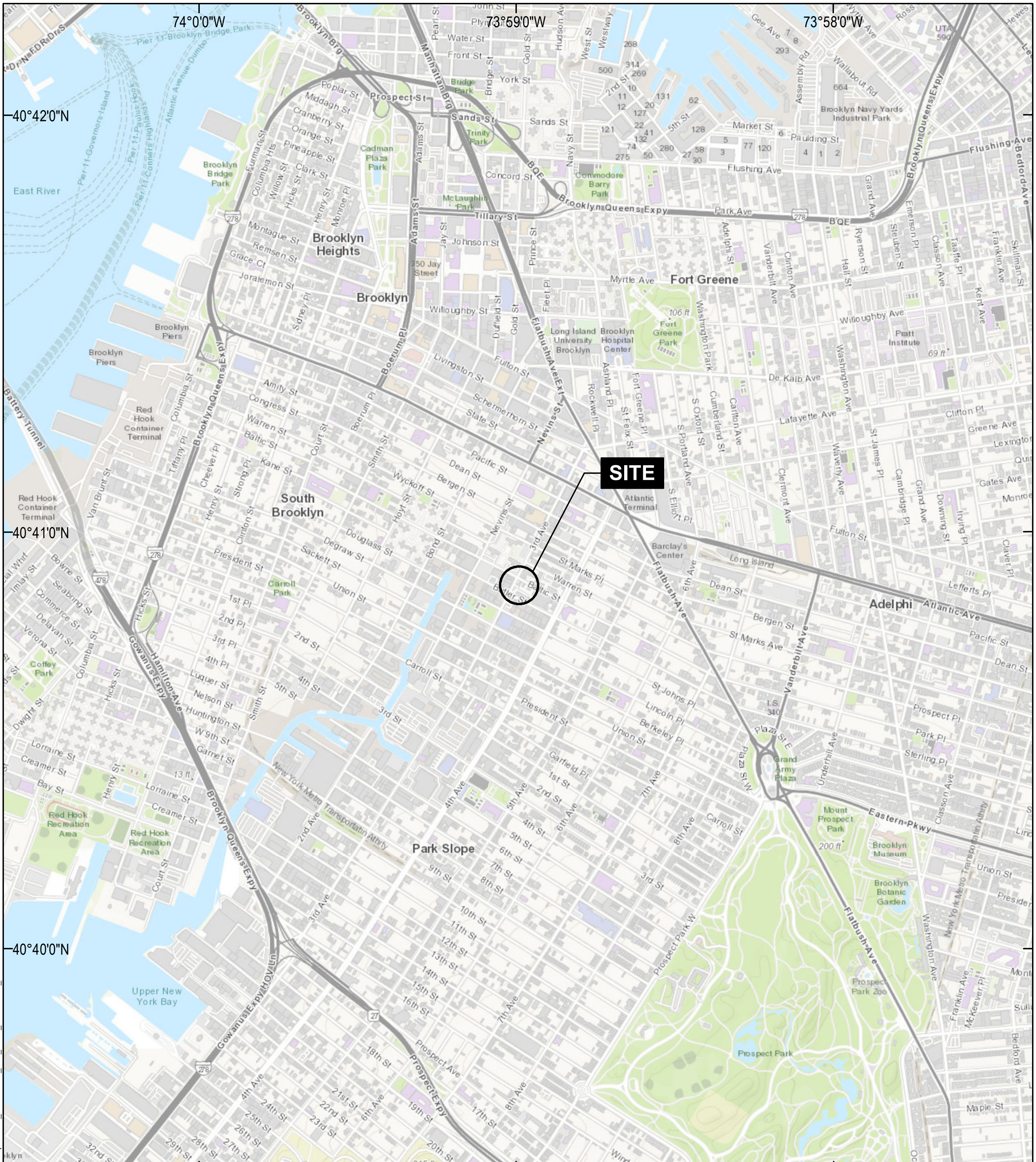
5. Costs are estimated and subject to change. Costs do not include new building construction.

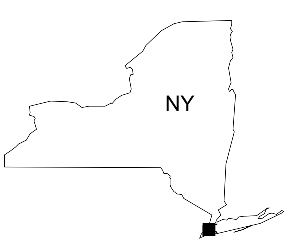
6. RAWP implementation is assumed to take 5 months.

7. This cost estimate was prepared to compare various remedial alternatives as was based on available information at the time of preparation. The estimate may be +/- 30-50% of the actual cost. This estimate was not prepared for financial or legal consulting purposes and was not intended for use regarding compliance with financial reporting requirements or liability services.

8. This estimate does not include legal fees associated with attorneys involved in the project, insurance fees or outside consulting fees.

FIGURES





MAP SOURCE: ESRI
SITE COORDINATES: 40°40'52"N, 73°58'59"W

HALEY ALDRICH

556 BALTIC STREET
BROOKLYN, NY

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
MARCH 2023

FIGURE 1

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2021_12\204090_000_0001_PROJECT_LOCUS.mxd - anichols - 1/28/2022 1:39:47 PM

LEGEND

- SITE BOUNDARY
- UST LOCATION

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

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SCALE IN FEET

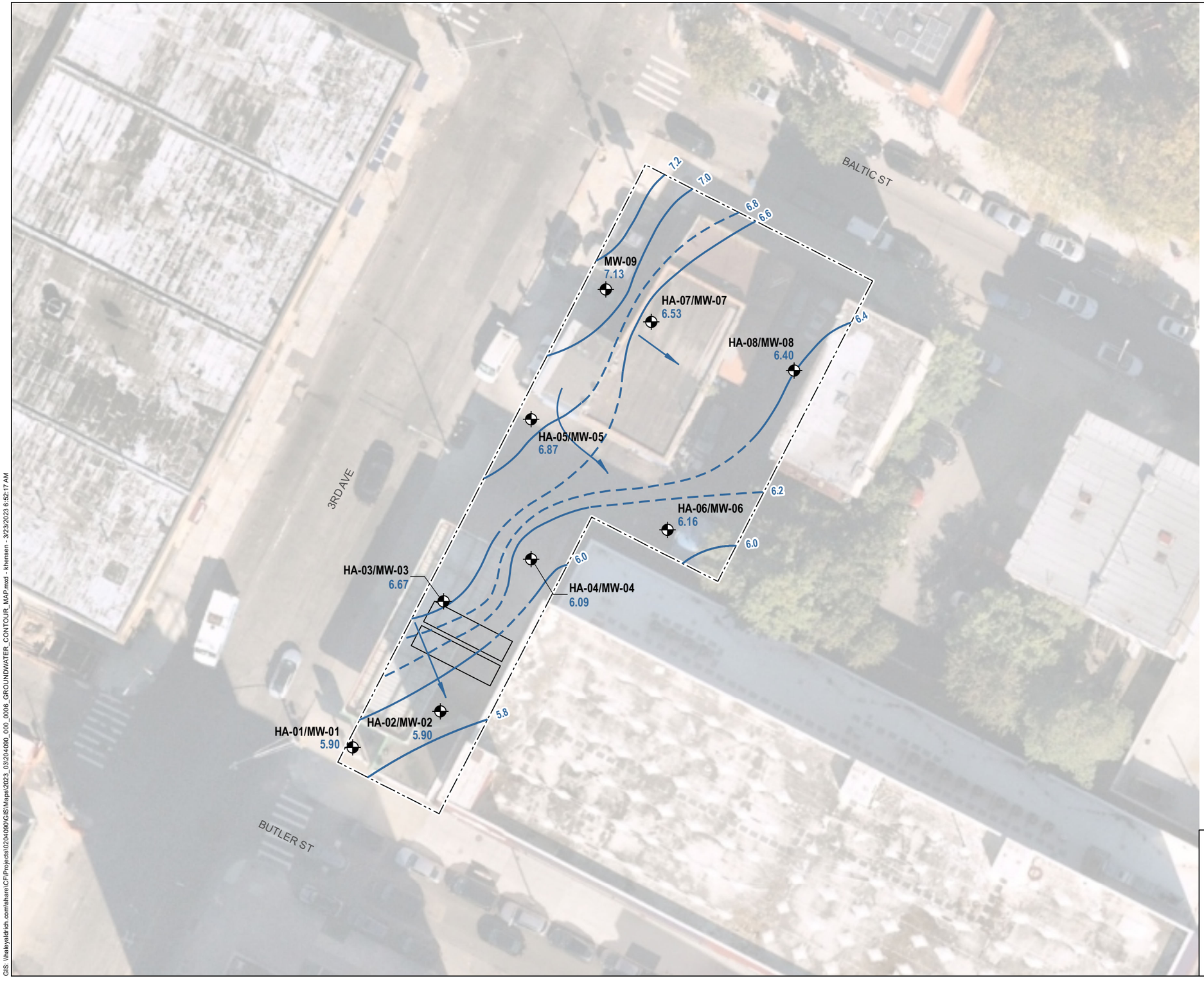
HALEY ALDRICH

556 BALTIC STREET
BROOKLYN, NY

SITE MAP

MARCH 2023

FIGURE 2



LEGEND

- MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR, IN FEET (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION
- UST LOCATION
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

GROUNDWATER CONTOUR MAP

MARCH 2023

FIGURE 6

GIS: \\haleyaldrich.com\share\CFI\Projects\02\04090\GIS\Maps\2023_03\204090_000_0006_GROUNDWATER_CONTOUR_MAP.mxd - khensen - 3/23/2023 6:52:17 AM

HA-05	02/02/2023 L2305934-05 HA-05 (2-4) 2 - 4 (ft)	02/02/2023 L2305934-06 HA-05 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-07 HA-05 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-08 HA-05 (14-16) 14 - 16 (ft)
SVOCs				
Benzo(a)anthracene	1.3	0.09 J	0.16	ND (0.11)
Benzo(a)pyrene	1.4	0.087 J	0.16	ND (0.15)
Benzo(b)fluoranthene	1.7	0.1 J	0.18	ND (0.11)
Indeno(1,2,3-cd)pyrene	0.84	0.05 J	0.085 J	ND (0.15)

HA-15	02/01/2023 L2305570-13 HA-15 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-14 HA-15 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-15 HA-15 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-16 HA-15 (14-16) 14 - 16 (ft)
Total Metals				
Barium	189	56.3	642	109
Lead	228	125	1570	134
Mercury	0.573	0.334	7.21	0.661

HA-11	02/09/2023 L2307196-09 HA-11 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-10 HA-11 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-11 HA-11 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-12 HA-11 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	6.33	4.73	19.8	6.5
Lead	238	44.2	5320	115
Mercury	0.913	0.291	2.05	0.178
SVOCs				
Benzo(a)anthracene	3.3	0.037 J	0.98	0.23
Benzo(a)pyrene	4.4	ND (0.16)	1.3	0.3
Benzo(b)fluoranthene	5.1	0.038 J	0.76	0.32
Dibenz(a,h)anthracene	0.66	ND (0.12)	0.41	0.042 J
Indeno(1,2,3-cd)pyrene	3.2	ND (0.16)	0.43	0.19

HA-07	02/09/2023 L2307196-01 HA-07 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-02 HA-07 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-03 HA-07 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-04 HA-07 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	4.86	4.54	23.4	4.92
Barium	130	133	676	106
Lead	212	321	434	204
Mercury	0.564	1.04	1.92	0.99
SVOCs				
Benzo(a)anthracene	4.9	0.026 J	2.6	0.5
Benzo(a)pyrene	5.5	ND (0.17)	2.5	1.1
Benzo(b)fluoranthene	6.5	ND (0.13)	3	0.97
Chrysene	4.8	0.024 J	2.4	0.47
Dibenz(a,h)anthracene	0.7	ND (0.13)	0.33	0.15
Indeno(1,2,3-cd)pyrene	3.4	ND (0.17)	1.7	0.7

HA-10	02/08/2023 L2306883-09 HA-10 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-10 HA-10 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-11 HA-10 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-12 HA-10 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	11.2	5.39	5.23	28.3
Lead	382	47	178	510
SVOCs				
Benzo(a)anthracene	1.8	0.53 J	0.028 J	0.046 J
Benzo(a)pyrene	1.8	0.58 J	ND (0.16)	0.069 J
Benzo(b)fluoranthene	2	0.65	ND (0.12)	0.069 J
Indeno(1,2,3-cd)pyrene	1.2	0.48 J	ND (0.16)	0.039 J

HA-09	02/09/2023 L2307196-05 HA-09 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-06 HA-09 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-07 HA-09 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-08 HA-09 (14-16) 14 - 16 (ft)
Total Metals				
Mercury	ND (0.077)	1.15	ND (0.087)	0.22
SVOCs				
Benzo(a)anthracene	0.12	3.3	0.11 J	0.1 J
Benzo(a)pyrene	0.13 J	3.8	0.12 J	0.1 J
Benzo(b)fluoranthene	0.14	4.3	0.13	0.13
Dibenz(a,h)anthracene	ND (0.11)	0.51	ND (0.12)	ND (0.12)
Indeno(1,2,3-cd)pyrene	0.074 J	2.5	0.072 J	0.062 J

HA-04	02/02/2023 L2305934-01 HA-04 (2-4) 2 -2 (ft)	02/02/2023 L2305934-02 HA-04 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-09 DUP_1_02022023 6 - 8 (ft)	02/02/2023 L2305934-03 HA-04 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-04 HA-04 (14-16) 14 - 16 (ft)
Total Metals					
Arsenic	5.34 J+	26.6 J+	4.98 J+	20.8 J+	29 J+
Barium	146 J+	510 J+	90.2 J+	239 J+	235 J+
Lead	230	746 J	394 J	1480	586
Mercury	1.05	1.11	0.76	1.76	0.633
SVOCs					
Benzo(a)anthracene	1.5	ND (0.12)	0.1 J	0.034 J	ND (0.6)
Benzo(a)pyrene	1.8	ND (0.16)	0.12 J	ND (0.18)	ND (0.81)
Benzo(b)fluoranthene	2.2	0.034 J	0.14	0.055 J	ND (0.6)
Indeno(1,2,3-cd)pyrene	1.2	ND (0.16)	0.089 J	0.052 J	ND (0.81)

HA-12	02/09/2023 L2307196-13 HA-12 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-14 HA-12 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-15 HA-12 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-16 HA-12 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	24	9.72	8.07	5.04
Lead	223	371	434	59.8
Mercury	0.888	2.31	0.236	0.087
SVOCs				
Benzo(a)anthracene	0.084 J	7.2	7.2	0.094 J
Benzo(a)pyrene	0.1 J	6.6	7.4	0.097 J
Benzo(b)fluoranthene	0.11 J	7.3	8.2	0.11 J
Chrysene	0.083 J	7.4	7.8	0.091 J
Dibenz(a,h)anthracene	ND (0.12)	0.96	1	ND (0.12)
Indeno(1,2,3-cd)pyrene	0.062 J	4	4.6	0.065 J

HA-03	02/10/2023 L2307511-01 HA-03 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-02 HA-03 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-03 HA-03 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-04 HA-03 (14-16) 14 - 16 (ft)
Total Metals				
Mercury	0.104	0.503	1.25	0.158
SVOCs				
Benzo(a)anthracene	0.21	1.2	20	ND (0.11)
Benzo(a)pyrene	0.26	1.5	15	ND (0.15)
Benzo(b)fluoranthene	0.32	1.9	16	ND (0.11)
Benzo(k)fluoranthene	0.091 J	0.54	4	ND (0.11)
Chrysene	0.21	1.2	18	ND (0.11)
Dibenz(a,h)anthracene	0.04 J	0.25	1.8	ND (0.11)
Indeno(1,2,3-cd)pyrene	0.19	1.2	8.6	ND (0.15)

HA-08	02/01/2023 L2305570-05 HA-08 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-06 HA-08 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-07 HA-08 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-08 HA-08 (14-16) 14 - 16 (ft)
Total Metals				
Lead	198	75.1	1620	243
Mercury	0.577	0.156	1.03	0.286
SVOCs				
Benzo(a)anthracene	6.6	0.21	0.086 J	ND (0.43)
Benzo(a)pyrene	8.4	0.18	0.062 J	ND (0.58)
Benzo(b)fluoranthene	9.4	0.2	0.076 J	ND (0.43)
Chrysene	6	0.18	0.09 J	ND (0.43)
Dibenz(a,h)anthracene	0.89	0.023 J	ND (0.13)	ND (0.43)
Indeno(1,2,3-cd)pyrene	4.8	0.088 J	0.092 J	ND (0.58)

HA-20	02/10/2023 L2307511-05 HA-20 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-06 HA-20 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-07 HA-20 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-08 HA-20 (14-16) 14 - 16 (ft)
Total Metals				
Lead	335	476	1120	91.8
Mercury	0.139	0.142	0.338	1.11
SVOCs				
Indeno(1,2,3-cd)pyrene	0.58	0.064 J	0.46	0.049 J

HA-13	02/13/2023 L2307677-01 HA-13 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-02 HA-13 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-03 HA-13 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-04 HA-13 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	8.6	7.04	22.8	11
Lead	379	766	286	109
Mercury	2.36 J-	1.43 J-	1.3 J-	0.876 J-
SVOCs				
Benzo(a)anthracene	1.5	1.9	0.34	0.63
Benzo(a)pyrene	1.6	2	0.41	0.77
Benzo(b)fluoranthene	1.8	2.1	0.47	0.8
Indeno(1,2,3-cd)pyrene	1	1	0.26	0.48

HA-21	02/08/2023 L2306883-22 HA-21 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-23 HA-21 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-24 HA-21 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-25 HA-21 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-26 HA-21 (20-22) 20 - 22 (ft)
Total Metals					
Arsenic	10.9	16.9	14.1	25.9	11.5
Lead	305	1760	299	520	486
Mercury	0.228	0.905	0.665	1.32	5.12
SVOCs					
Benzo(a)anthracene	1.9	5.4	0.11 J	0.17 J	0.035 J
Benzo(a)pyrene	2.4	4.4	0.15 J	0.18 J	ND (0.18)
Benzo(b)fluoranthene	2.8	5.2	0.16 J	0.2 J	ND (0.14)
Chrysene	2	4.8	0.078 J	0.14 J	0.028 J
Dibenz(a,h)anthracene	0.35	0.55	ND (0.34)	ND (0.37)	ND (0.14)
Indeno(1,2,3-cd)pyrene	1.7	2.6	0.13 J	0.13 J	ND (0.18)

HA-06	02/01/2023 L2305570-01 HA-06 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-02 HA-06 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-03 HA-06 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-04 HA-06 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	33.9	3.54	4.93	5.6
Mercury	1.01	0.2	0.755	0.233
SVOCs				
Benzo(a)anthracene	3.5	0.19	0.28	1.4
Benzo(a)pyrene	3.1	0.24	0.23	1.1
Benzo(b)fluoranthene	3.4	0.27	0.26	1.2
Dibenz(a,h)anthracene	0.41	0.024 J	0.034 J	0.14
Indeno(1,2,3-cd)pyrene	2	0.099 J	0.12 J	0.61

HA-25	02/02/2023 L2305935-04 HA-25 (10-12) 10 - 12 (ft)	02/02/2023 L2305935-05 HA-25 (12-14) 12 - 14 (ft)	02/02/2023 L2305935-06 HA-25 (14-16) 14 - 16 (ft)
Total Metals			
Mercury	0.337	0.508	1.07

HA-14	02/01/2023 L2305570-09 HA-14 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-10 HA-14 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-11 HA-14 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-12 HA-14 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	11.3	5.42	3.02	28.6
Barium	613	46.3	61.8	176
Lead	1020	65	20	574
Mercury	0.886	0.214	1.23	ND (0.104)
SVOCs				
Benzo(a)anthracene	2.2	0.051 J	0.051 J	0.71
Benzo(a)pyrene	2.1	0.05 J	0.046 J	0.79
Benzo(b)fluoranthene	2.5	0.058 J	0.044 J	0.86
Indeno(1,2,3-cd)pyrene	1.4	0.033 J	0.026 J	0.35 J

HA-01	02/08/2023 L2306883-01 HA-01 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-02 HA-01 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-03 HA-01 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-04 HA-01 (14-16) 14 - 16 (ft)
Total Metals				
Lead	114	550	120	64.5

HA-26	02/10/2023 L2307512-01 HA-26 (11-13) 11 - 13 (ft)	02/10/2023 L2307512-04 DUP-1_02102023 11 - 13 (ft)	02/10/2023 L2307512-02 HA-26 (13-15) 13 - 15 (ft)	02/10/2023 L2307512-05 DUP-2_02102023 13 - 15 (ft)	02/10/2023 L2307512-03 HA-26 (15-17) 15 - 17 (ft)
Total Metals					
Mercury	0.502 J+	0.162 J+	7.1 J+	1.84 J+	0.352 J+

HA-18	02/13/2023 L2307677-05 HA-18 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-06 HA-18 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-07 HA-18 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-09 DUP_1_02132023 10 - 12 (ft)	02/13/2023 L2307677-08 HA-18 (14-16) 14 - 16 (ft)
Total Metals					
Arsenic	11.7	7.34	17	19.3	8.17
Copper	76.7 J-	58.6 J-	324 J-	475 J-	24.8 J-
Lead	997	228	518	1220	142
Mercury	0.769 J-	0.376 J-	11.7 J-	5.28 J-	0.638 J-
SVOCs					
Benzo(a)anthracene	1.8	0.97	0.14	0.021 J	0.086 J
Benzo(a)pyrene	1.9	1.1	0.16 J	ND (0.15)	0.13 J
Benzo(b)fluoranthene	2.1	1.3	0.19	ND (0.11)	0.12
Indeno(1,2,3-cd)pyrene	1.2	0.78	0.12 J	ND (0.15)	0.096 J

HA-02	02/08/2023 L2306883-05 HA-02 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-06 HA-02 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-07 HA-02 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-08 HA-02 (14-16) 14 - 16 (ft)
Total Metals				
Arsenic	9.27	51	4.25	5.35
Copper	155	323	12.4	76.4
Lead	1850	3070	57.1	183
Mercury	0.515	3.22	0.102	0.726
SVOCs				
Benzo(a)anthracene	4	0.32	0.14	0.086 J
Benzo(a)pyrene	3.8	0.28	0.11 J	0.13 J
Benzo(b)fluoranthene	4.2	0.33	0.13	0.13
Dibenz(a,h)anthracene	0.54	0.042 J	ND (0.12)	0.031 J
Indeno(1,2,3-cd)pyrene	2.4	0.18	0.075 J	0.11 J

HA-19	02/08/2023 L2306883-17 HA-19 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-18 HA-19 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-19 HA-19 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-27 DUP_1_02082023 10 - 12 (ft)	02/08/2023 L2306883-20 HA-19 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-21 HA-19 (20-22) 20 - 22 (ft)
Total Metals						
Lead	578	259	602 J	1010 J	677	34.2
Mercury	0.476	0.343	15.4	0.858	1.51	ND (0.077)
SVOCs						
Indeno(1,2,3-cd)pyrene	0.31	0.64	0.68	ND (0.15)	0.13 J	ND (0.43)
VOCs						
n-Propylbenzene	0.00032 J	0.00018 J	3	1.2	160	0.0024

LEGEND

- SOIL BORING/MONITORING WELL
- SOIL BORING
- SITE BOUNDARY

Notes

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 RESTRICTED RESIDENTIAL SOIL CLEANUP OBJECTIVES (RRSCOS)
3. EXCEEDANCES OF RRSCOS SHADED IN YELLOW
4. RESULTS ARE SHOWN IN MG/KG
5. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

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0 40 80

SCALE IN FEET

HALEY ALDRICH

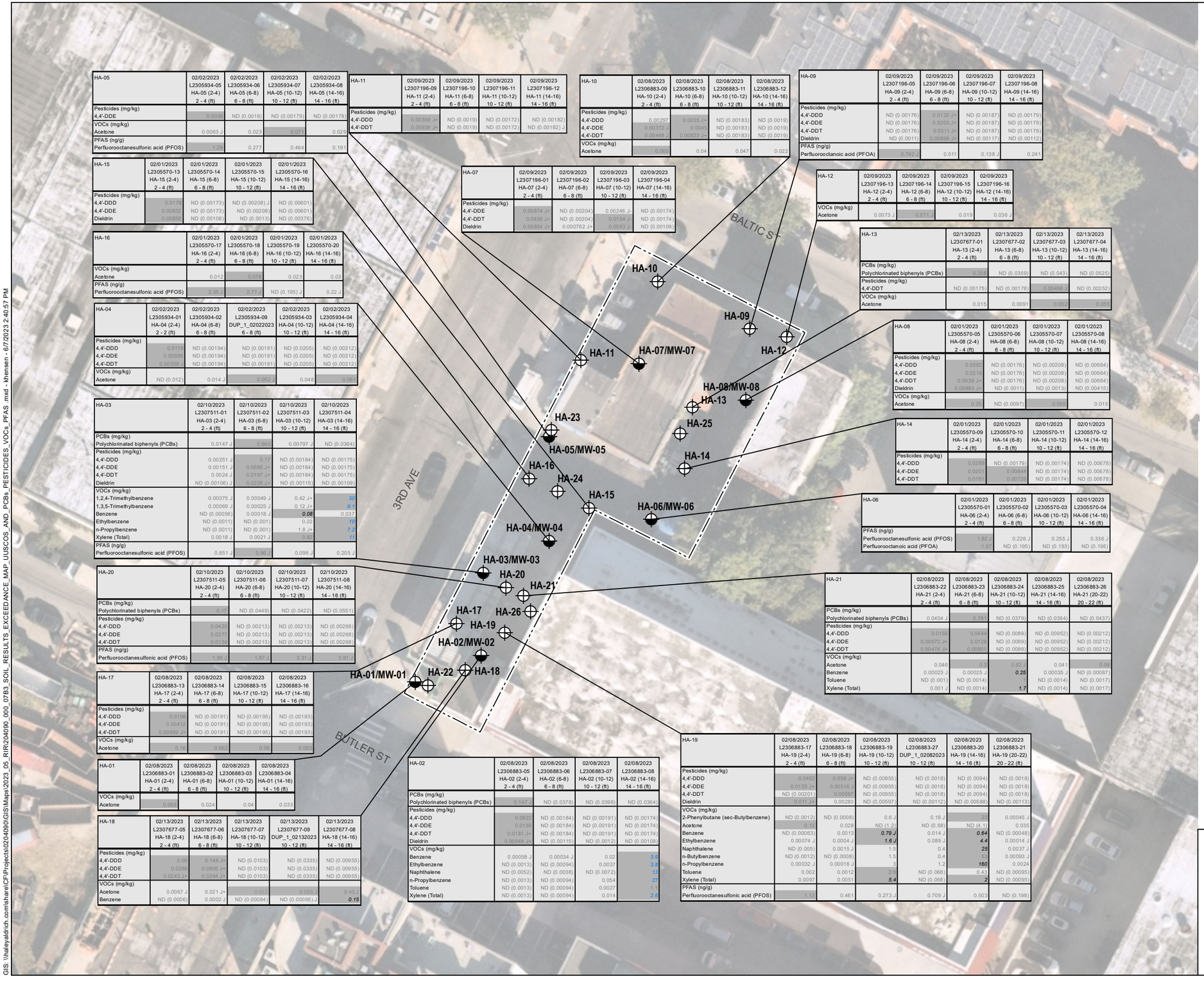
REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

SOIL RESULTS EXCEEDANCE MAP – RRSCOS

JUNE 2023

FIGURE 4A

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_05_RIR\204090_000_007A_SOIL_RESULTS_EXCEEDANCE_MAP_RRSCOS.mxd - khensen - 6/7/2023 1:41:37 PM



HA-05	02/02/2023 L2305934-05 HA-05 (2-4) 2 - 4 (ft)	02/02/2023 L2305934-06 HA-05 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-07 HA-05 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-08 HA-05 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDE	0.0036	ND (0.0018)	ND (0.00179)	ND (0.00178)
VOCs (mg/kg)				
Acetone	0.0063 J	0.023	0.071	0.028
PFAS (ng/g)				
Perfluorooctanesulfonic acid (PFOS)	1.29	0.277	0.464	0.191

HA-11	02/09/2023 L2307196-09 HA-11 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-10 HA-11 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-11 HA-11 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-12 HA-11 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDD	0.00359 J+	ND (0.0019)	ND (0.00172)	ND (0.00182)
4,4'-DDT	0.00938 J+	ND (0.0019)	ND (0.00172)	ND (0.00182) J

HA-10	02/08/2023 L2306883-09 HA-10 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-10 HA-10 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-11 HA-10 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-12 HA-10 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDD	0.00297	0.0035 J+	ND (0.00183)	ND (0.0019)
4,4'-DDE	0.00372 J	0.0045	ND (0.00183)	ND (0.0019)
4,4'-DDT	0.00448 J	0.00823 J+	ND (0.00183)	ND (0.0019)
VOCs (mg/kg)				
Acetone	0.063	0.04	0.047	0.022

HA-09	02/09/2023 L2307196-05 HA-09 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-06 HA-09 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-07 HA-09 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-08 HA-09 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDD	ND (0.00176)	0.0132 J+	ND (0.00187)	ND (0.00179)
4,4'-DDE	ND (0.00176)	0.0203 J+	ND (0.00187)	ND (0.00179)
4,4'-DDT	ND (0.00176)	0.0311 J+	ND (0.00187)	ND (0.00179)
Dieldrin	ND (0.0011)	0.00898 J+	ND (0.00117)	ND (0.00112)
PFAS (ng/g)				
Perfluorooctanoic acid (PFOA)	0.742 J	0.511	0.138 J	0.241

HA-15	02/01/2023 L2305570-13 HA-15 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-14 HA-15 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-15 HA-15 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-16 HA-15 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDD	0.0178	ND (0.00173)	ND (0.00208) J	ND (0.00601)
4,4'-DDE	0.00632	ND (0.00173)	ND (0.00208)	ND (0.00601)
Dieldrin	0.00855	ND (0.00108)	ND (0.0013)	ND (0.00376)

HA-07	02/09/2023 L2307196-01 HA-07 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-02 HA-07 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-03 HA-07 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-04 HA-07 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDE	0.00874 J+	ND (0.00204)	0.00246 J+	ND (0.00174)
4,4'-DDT	0.0456 J+	ND (0.00204)	0.0154 J+	ND (0.00174)
Dieldrin	0.00854 J+	0.000762 J+	0.0083 J+	ND (0.00109)

HA-12	02/09/2023 L2307196-13 HA-12 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-14 HA-12 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-15 HA-12 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-16 HA-12 (14-16) 14 - 16 (ft)
VOCs (mg/kg)				
Acetone	0.0073 J	0.071 J	0.019	0.036 J

HA-16	02/01/2023 L2305570-17 HA-16 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-18 HA-16 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-19 HA-16 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-20 HA-16 (14-16) 14 - 16 (ft)
VOCs (mg/kg)				
Acetone	0.012	0.078	0.023	0.03
PFAS (ng/g)				
Perfluorooctanesulfonic acid (PFOS)	2.35 J	2.71 J	ND (0.195) J	0.22 J

HA-13	02/13/2023 L2307677-01 HA-13 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-02 HA-13 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-03 HA-13 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-04 HA-13 (14-16) 14 - 16 (ft)
PCBs (mg/kg)				
Polychlorinated biphenyls (PCBs)	0.358	ND (0.0359)	ND (0.043)	ND (0.0525)
Pesticides (mg/kg)				
4,4'-DDT	ND (0.00175)	ND (0.00178)	0.00488 J	ND (0.00252)
VOCs (mg/kg)				
Acetone	0.015	0.0091	0.052	0.065

HA-04	02/02/2023 L2305934-01 HA-04 (2-4) 2 - 2 (ft)	02/02/2023 L2305934-02 HA-04 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-09 DUP_1_02022023 6 - 8 (ft)	02/02/2023 L2305934-03 HA-04 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-04 HA-04 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)					
4,4'-DDD	0.0118	ND (0.00194)	ND (0.00191)	ND (0.0205)	ND (0.00312)
4,4'-DDE	0.00588	ND (0.00194)	ND (0.00191)	ND (0.0205)	ND (0.00312)
4,4'-DDT	0.00359 J	ND (0.00194)	ND (0.00191)	ND (0.0205)	ND (0.00312)
VOCs (mg/kg)					
Acetone	ND (0.012)	0.014 J	0.052 J	0.048	0.081

HA-08	02/01/2023 L2305570-05 HA-08 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-06 HA-08 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-07 HA-08 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-08 HA-08 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDD	0.0362	ND (0.00176)	ND (0.00208)	ND (0.00664)
4,4'-DDE	0.0219	ND (0.00176)	ND (0.00208)	ND (0.00664)
4,4'-DDT	0.0639 J+	ND (0.00176)	ND (0.00208)	ND (0.00664)
Dieldrin	0.00883 J+	ND (0.0011)	ND (0.0013)	ND (0.00415)
VOCs (mg/kg)				
Acetone	0.25	ND (0.0097)	0.065	0.015

HA-03	02/10/2023 L2307511-01 HA-03 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-02 HA-03 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-03 HA-03 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-04 HA-03 (14-16) 14 - 16 (ft)
PCBs (mg/kg)				
Polychlorinated biphenyls (PCBs)	0.0147 J	0.665	0.00797 J	ND (0.0364)
Pesticides (mg/kg)				
4,4'-DDD	0.00251 J	0.17	ND (0.00184)	ND (0.00175)
4,4'-DDE	0.00151 J	0.0686 J+	ND (0.00184)	ND (0.00175)
4,4'-DDT	0.0024 J	0.0197 J+	ND (0.00184)	ND (0.00175)
Dieldrin	ND (0.00106) J	0.0238 J+	ND (0.00115)	ND (0.00109)
VOCs (mg/kg)				
1,2,4-Trimethylbenzene	0.00075 J	0.00049 J	0.42 J+	30
1,3,5-Trimethylbenzene	0.00069 J	0.00025 J	0.12 J+	9.1
Benzene	ND (0.00056)	0.00018 J	0.08	0.037
Ethylbenzene	ND (0.0011)	ND (0.001)	0.22	10
n-Propylbenzene	ND (0.0011)	ND (0.001)	1.8 J+	7.2
Xylene (Total)	0.0018 J	0.0021 J	0.82	41
PFAS (ng/g)				
Perfluorooctanesulfonic acid (PFOS)	0.851 J	0.96 J	0.096 J	0.205 J

HA-14	02/01/2023 L2305570-09 HA-14 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-10 HA-14 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-11 HA-14 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-12 HA-14 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDD	0.0289	ND (0.00179)	ND (0.00174)	ND (0.00678)
4,4'-DDE	0.0201	0.00644	ND (0.00174)	ND (0.00678)
4,4'-DDT	0.0181	0.00725	ND (0.00174)	ND (0.00678)

HA-06	02/01/2023 L2305570-01 HA-06 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-02 HA-06 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-03 HA-06 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-04 HA-06 (14-16) 14 - 16 (ft)
PFAS (ng/g)				
Perfluorooctanesulfonic acid (PFOS)	1.82 J	0.226 J	0.255 J	0.336 J
Perfluorooctanoic acid (PFOA)	1.08	ND (0.195)	ND (0.193)	ND (0.195)

HA-20	02/10/2023 L2307511-05 HA-20 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-06 HA-20 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-07 HA-20 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-08 HA-20 (14-16) 14 - 16 (ft)
PCBs (mg/kg)				
Polychlorinated biphenyls (PCBs)	0.17	ND (0.0449)	ND (0.0422)	ND (0.0551)
Pesticides (mg/kg)				
4,4'-DDD	0.0428	ND (0.00213)	ND (0.00213)	ND (0.00268)
4,4'-DDE	0.0277	ND (0.00213)	ND (0.00213)	ND (0.00268)
4,4'-DDT	0.0134	ND (0.00213)	ND (0.00213)	ND (0.00268)
PFAS (ng/g)				
Perfluorooctanesulfonic acid (PFOS)	1.88 J	1.67 J	3.31 J	3.91 J

HA-21	02/08/2023 L2306883-22 HA-21 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-23 HA-21 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-24 HA-21 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-25 HA-21 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-26 HA-21 (20-22) 20 - 22 (ft)
PCBs (mg/kg)					
Polychlorinated biphenyls (PCBs)	0.0454 J	0.791	ND (0.0379)	ND (0.0394)	ND (0.0437)
Pesticides (mg/kg)					
4,4'-DDD	0.0153	0.0444	ND (0.0089)	ND (0.00952)	ND (0.00212)
4,4'-DDE	0.00672 J+	0.0128	ND (0.0089)	ND (0.00952)	ND (0.00212)
4,4'-DDT	0.00474 J+	0.00901	ND (0.0089)	ND (0.00952)	ND (0.00212)
VOCs (mg/kg)					
Acetone	0.040	0.2	0.62 J	0.041	0.03
Benzene	0.00023 J	0.00025 J	0.25	0.00035 J	ND (0.00087)
Toluene	ND (0.001)	ND (0.0014)	ND (0.0014)	ND (0.0014)	ND (0.0017)
Xylene (Total)	0.001 J	ND (0.0014)	1.7	ND (0.0014)	ND (0.0017)

HA-01	02/08/2023 L2306883-01 HA-01 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-02 HA-01 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-03 HA-01 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-04 HA-01 (14-16) 14 - 16 (ft)
VOCs (mg/kg)				
Acetone	0.066	0.024	0.04	0.033

HA-17	02/08/2023 L2306883-13 HA-17 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-14 HA-17 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-15 HA-17 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-16 HA-17 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)				
4,4'-DDD	0.0106	ND (0.00191)	ND (0.00195)	ND (0.00193)
4,4'-DDE	0.00412	ND (0.00191)	ND (0.00195)	ND (0.00193)
4,4'-DDT	0.00609 J+	ND (0.00191)	ND (0.00195)	ND (0.00193)
VOCs (mg/kg)				
Acetone	0.16	0.062	0.08	0.055

HA-02	02/08/2023 L2306883-05 HA-02 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-06 HA-02 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-07 HA-02 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-08 HA-02 (14-16) 14 - 16 (ft)
PCBs (mg/kg)				
Polychlorinated biphenyls (PCBs)	0.147 J	ND (0.0378)	ND (0.0398)	ND (0.0364)
Pesticides (mg/kg)				
4,4'-DDD	0.0922	ND (0.00184)	ND (0.00191)	ND (0.00174)
4,4'-DDE	0.0155	ND (0.00184)	ND (0.00191)	ND (0.00174)
4,4'-DDT	0.0181 J+	ND (0.00184)	ND (0.00191)	ND (0.00174)
Dieldrin	0.00548 J+	ND (0.00115)	ND (0.0012)	ND (0.00109)
VOCs (mg/kg)				
Benzene	0.00058 J	0.00034 J	0.02	3.9
Ethylbenzene	ND (0.0013)	ND (0.00094)	0.0037	3.8
Naphthalene	ND (0.0052)	ND (0.0038)	ND (0.0072)	13
n-Propylbenzene	ND (0.0013)	ND (0.00094)	0.054	27
Toluene	ND (0.0013)	ND (0.00094)	0.0027	1.1
Xylene (Total)	ND (0.0013)	ND (0.00094)	0.014	2.8

HA-19	02/08/2023 L2306883-17 HA-19 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-18 HA-19 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-19 HA-19 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-27 DUP_1_02082023 10 - 12 (ft)	02/08/2023 L2306883-20 HA-19 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-21 HA-19 (20-22) 20 - 22 (ft)
Pesticides (mg/kg)						
4,4'-DDD	0.0462	0.038 J+	ND (0.00955)	ND (0.0018)	ND (0.0094)	ND (0.0018)
4,4'-DDE	0.0125 J+	0.00516 J	ND (0.00955)	ND (0.0018)	ND (0.0094)	ND (0.0018)
4,4'-DDT	ND (0.00201)	0.00587	ND (0.00955)	ND (0.0018)	ND (0.0094)	ND (0.0018)
Dieldrin	0.011 J+	0.00283	ND (0.00597)	ND (0.00112)	ND (0.00588)	ND (0.00113)
VOCs (mg/kg)						
2-Phenylbutane (sec-Butylbenzene)	ND (0.0012)	ND (0.0008)	0.6 J	0.18 J	23	0.00045 J
Acetone	0.12	0.028	ND (1.2)	ND (0.68)	ND (4.1)	0.035
Benzene	ND (0.00063)	0.0013	0.79 J	0.014 J	0.64	ND (0.00048)
Ethylbenzene	0.00074 J	0.0004 J	1.6 J	0.089 J	4.4	0.00014 J
Naphthalene	ND (0.005)	0.0015 J	1.5	0.4	25	0.0037 J
n-Butylbenzene	ND (0.0012)	ND (0.0008)	1.5	0.4	53	0.00093 J
n-Propylbenzene	0.00032 J	0.00018 J	3	1.2	160	0.0024
Toluene	0.002	0.0012	2.9	ND (0.068)	0.43	ND (0.00095)
Xylene (Total)	0.0097	0.0051	5.4	ND (0.068)	2	ND (0.00095)
PFAS (ng/g)						
Perfluorooctanesulfonic acid (PFOS)	1.13	0.461	0.273 J	0.709 J	0.503	ND (0.198)

HA-18	02/13/2023 L2307677-05 HA-18 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-06 HA-18 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-07 HA-18 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-09 DUP_1_02132023 10 - 12 (ft)	02/13/2023 L2307677-08 HA-18 (14-16) 14 - 16 (ft)
Pesticides (mg/kg)					
4,4'-DDD	0.06	0.148 J+	ND (0.0103)	ND (0.0335)	ND (0.00955)
4,4'-DDE	0.0266	0.0906 J+	ND (0.0103)	ND (0.0335)	ND (0.00955)
4,4'-DDT	0.0243 J+	0.0294 J+	ND (0.0103)	ND (0.0335)	ND (0.00955)
VOCs (mg/kg)					
Acetone	0.0067 J	0.021 J+	0.062	0.055 J	0.43 J
Benzene	ND (0.0006)	0.0002 J	ND (0.00084)	ND (0.00056) J	0.15

LEGEND

- SOIL BORING/MONITORING WELL
- SOIL BORING
- SITE BOUNDARY

Notes

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (UUSCOS) AND 40 CFR 261 SUBPART C AND TABLE 1 OF 40 CFR 261.24 AND NYSDEC PART3 375 PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVES (PGWSCOS) WHERE APPLICABLE
3. EXCEEDANCES OF UUSCOS SHADED IN GRAY
4. EXCEEDANCES OF PGWSCOS FOR COMPOUNDS DETECTED IN GROUNDWATER ABOVE THE NYSDEC AMBIENT WATER QUALITY STANDARDS (AWQS) ARE SHOWN IN BLUE AND BLACK ITALICS.
5. BLUE ITALICS INDICATE A COMPOUND DETECTED ABOVE THE PWGSCO IN A SOIL SAMPLE COLLECTED AT A CO-LOCATED MONITORING WELL LOCATION WITH THE CORRESPONDING COMPOUND FOUND IN GROUNDWATER ABOVE THE AWQS.
6. BLACK ITALICS INDICATE A COMPOUND DETECTED ABOVE THE PGWSCO IN A SOIL SAMPLE WHERE THE COMPOUND WAS NOT ALSO DETECTED IN GROUNDWATER AT THAT LOCATION BUT WAS DETECTED ELSEWHERE ON THE SITE IN GROUNDWATER ABOVE THE AWQS.
7. RESULTS ARE SHOWN IN MG/KG WITH EXCEPTION OF PFAS SHOWN IN NG/G.
8. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

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SCALE IN FEET

HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

SOIL RESULTS EXCEEDANCE MAP UUSCOS AND PGWSCOS - PCBS, PESTICIDES, VOCS, PFAS

JUNE 2023

FIGURE 4B

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_05_RIR\204090_000_07B3_SOIL_RESULTS_EXCEEDANCE_MAP_UUSCOS_AND_PCBs_PESTICIDES_VOCs_PFAS .mxd - khensen - 6/7/2023 2:40:57 PM

HA-05	02/02/2023 L2305934-05 HA-05 (2-4) 2 - 4 (ft)	02/02/2023 L2305934-06 HA-05 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-07 HA-05 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-08 HA-05 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	*1.2*	0.09 J	0.16	ND (0.11)
Benzo(a)pyrene	1.4	0.087 J	0.16	ND (0.15)
Benzo(b)fluoranthene	1.5	0.1 J	0.18	ND (0.11)
Chrysene	*1.2*	0.088 J	0.17	ND (0.11)
Indeno(1,2,3-cd)pyrene	0.84	0.05 J	0.085 J	ND (0.15)

HA-11	02/09/2023 L2307196-09 HA-11 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-10 HA-11 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-11 HA-11 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-12 HA-11 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	3.3	0.037 J	0.98	0.23
Benzo(a)pyrene	4.4	ND (0.16)	1.3	0.3
Benzo(b)fluoranthene	*5.1*	0.038 J	0.76	0.32
Benzo(k)fluoranthene	*1.9*	ND (0.12)	0.43	0.12
Chrysene	3.3	0.031 J	*1.3*	0.23
Dibenz(a,h)anthracene	0.66	ND (0.12)	0.43	0.042 J
Indeno(1,2,3-cd)pyrene	3.2	ND (0.16)	0.43	0.19

HA-07	02/09/2023 L2307196-01 HA-07 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-02 HA-07 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-03 HA-07 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-04 HA-07 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	*4.9*	0.026 J	*2.6*	0.5
Benzo(a)pyrene	5.5	ND (0.17)	2.2	1.1
Benzo(b)fluoranthene	*6.5*	ND (0.13)	*3*	0.97
Benzo(k)fluoranthene	*2.2*	ND (0.13)	0.83	0.38
Chrysene	*4.6*	0.024 J	*2.4*	0.47
Dibenz(a,h)anthracene	0.7	ND (0.13)	0.33	0.15
Indeno(1,2,3-cd)pyrene	3.4	ND (0.17)	1.7	0.7

HA-10	02/08/2023 L2306883-09 HA-10 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-10 HA-10 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-11 HA-10 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-12 HA-10 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	*1.8*	0.53 J	0.028 J	0.046 J
Benzo(a)pyrene	1.9	0.58 J	ND (0.16)	0.069 J
Benzo(b)fluoranthene	*2*	0.65	ND (0.12)	0.069 J
Chrysene	*1.7*	0.47 J	0.022 J	0.058 J
Indeno(1,2,3-cd)pyrene	1.2	0.48 J	ND (0.16)	0.039 J

HA-09	02/09/2023 L2307196-05 HA-09 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-06 HA-09 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-07 HA-09 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-08 HA-09 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	0.12	*3.3*	0.11 J	0.1 J
Benzo(a)pyrene	0.13 J	3.4	0.12 J	0.1 J
Benzo(b)fluoranthene	0.14	*4.3*	0.13	0.13
Benzo(k)fluoranthene	0.062 J	1.3	0.048 J	0.035 J
Chrysene	0.12	*3.2*	0.11 J	0.097 J
Dibenz(a,h)anthracene	ND (0.11)	0.51	ND (0.12)	ND (0.12)
Indeno(1,2,3-cd)pyrene	0.074 J	2.3	0.072 J	0.062 J

HA-12	02/09/2023 L2307196-13 HA-12 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-14 HA-12 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-15 HA-12 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-16 HA-12 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
3&4-Methylphenol	ND (0.28)	0.46	0.29	ND (0.28)
Benzo(a)anthracene	0.084 J	*7.2*	*7.2*	0.094 J
Benzo(a)pyrene	0.1 J	6.8	7.3	0.097 J
Benzo(b)fluoranthene	0.11 J	*7.3*	*8.2*	0.11 J
Benzo(k)fluoranthene	0.043 J	*2.9*	*3.4*	0.038 J
Chrysene	0.083 J	*7.4*	*7.8*	0.091 J
Dibenz(a,h)anthracene	ND (0.12)	0.96	1	ND (0.12)
Indeno(1,2,3-cd)pyrene	0.062 J	4	4.6	0.065 J

HA-04	02/02/2023 L2305934-01 HA-04 (2-4) 2 - 2 (ft)	02/02/2023 L2305934-02 HA-04 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-09 DUP_1_02022023 6 - 8 (ft)	02/02/2023 L2305934-03 HA-04 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-04 HA-04 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)					
Benzo(a)anthracene	*1.5*	ND (0.12)	0.1 J	0.034 J	ND (0.6)
Benzo(a)pyrene	1.5	ND (0.16)	0.12 J	ND (0.18)	ND (0.81)
Benzo(b)fluoranthene	*2.2*	0.034 J	0.14	0.055 J	ND (0.6)
Chrysene	*1.6*	0.029 J	0.12	0.032 J	ND (0.6)
Indeno(1,2,3-cd)pyrene	1.6	ND (0.16)	0.089 J	0.052 J	ND (0.81)

HA-08	02/01/2023 L2305570-05 HA-08 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-06 HA-08 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-07 HA-08 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-08 HA-08 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
3&4-Methylphenol	ND (0.26)	ND (0.26)	1.4	0.33 J
Benzo(a)anthracene	*6.6*	0.21	0.086 J	ND (0.43)
Benzo(a)pyrene	6.4	0.18	0.062 J	ND (0.58)
Benzo(b)fluoranthene	*9.4*	0.2	0.076 J	ND (0.43)
Benzo(k)fluoranthene	*2.7*	0.072 J	ND (0.13)	ND (0.43)
Chrysene	*8*	0.18	0.09 J	ND (0.43)
Dibenz(a,h)anthracene	0.89	0.023 J	ND (0.13)	ND (0.43)
Indeno(1,2,3-cd)pyrene	4.5	0.088 J	0.092 J	ND (0.58)

HA-03	02/10/2023 L2307511-01 HA-03 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-02 HA-03 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-03 HA-03 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-04 HA-03 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	0.21	*1.2*	*20*	ND (0.11)
Benzo(a)pyrene	0.26	1.5	19	ND (0.15)
Benzo(b)fluoranthene	0.32	*1.9*	*18*	ND (0.11)
Benzo(k)fluoranthene	0.091 J	0.54	*4*	ND (0.11)
Chrysene	0.21	*1.2*	*19*	ND (0.11)
Dibenz(a,h)anthracene	0.04 J	0.25	1.8	ND (0.11)
Indeno(1,2,3-cd)pyrene	0.19	1.2	*8.6*	ND (0.15)

HA-13	02/13/2023 L2307677-01 HA-13 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-02 HA-13 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-03 HA-13 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-04 HA-13 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	*1.5*	*1.9*	0.34	0.63
Benzo(a)pyrene	1.4	2	0.41	0.77
Benzo(b)fluoranthene	*1.8*	*2.1*	0.47	0.8
Benzo(k)fluoranthene	0.72	0.87	0.19	0.32
Chrysene	*1.4*	*1.8*	0.4	0.65
Indeno(1,2,3-cd)pyrene	1.1	1.4	0.26	0.48

HA-20	02/10/2023 L2307511-05 HA-20 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-06 HA-20 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-07 HA-20 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-08 HA-20 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Indeno(1,2,3-cd)pyrene	0.58	0.064 J	0.46	0.049 J

HA-21	02/08/2023 L2306883-22 HA-21 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-23 HA-21 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-24 HA-21 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-25 HA-21 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-26 HA-21 (20-22) 20 - 22 (ft)
SVOCs (mg/kg)					
Benzo(a)anthracene	*1.9*	*5.4*	0.11 J	0.17 J	0.035 J
Benzo(a)pyrene	2.4	4.4	0.15 J	0.18 J	ND (0.18)
Benzo(b)fluoranthene	*2.8*	*5.2*	0.16 J	0.2 J	ND (0.14)
Benzo(k)fluoranthene	1	1.4	ND (0.34)	ND (0.37)	ND (0.14)
Chrysene	*2*	*4.8*	0.078 J	0.14 J	0.028 J
Dibenz(a,h)anthracene	0.35	0.55	ND (0.34)	ND (0.37)	ND (0.14)
Indeno(1,2,3-cd)pyrene	1.7	2.6	0.13 J	0.13 J	ND (0.18)

HA-06	02/01/2023 L2305570-01 HA-06 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-02 HA-06 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-03 HA-06 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-04 HA-06 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	*3.5*	0.19	0.28	*1.4*
Benzo(a)pyrene	3.7	0.24	0.23	1.7
Benzo(b)fluoranthene	*3.4*	0.27	0.26	1.2
Benzo(k)fluoranthene	1.2	0.09 J	0.09 J	0.46
Chrysene	*3.6*	0.17	0.26	*1.3*
Dibenz(a,h)anthracene	0.43	0.024 J	0.034 J	0.14
Indeno(1,2,3-cd)pyrene	2.7	0.099 J	0.12 J	0.61

HA-14	02/01/2023 L2305570-09 HA-14 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-10 HA-14 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-11 HA-14 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-12 HA-14 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
3&4-Methylphenol	ND (0.26)	ND (0.28)	ND (0.26)	0.3
Benzo(a)anthracene	*2.2*	0.051 J	0.051 J	0.71
Benzo(a)pyrene	2.1	0.05 J	0.046 J	0.79
Benzo(b)fluoranthene	*2.5*	0.058 J	0.044 J	0.86
Chrysene	*2.2*	0.046 J	0.045 J	0.66
Indeno(1,2,3-cd)pyrene	1.4	0.033 J	0.026 J	0.35 J

HA-18	02/13/2023 L2307677-05 HA-18 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-06 HA-18 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-07 HA-18 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-09 DUP_1_02132023 10 - 12 (ft)	02/13/2023 L2307677-08 HA-18 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)					
Benzo(a)anthracene	*1.8*	0.97	0.14	0.021 J	0.086 J
Benzo(a)pyrene	1.9	1.1	0.16 J	ND (0.15)	0.13 J
Benzo(b)fluoranthene	*2.1*	1.3	0.19	ND (0.11)	0.12
Chrysene	*1.7*	*1.1*	0.15	ND (0.11)	0.095 J
Indeno(1,2,3-cd)pyrene	1.2	0.78	0.12 J	ND (0.15)	0.096 J

HA-02	02/08/2023 L2306883-05 HA-02 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-06 HA-02 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-07 HA-02 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-08 HA-02 (14-16) 14 - 16 (ft)
SVOCs (mg/kg)				
Benzo(a)anthracene	*4*	0.32	0.14	0.086 J
Benzo(a)pyrene	3.8	0.28	0.11 J	0.13 J
Benzo(b)fluoranthene	*4.2*	0.33	0.13	0.13
Benzo(k)fluoranthene	1	0.11 J	0.038 J	0.058 J
Chrysene	*3.7*	0.34	0.13	0.084 J
Dibenz(a,h)anthracene	0.54	0.042 J	ND (0.12)	0.031 J
Indeno(1,2,3-cd)pyrene	2.4	0.18	0.075 J	0.11 J

HA-19	02/08/2023 L2306883-17 HA-19 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-18 HA-19 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-19 HA-19 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-27 DUP_1_02082023 10 - 12 (ft)	02/08/2023 L2306883-20 HA-19 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-21 HA-19 (20-22) 20 - 22 (ft)
SVOCs (mg/kg)						
Indeno(1,2,3-cd)pyrene	0.31	0.64	0.68	ND (0.15)	0.13 J	ND (0.43)

LEGEND

- SOIL BORING/MONITORING WELL
- SOIL BORING
- SITE BOUNDARY

Notes

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (UUSCOS) AND 40 CFR 261 SUBPART C AND TABLE 1 OF 40 CFR 261.24 AND NYSDEC PART3 375 PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVES (PGWSCOS) WHERE APPLICABLE

3. EXCEEDANCES OF UUSCOS SHADED IN GRAY

4. EXCEEDANCES OF PGWSCOS FOR COMPOUNDS DETECTED IN GROUNDWATER ABOVE THE NYSDEC AMBIENT WATER QUALITY STANDARDS (AWQS) ARE SHOWN IN BLUE AND BLACK ITALICS.

5. BLUE ITALICS INDICATE A COMPOUND DETECTED ABOVE THE PWGSCO IN A SOIL SAMPLE COLLECTED AT A CO-LOCATED MONITORING WELL LOCATION WITH THE CORRESPONDING COMPOUND FOUND IN GROUNDWATER ABOVE THE AWQS.

6. BLACK ITALICS INDICATE A COMPOUND DETECTED ABOVE THE PGWSCO IN A SOIL SAMPLE WHERE THE COMPOUND WAS NOT ALSO DETECTED IN GROUNDWATER AT THAT LOCATION BUT WAS DETECTED ELSEWHERE ON THE SITE IN GROUNDWATER ABOVE THE AWQS.

7. RESULTS ARE SHOWN IN MG/KG.

8. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 40 80

SCALE IN FEET

HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

SOIL RESULTS EXCEEDANCES MAP UUSCOS AND PGWSCOS - SVOCS

JUNE 2023

FIGURE 4C

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_05_RIR\204090_000_07B2_SOIL_RESULTS_EXCEEDANCE_MAP_UUSCOS_AND_PGWSCOS_SVOCs.mxd - khensen - 6/7/2023 2:38:33 PM

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_05_RIR\204090_000_07B1_SOIL_RESULTS_EXCEEDANCE_MAP_UUSCOS_AND_PGWSCOS_METALS.mxd - khensen - 6/8/2023 7:07:28 AM

HA-24

	02/02/2023 L2305935-01 HA-24 (0-2) 0 - 2 (ft)	02/02/2023 L2305935-02 HA-24 (2-4) 2 - 4 (ft)	02/02/2023 L2305935-03 HA-24 (4-6) 4 - 6 (ft)
Total Metals (mg/kg)			
Lead	33.7	31.3	387

HA-11

	02/09/2023 L2307196-09 HA-11 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-10 HA-11 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-11 HA-11 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-12 HA-11 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	6.33	4.73	19.8	6.5
Copper	47.3	15.4	121	19
Lead	238	44.2	5320	112
Mercury	0.913	0.243	2.05	0.178
Zinc	218	39.3	173	49

HA-07

	02/09/2023 L2307196-01 HA-07 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-02 HA-07 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-03 HA-07 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-04 HA-07 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	4.86	4.54	23.4	4.92
Barium	130	133	676	106
Copper	36.2	73.7	63.9	37
Lead	212	321	434	204
Mercury	0.564	1.04	1.92	0.59
Selenium	0.35 J	0.633 J	0.56 J	0.88
Zinc	198	79.6	295	188

HA-10

	02/08/2023 L2306883-09 HA-10 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-10 HA-10 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-11 HA-10 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-12 HA-10 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	11.2	5.39	5.23	28.3
Lead	382	47	178	510
Mercury	0.557	0.1 J	0.428	0.503
Selenium	0.236 J	ND (2.03)	ND (1.82)	4.07
Zinc	62.2	48.8	45.2	128

HA-05

	02/02/2023 L2305934-05 HA-05 (2-4) 2 - 4 (ft)	02/02/2023 L2305934-06 HA-05 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-07 HA-05 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-08 HA-05 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Copper	62.2	122	31.9	10.2
Lead	129	358	245	30.1
Mercury	0.286	0.362	0.387	0.117
Zinc	99.6	586	89.9	26.8

HA-09

	02/09/2023 L2307196-05 HA-09 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-06 HA-09 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-07 HA-09 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-08 HA-09 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Lead	13.2	324	16.3	128
Mercury	ND (0.077)	1.15	ND (0.087)	0.22
Nickel	9.02	15	32	18.6
Zinc	21.5	463	55.4	51.1

HA-16

	02/01/2023 L2305570-17 HA-16 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-18 HA-16 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-19 HA-16 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-20 HA-16 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Lead	112	49.4	89.5	75
Mercury	0.2	0.142	0.059 J	0.171
Nickel	11.4	36.2	11.3	29.4

HA-12

	02/09/2023 L2307196-13 HA-12 (2-4) 2 - 4 (ft)	02/09/2023 L2307196-14 HA-12 (6-8) 6 - 8 (ft)	02/09/2023 L2307196-15 HA-12 (10-12) 10 - 12 (ft)	02/09/2023 L2307196-16 HA-12 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	39	9.72	8.07	5.04
Copper	47.9	52.8	11.8	22.4
Lead	223	371	434	59.8
Mercury	0.868	2.31	0.236	0.087
Zinc	109	245	58.1	47.8

HA-04

	02/02/2023 L2305934-01 HA-04 (2-4) 2 - 2 (ft)	02/02/2023 L2305934-02 HA-04 (6-8) 6 - 8 (ft)	02/02/2023 L2305934-09 DUP_1_02022023 6 - 8 (ft)	02/02/2023 L2305934-03 HA-04 (10-12) 10 - 12 (ft)	02/02/2023 L2305934-04 HA-04 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)					
Arsenic	5.34 J+	26.6 J+	4.98 J+	20.8 J+	29 J+
Barium	146 J+	510 J+	90.2 J+	239 J+	235 J+
Copper	34.8	89.1 J	30.1 J	51.1	77.7
Lead	230	746 J	394 J	1480	586
Mercury	1.05	1.11	0.79	1.76	0.633
Zinc	138	831	196 J	117	157

HA-08

	02/01/2023 L2305570-05 HA-08 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-06 HA-08 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-07 HA-08 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-08 HA-08 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	6.88	4.66	13.9	8.41
Copper	59.3	71.7	41.8	29.7
Lead	198	753	1620	243
Mercury	0.577	0.156	1.63	0.208
Nickel	44.2	50.3	12.6	10.4
Zinc	218	772	126	59

HA-03

	02/10/2023 L2307511-01 HA-03 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-02 HA-03 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-03 HA-03 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-04 HA-03 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Lead	67.1	208	237	59.5
Mercury	0.104	0.503	1.25	0.158
Zinc	150	206	93	35.4

HA-13

	02/13/2023 L2307677-01 HA-13 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-02 HA-13 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-03 HA-13 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-04 HA-13 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	8.6	7.04	22.9	11
Copper	57.7 J-	32.1 J-	54.7 J-	28.3 J-
Lead	379	766	286	109
Mercury	2.36 J-	1.43 J-	1.3 J-	0.876 J-
Zinc	349	735	294	41.6

HA-20

	02/10/2023 L2307511-05 HA-20 (2-4) 2 - 4 (ft)	02/10/2023 L2307511-06 HA-20 (6-8) 6 - 8 (ft)	02/10/2023 L2307511-07 HA-20 (10-12) 10 - 12 (ft)	02/10/2023 L2307511-08 HA-20 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	12.5	19	5.64	13.7
Copper	52.2	31.3	23.2	17.6
Lead	335	476	1120	91.8
Mercury	0.139	0.142	0.338	1.11
Zinc	367	191	95.4	55.4

HA-25

	02/02/2023 L2305935-04 HA-25 (10-12) 10 - 12 (ft)	02/02/2023 L2305935-05 HA-25 (12-14) 12 - 14 (ft)	02/02/2023 L2305935-06 HA-25 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)			
Mercury	0.337	0.505	1.07

HA-21

	02/08/2023 L2306883-22 HA-21 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-23 HA-21 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-24 HA-21 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-25 HA-21 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-26 HA-21 (20-22) 20 - 22 (ft)
Total Metals (mg/kg)					
Arsenic	10.9	16.9	14.8	25.9	11.5
Copper	94.3	64.4	24	43.8	29.4
Lead	305	1760	298	520	486
Mercury	0.228	0.905	0.663	1.32	5.12
Nickel	31.1	33.7	7.63	9.17	26.7
Selenium	0.313 J	6.31	1.17 J	1.79 J	0.511 J
Zinc	216	321	169	157	86.4

HA-14

	02/01/2023 L2305570-09 HA-14 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-10 HA-14 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-11 HA-14 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-12 HA-14 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	11.3	5.42	3.02	28.9
Barium	613	46.3	61.8	175
Copper	87.1	15.8	23.2	184
Lead	1020	65	20	573
Mercury	0.889	0.214	1.28	ND (0.104)
Nickel	74	18.3	26.5	13.1
Zinc	638	48.5	52.2	110

HA-17

	02/08/2023 L2306883-13 HA-17 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-14 HA-17 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-15 HA-17 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-16 HA-17 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Copper	55.6	19.5	13.3	23.3
Lead	314	21.2	11.9	188
Mercury	0.714	0.1	ND (0.081)	0.276
Nickel	16.9	33.7	15.8	29
Zinc	178	37.2	23.9	43.7

HA-15

	02/01/2023 L2305570-13 HA-15 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-14 HA-15 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-15 HA-15 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-16 HA-15 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Barium	189	56.3	642	109
Lead	228	123	1570	134
Mercury	0.573	0.334	7.21	0.667
Nickel	25.5	34.3	10.4	16
Zinc	166	53.4	2120	336

HA-06

	02/01/2023 L2305570-01 HA-06 (2-4) 2 - 4 (ft)	02/01/2023 L2305570-02 HA-06 (6-8) 6 - 8 (ft)	02/01/2023 L2305570-03 HA-06 (10-12) 10 - 12 (ft)	02/01/2023 L2305570-04 HA-06 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	33.9	3.54	4.93	5.8
Copper	132	16.5	24.4	24.2
Lead	322	82.4	117	194
Mercury	1.41	0.2	0.755	0.233
Nickel	37	20.2	24.5	29.6
Zinc	126	48	60.4	62.7

HA-01

	02/08/2023 L2306883-01 HA-01 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-02 HA-01 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-03 HA-01 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-04 HA-01 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Lead	114	550	129	64.5
Mercury	0.241	0.616	0.17	0.585
Zinc	178	60.8	30.7	41.6

HA-26

	02/10/2023 L2307512-01 HA-26 (11-13) 11 - 13 (ft)	02/10/2023 L2307512-04 DUP-1_02102023 11 - 13 (ft)	02/10/2023 L2307512-02 HA-26 (13-15) 13 - 15 (ft)	02/10/2023 L2307512-05 DUP-2_02102023 13 - 15 (ft)	02/10/2023 L2307512-03 HA-26 (15-17) 15 - 17 (ft)
Total Metals (mg/kg)					
Mercury	0.502 J+	0.162 J+	7.1 J+	1.84 J+	0.352 J+

HA-18

	02/13/2023 L2307677-05 HA-18 (2-4) 2 - 4 (ft)	02/13/2023 L2307677-06 HA-18 (6-8) 6 - 8 (ft)	02/13/2023 L2307677-07 HA-18 (10-12) 10 - 12 (ft)	02/13/2023 L2307677-09 DUP_1_02132023 10 - 12 (ft)	02/13/2023 L2307677-08 HA-18 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)					
Arsenic	11.7	7.34	17	19.3	8.17
Copper	76.7 J-	58.6 J-	324 J-	475 J-	24.8 J-
Lead	997	228	518	1220	142
Mercury	0.769 J-	0.376 J-	11.7 J-	5.28 J-	0.638 J-
Silver	ND (0.44)	ND (0.444)	5.37	1.43 J	0.451 J
Zinc	308	211	64.1 J	160 J	49.9

HA-02

	02/08/2023 L2306883-05 HA-02 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-06 HA-02 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-07 HA-02 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-08 HA-02 (14-16) 14 - 16 (ft)
Total Metals (mg/kg)				
Arsenic	9.27	51	4.25	5.35
Copper	155	323	12.4	76.4
Lead	1850	3070	57.1	183
Mercury	0.515	3.22	0.102	0.728
Nickel	34.5	15.6	12.4	6.77
Zinc	576	414	54.8	144J

HA-19

	02/08/2023 L2306883-17 HA-19 (2-4) 2 - 4 (ft)	02/08/2023 L2306883-18 HA-19 (6-8) 6 - 8 (ft)	02/08/2023 L2306883-19 HA-19 (10-12) 10 - 12 (ft)	02/08/2023 L2306883-27 DUP_1_02082023 10 - 12 (ft)	02/08/2023 L2306883-20 HA-19 (14-16) 14 - 16 (ft)	02/08/2023 L2306883-21 HA-19 (20-22) 20 - 22 (ft)
Total Metals (mg/kg)						
Arsenic	7.95	6.96	15.3	15.4	14.1	3.42
Copper	65.1	31.6	24	22.6	28	17.3
Lead	579	259	602 J	1010 J	677	34.2
Mercury	0.473	0.343	15.4	0.858	1.51	ND (0.077)
Nickel	20.6	12.5	13.6	10.8	9.95	31.8
Silver	0.484 J	0.306 J	0.477	ND (0.454)	4.34	ND (0.438)
Zinc	247	110	194	273	3450	37.4

LEGEND

- SOIL BORING/MONITORING WELL
- SOIL BORING
- SITE BOUNDARY

Notes

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (UUSCOS) AND 40 CFR 261 SUBPART C AND TABLE 1 OF 40 CFR 261.24 AND NYSDEC PART3 375 PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVES (PGWSCOS) WHERE APPLICABLE
3. EXCEEDANCES OF UUSCOS SHADED IN GRAY
4. EXCEEDANCES OF PGWSCOS FOR COMPOUNDS DETECTED IN GROUNDWATER ABOVE THE NYSDEC AMBIENT WATER QUALITY STANDARDS (AWQS) WERE NOT OBSERVED.
5. RESULTS ARE SHOWN IN MG/KG.
6. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

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SCALE IN FEET

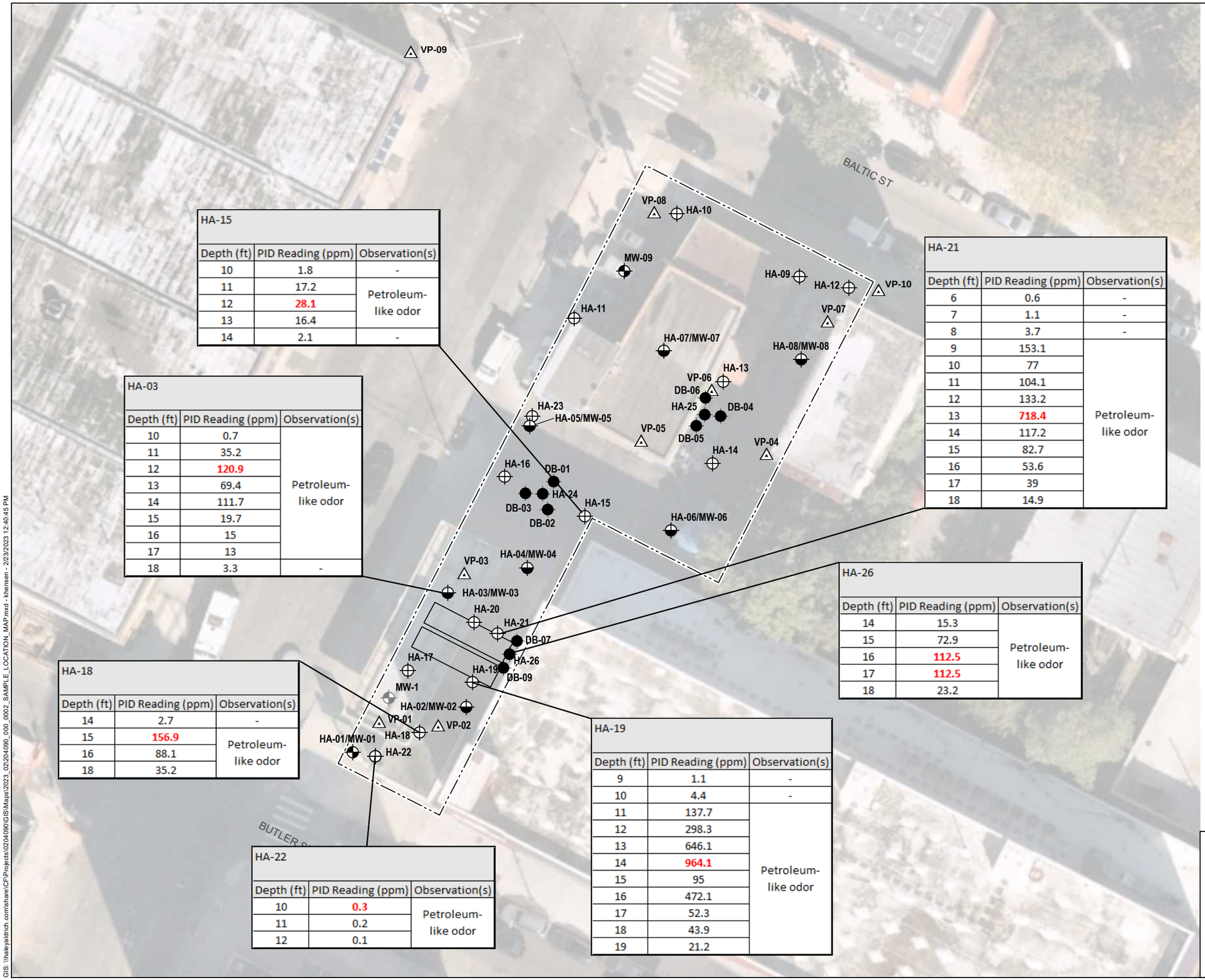
HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

SOIL RESULTS EXCEEDANCE MAP UUSCOS AND PGWSCOS - METALS

JUNE 2023

FIGURE 4D



HA-15

Depth (ft)	PID Reading (ppm)	Observation(s)
10	1.8	-
11	17.2	Petroleum-like odor
12	**28.1**	
13	16.4	
14	2.1	-

HA-03

Depth (ft)	PID Reading (ppm)	Observation(s)
10	0.7	Petroleum-like odor
11	35.2	
12	**120.9**	
13	69.4	
14	111.7	
15	19.7	
16	15	
17	13	
18	3.3	-

HA-21

Depth (ft)	PID Reading (ppm)	Observation(s)
6	0.6	-
7	1.1	-
8	3.7	-
9	153.1	Petroleum-like odor
10	77	
11	104.1	
12	133.2	
13	**718.4**	
14	117.2	
15	82.7	
16	53.6	
17	39	
18	14.9	

HA-26

Depth (ft)	PID Reading (ppm)	Observation(s)
14	15.3	Petroleum-like odor
15	72.9	
16	**112.5**	
17	**112.5**	
18	23.2	

HA-18

Depth (ft)	PID Reading (ppm)	Observation(s)
14	2.7	-
15	**156.9**	Petroleum-like odor
16	88.1	
18	35.2	

HA-19

Depth (ft)	PID Reading (ppm)	Observation(s)
9	1.1	-
10	4.4	-
11	137.7	Petroleum-like odor
12	298.3	
13	646.1	
14	**964.1**	
15	95	
16	472.1	
17	52.3	
18	43.9	
19	21.2	

HA-22

Depth (ft)	PID Reading (ppm)	Observation(s)
10	**0.3**	Petroleum-like odor
11	0.2	
12	0.1	

LEGEND

- FORMER MONITORING WELL
- MONITORING WELL
- SOIL BORING/MONITORING WELL
- SOIL BORING
- SOIL VAPOR
- UST LOCATION
- SITE BOUNDARY
- DELINEATION SOIL BORING

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021
3. PID = PHOTOIONIZATION DETECTOR
4. PID RESULTS IN PARTS PER MILLION (ppm)
5. MAXIMUM PID READINGS ARE SHOWN IN BOLD RED

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SCALE IN FEET

HALEY ALDRICH

556 BALTIC STREET
BROOKLYN, NY

FIELD SCREENING OBSERVATIONS

MARCH 2023

FIGURE 4E

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_02\204090_000_0002_SAMPLE_LOCATION_MAP.mxd - khensen - 2/23/2023 12:40:45 PM

MW-05	02/10/2023 L2307510-02
Metals	
Iron, Dissolved	304
Iron, Total	3110
Manganese, Dissolved	384.3
Manganese, Total	386.5
Sodium, Dissolved	84400 J+
Sodium, Total	85600
Semi-Volatile Organic Compounds	
Benzo(a)anthracene	0.14 J+
Benzo(a)pyrene	0.12 J+
Benzo(b)fluoranthene	0.16 J+
Benzo(k)fluoranthene	0.05 J
Chrysene	0.11
Indeno(1,2,3-cd)pyrene	0.08 J

MW-09	02/16/2023 L2308425-04
Metals	
Iron, Total	2140
Sodium, Dissolved	151000
Sodium, Total	154000
Semi-Volatile Organic Compounds	
Benzo(a)anthracene	0.03 J
Benzo(a)pyrene	0.02 J
Benzo(b)fluoranthene	0.02 J
Benzo(k)fluoranthene	0.01 J
Chrysene	0.01 J

MW-07	02/16/2023 L2308425-03
Metals	
Iron, Dissolved	802
Iron, Total	983
Sodium, Dissolved	23200
Sodium, Total	23200
Volatile Organic Compounds	
cis-1,2-Dichloroethene	5.3

MW-04	02/10/2023 L2307510-03
Metals	
Iron, Dissolved	1560
Iron, Total	4220
Manganese, Dissolved	588.6
Manganese, Total	617.9
Sodium, Dissolved	86700 J+
Sodium, Total	89800

MW-08	02/10/2023 L2307510-01
Metals	
Iron, Total	3330
Manganese, Total	335.5
Sodium, Dissolved	20500 J+
Sodium, Total	23600
Semi-Volatile Organic Compounds	
Benzo(b)fluoranthene	0.1 J+
Benzo(k)fluoranthene	0.04 J
Chrysene	0.08 J
Indeno(1,2,3-cd)pyrene	0.05 J

MW-03	02/16/2023 L2308425-02
Metals	
Iron, Dissolved	634
Iron, Total	10500
Manganese, Dissolved	823
Manganese, Total	920
Sodium, Dissolved	246000
Sodium, Total	261000
Semi-Volatile Organic Compounds	
Benzo(a)anthracene	0.14
Benzo(a)pyrene	0.13
Benzo(b)fluoranthene	0.15
Benzo(k)fluoranthene	0.05 J
Chrysene	0.13
Indeno(1,2,3-cd)pyrene	0.08 J
Volatile Organic Compounds	
1,2,4,5-Tetramethylbenzene	9.8
1,2,4-Trimethylbenzene	33
1,3,5-Trimethylbenzene	13
Ethylbenzene	15
m,p-Xylenes	13
n-Butylbenzene	6.8
n-Propylbenzene	14
Xylene (Total)	14 J

MW-06	02/09/2023 L2307194-01	02/09/2023 L2307194-02
Metals		
Iron, Total	1080	995
Manganese, Dissolved	333.2	321.8
Manganese, Total	328.7	324.4

MW-02	02/10/2023 L2307510-04
Metals	
Iron, Dissolved	1550
Iron, Total	5040
Manganese, Dissolved	657.8
Manganese, Total	668.3
Sodium, Dissolved	80900 J+
Sodium, Total	86200
Semi-Volatile Organic Compounds	
Phenol	1.5 J
Volatile Organic Compounds	
1,2,4,5-Tetramethylbenzene	63
2-Phenylbutane (sec-Butylbenzene)	22
Benzene	170
Ethylbenzene	19
Isopropylbenzene (Cumene)	140
m,p-Xylenes	12
Methyl Tert Butyl Ether (MTBE)	12
Naphthalene	13
n-Butylbenzene	19
n-Propylbenzene	220
Xylene (Total)	15 J

MW-01	02/16/2023 L2308425-01
Metals	
Iron, Total	11200
Manganese, Dissolved	1043
Manganese, Total	1092
Sodium, Dissolved	559000
Sodium, Total	591000
Semi-Volatile Organic Compounds	
Benzo(b)fluoranthene	0.01 J

MW-09
HA-07/MW-07
HA-08/MW-08
HA-05/MW-05
HA-06/MW-06
HA-04/MW-04
HA-03/MW-03
HA-02/MW-02
HA-01/MW-01
BALTIC ST
3RD AVE
BUTLER ST

LEGEND

MONITORING WELL

SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. GROUNDWATER SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION(NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS (AWQS)
3. ALL RESULTS SHOWN EXCEED THE NYSDEC AWQS.
4. RESULTS ARE DISPLAYED IN MICROGRAMS PER LITER (ug/L).
5. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021
6. IRON, MANGANESE AND SODIUM ARE NATURALLY OCCURRING METALS AND WILL NOT BE ADDRESSED BY THE REMEDY.

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SCALE IN FEET

HALEY ALDRICH

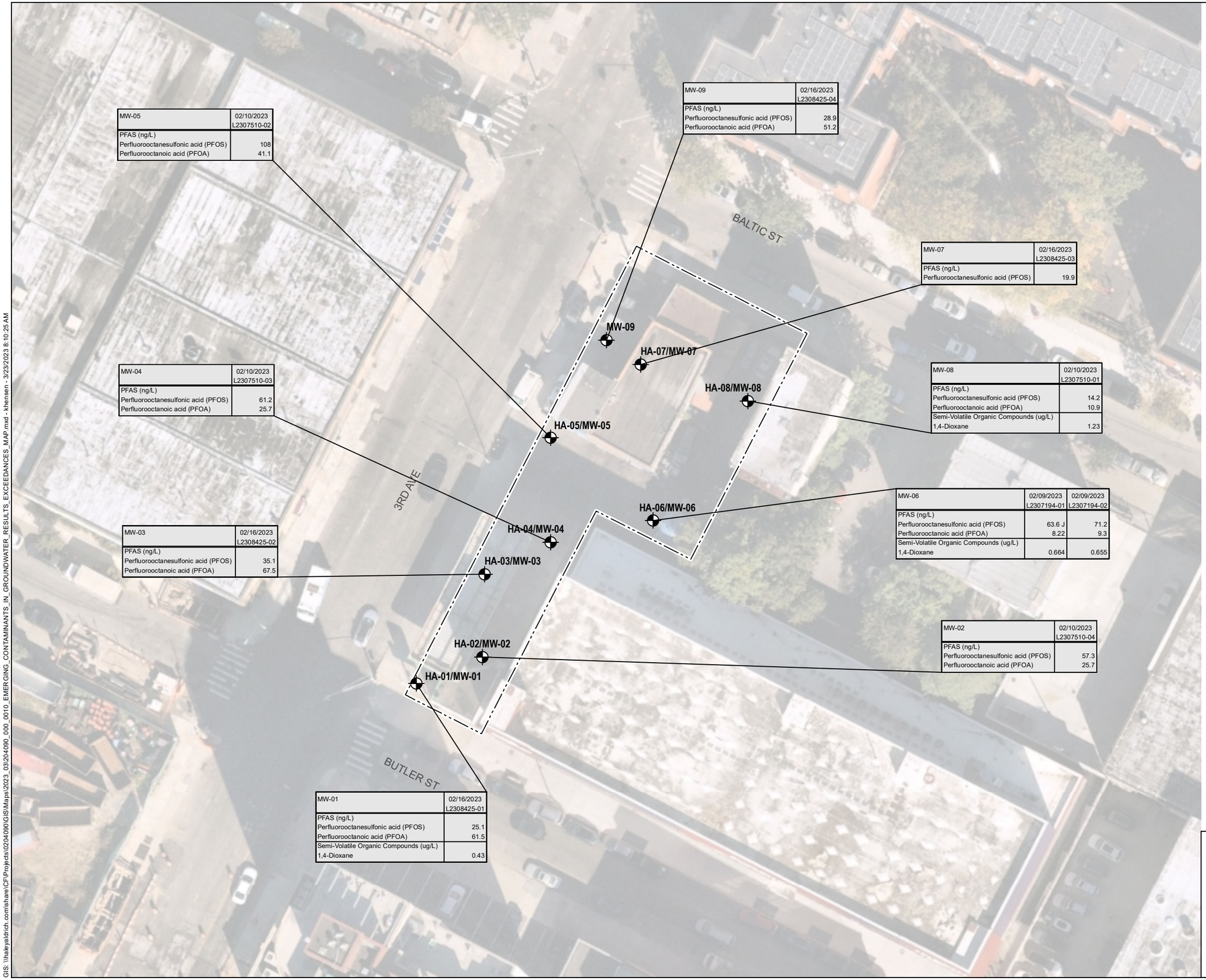
556 BALTIC STREET
BROOKLYN, NY

GROUNDWATER RESULTS EXCEEDANCE MAP

MARCH 2023

FIGURE 5

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_03\204090_000_0009_GROUNDWATER_RESULTS_EXCEEDANCE_MAP.mxd - khensen - 3/22/2023 3:28:37 PM



LEGEND

MONITORING WELL

SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. EMERGING CONTAMINANTS ANALYTICAL RESULTS COMPARED TO THE NYSDEC FEBRUARY 2023 GUIDANCE VALUES (NYSDEC GV) FOR PFOA, PFOS, AND 1,4-DIOXANE.

3. PFAS RESULTS SHOWN IN NG/L. 1,4-DIOXANE RESULTS SHOWN IN MICROGRAMS PER LITER (µg/L).

4. ONLY EXCEEDANCES SHOWN FIGURE.

5. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

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SCALE IN FEET

HALEY ALDRICH

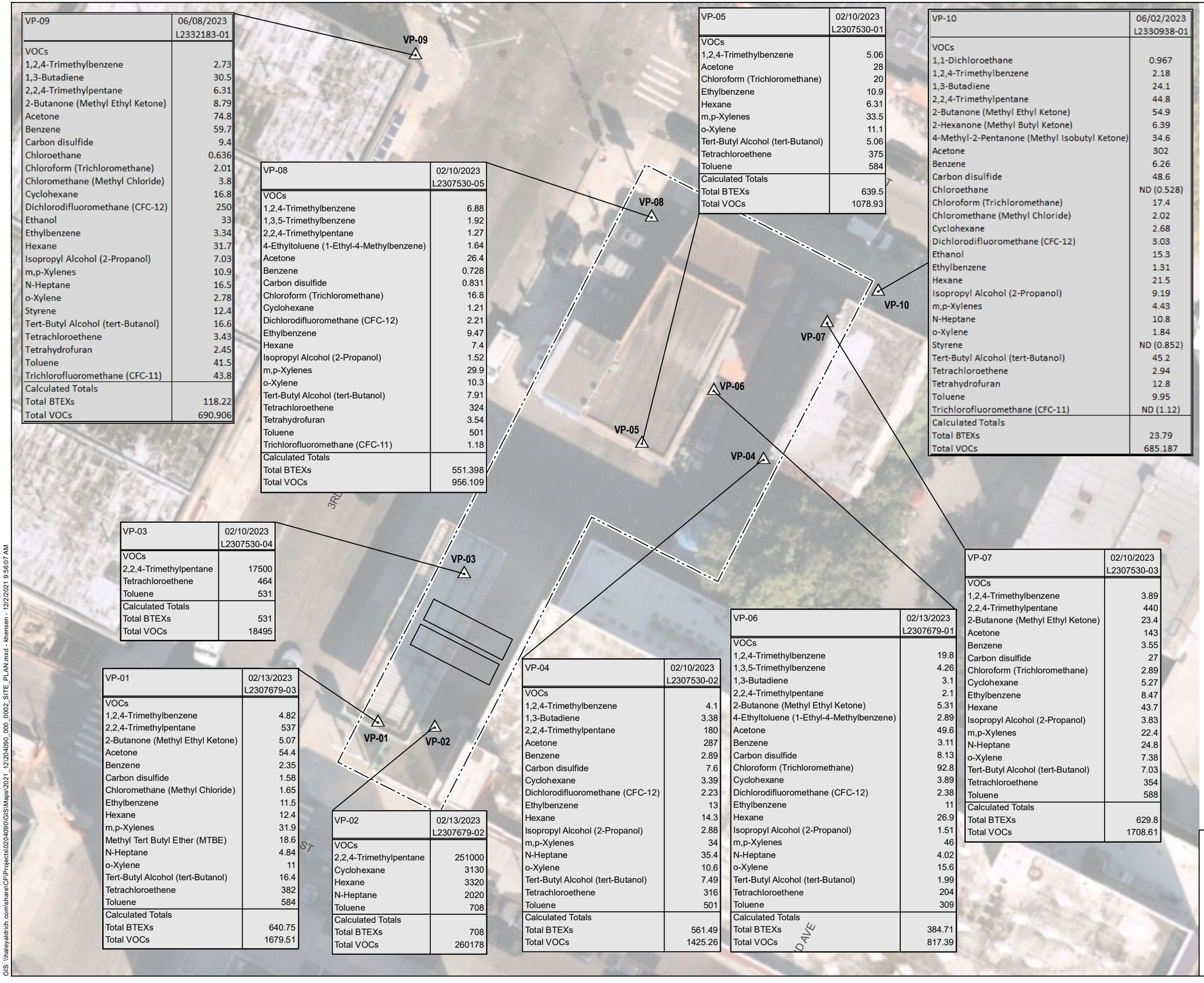
556 BALTIC STREET
BROOKLYN, NY

EMERGING CONTAMINANTS IN GROUNDWATER RESULTS EXCEEDANCES MAP

MARCH 2023

FIGURE 6

GIS: \\haleyaldrich.com\share\CF\Projects\02040090\GIS\Maps\2023_03\204090_000_0010_EMERGING_CONTAMINANTS_IN_GROUNDWATER_RESULTS_EXCEEDANCES_MAP.mxd - khensen - 3/23/2023 8:10:25 AM



VP-09	06/08/2023 L2332183-01
VOCs	
1,2,4-Trimethylbenzene	2.73
1,3-Butadiene	30.5
2,2,4-Trimethylpentane	6.31
2-Butanone (Methyl Ethyl Ketone)	8.79
Acetone	74.8
Benzene	59.7
Carbon disulfide	9.4
Chloroethane	0.636
Chloroform (Trichloromethane)	2.01
Chloromethane (Methyl Chloride)	3.8
Cyclohexane	16.8
Dichlorodifluoromethane (CFC-12)	250
Ethanol	33
Ethylbenzene	3.34
Hexane	31.7
Isopropyl Alcohol (2-Propanol)	7.03
m,p-Xylenes	10.9
N-Heptane	16.5
o-Xylene	2.78
Styrene	12.4
Tert-Butyl Alcohol (tert-Butanol)	16.6
Tetrachloroethene	3.43
Tetrahydrofuran	2.45
Toluene	41.5
Trichlorofluoromethane (CFC-11)	43.8
Calculated Totals	
Total BTEXs	118.22
Total VOCs	690.906

VP-08	02/10/2023 L2307530-05
VOCs	
1,2,4-Trimethylbenzene	6.88
1,3,5-Trimethylbenzene	1.92
2,2,4-Trimethylpentane	1.27
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	1.64
Acetone	26.4
Benzene	0.728
Carbon disulfide	0.831
Chloroform (Trichloromethane)	16.8
Cyclohexane	1.21
Dichlorodifluoromethane (CFC-12)	2.21
Ethylbenzene	9.47
Hexane	7.4
Isopropyl Alcohol (2-Propanol)	1.52
m,p-Xylenes	29.9
o-Xylene	10.3
Tert-Butyl Alcohol (tert-Butanol)	7.91
Tetrachloroethene	324
Tetrahydrofuran	3.54
Toluene	501
Trichlorofluoromethane (CFC-11)	1.18
Calculated Totals	
Total BTEXs	551.398
Total VOCs	956.109

VP-05	02/10/2023 L2307530-01
VOCs	
1,2,4-Trimethylbenzene	5.06
Acetone	28
Chloroform (Trichloromethane)	20
Ethylbenzene	10.9
Hexane	6.31
m,p-Xylenes	33.5
o-Xylene	11.1
Tert-Butyl Alcohol (tert-Butanol)	5.06
Tetrachloroethene	375
Toluene	584
Calculated Totals	
Total BTEXs	639.5
Total VOCs	1078.93

VP-10	06/02/2023 L2330938-01
VOCs	
1,1-Dichloroethane	0.967
1,2,4-Trimethylbenzene	2.18
1,3-Butadiene	24.1
2,2,4-Trimethylpentane	44.8
2-Butanone (Methyl Ethyl Ketone)	54.9
2-Hexanone (Methyl Butyl Ketone)	6.39
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	34.6
Acetone	302
Benzene	6.26
Carbon disulfide	48.6
Chloroethane	ND (0.528)
Chloroform (Trichloromethane)	17.4
Chloromethane (Methyl Chloride)	2.02
Cyclohexane	2.68
Dichlorodifluoromethane (CFC-12)	3.03
Ethanol	15.3
Ethylbenzene	1.31
Hexane	21.5
Isopropyl Alcohol (2-Propanol)	9.19
m,p-Xylenes	4.43
N-Heptane	10.8
o-Xylene	1.84
Styrene	ND (0.852)
Tert-Butyl Alcohol (tert-Butanol)	45.2
Tetrachloroethene	2.94
Tetrahydrofuran	12.8
Toluene	9.95
Trichlorofluoromethane (CFC-11)	ND (1.12)
Calculated Totals	
Total BTEXs	23.79
Total VOCs	685.187

VP-03	02/10/2023 L2307530-04
VOCs	
2,2,4-Trimethylpentane	17500
Tetrachloroethene	464
Toluene	531
Calculated Totals	
Total BTEXs	531
Total VOCs	18495

VP-01	02/13/2023 L2307679-03
VOCs	
1,2,4-Trimethylbenzene	4.82
2,2,4-Trimethylpentane	537
2-Butanone (Methyl Ethyl Ketone)	5.07
Acetone	54.4
Benzene	2.35
Carbon disulfide	1.58
Chloromethane (Methyl Chloride)	1.65
Ethylbenzene	11.5
Hexane	12.4
m,p-Xylenes	31.9
Methyl Tert Butyl Ether (MTBE)	18.6
N-Heptane	4.84
o-Xylene	11
Tert-Butyl Alcohol (tert-Butanol)	16.4
Tetrachloroethene	382
Toluene	584
Calculated Totals	
Total BTEXs	640.75
Total VOCs	1679.51

VP-02	02/13/2023 L2307679-02
VOCs	
2,2,4-Trimethylpentane	251000
Cyclohexane	3130
Hexane	3320
N-Heptane	2020
Toluene	708
Calculated Totals	
Total BTEXs	708
Total VOCs	260178

VP-04	02/10/2023 L2307530-02
VOCs	
1,2,4-Trimethylbenzene	4.1
1,3-Butadiene	3.38
2,2,4-Trimethylpentane	180
Acetone	287
Benzene	2.89
Carbon disulfide	7.6
Cyclohexane	3.39
Dichlorodifluoromethane (CFC-12)	2.23
Ethylbenzene	13
Hexane	14.3
Isopropyl Alcohol (2-Propanol)	2.88
m,p-Xylenes	34
N-Heptane	35.4
o-Xylene	10.6
Tert-Butyl Alcohol (tert-Butanol)	7.49
Tetrachloroethene	316
Toluene	501
Calculated Totals	
Total BTEXs	561.49
Total VOCs	1425.26

VP-06	02/13/2023 L2307679-01
VOCs	
1,2,4-Trimethylbenzene	19.8
1,3,5-Trimethylbenzene	4.26
1,3-Butadiene	3.1
2,2,4-Trimethylpentane	2.1
2-Butanone (Methyl Ethyl Ketone)	5.31
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	2.89
Acetone	49.6
Benzene	3.11
Carbon disulfide	8.13
Chloroform (Trichloromethane)	92.8
Cyclohexane	3.89
Dichlorodifluoromethane (CFC-12)	2.38
Ethylbenzene	11
Hexane	26.9
Isopropyl Alcohol (2-Propanol)	1.51
m,p-Xylenes	46
N-Heptane	4.02
o-Xylene	15.6
Tert-Butyl Alcohol (tert-Butanol)	1.99
Tetrachloroethene	204
Toluene	309
Calculated Totals	
Total BTEXs	384.71
Total VOCs	817.39

VP-07	02/10/2023 L2307530-03
VOCs	
1,2,4-Trimethylbenzene	3.89
2,2,4-Trimethylpentane	440
2-Butanone (Methyl Ethyl Ketone)	23.4
Acetone	143
Benzene	3.55
Carbon disulfide	27
Chloroform (Trichloromethane)	2.89
Cyclohexane	5.27
Ethylbenzene	8.47
Hexane	43.7
Isopropyl Alcohol (2-Propanol)	3.83
m,p-Xylenes	22.4
N-Heptane	24.8
o-Xylene	7.38
Tert-Butyl Alcohol (tert-Butanol)	7.03
Tetrachloroethene	354
Toluene	588
Calculated Totals	
Total BTEXs	629.8
Total VOCs	1708.61

LEGEND

- SITE BOUNDARY
- UST LOCATION
- SOIL VAPOR PROBE

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ALL DETECTED ANYLTES SHOWN ON FIGURE.
3. SOIL VAPOR ANALYSIS - VOLATILE ORGANIC COMPOUNDS (VOCs)
4. RESULTS ARE DISPLAYED IN MICROGRAMS PER CUBIC METER (µg/m3)
5. TOTAL DETECTED CONCENTRATION OF BENZENE, TOLUENE, ETHYLBENZENE AND XYLENES (BTEX)
6. TOTAL VOCs IS THE SUM OF ALL THE DETECTED CONCENTRATIONS
7. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

556 BALTIC STREET
BROOKLYN, NY

SOIL VAPOR CHEMISTRY MAP

MARCH 2023

FIGURE 7

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2021_12\204090_000_0002_SITE_PLAN.mxd - khensen - 12/2/2021 9:56:07 AM

LEGEND

EXCAVATION IN DEPTH BELOW GROUND SURFACE (BGS)

35 FEET

SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

ALTERNATIVE I EXCAVATION PLAN

APRIL 2023

FIGURE 8

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_04_RAWP\204090_000_0008_ALT_I_EXCAVATION_PLAN.mxd - khensen - 4/25/2023 9:39:59 AM

LEGEND

EXCAVATION DEPTH IN FEET BELOW GROUND SURFACE (BGS)

SITE BOUNDARY

15 FEET

18 FEET; APPLICATION AREA FOR PERSULFATE ACTIVATED WITH TSI-FSA™

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

ALTERNATIVE II EXCAVATION PLAN

APRIL 2023

FIGURE 9

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Mxds\2023_04_RAWP\204090_000_0010_ALT_II_EXCAVATION_PLAN.mxd - khensen - 4/25/2023 9:25:59 AM

LEGEND

EXCAVATION DEPTH IN FEET BELOW GROUND SURFACE (BGS)

15 FEET

SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

ALTERNATIVE III EXCAVATION PLAN

APRIL 2023

FIGURE 10

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_04_RAWP\204090_000_0011_ALT_III_EXCAVATION_PLAN.mxd - khensen - 4/25/2023 9:29:42 AM

LEGEND

ENDPOINT BOTTOM SAMPLE

SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

REMEDIAL INVESTIGATION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

ENDPOINT SAMPLE LOCATION PLAN

APRIL 2023

FIGURE 11

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Mxds\2023_04_RAWP\204090_000_0012_ENDPOINT_SAMPLE_LOCATION_PLAN.mxd - khensen - 4/25/2023 4:04:08 PM

Legend

Truck Routes

- **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 their 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, they may proceed by the most direct route to their next destination without returning to a designated truck route, provided that the operator's next destination does not require that they 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**
- **53 FT Trailer Exception**
- **Connecting Road Outside NYC**

Restricted Routes

- **No Commercial Vehicles**

Hazards

- Alert: see additional information
- Low Vertical Clearance (14 feet and under)

Navigation / Landmarks

- Highway Exit
- Major Highway
- Industrial Business Zone
- Parks and Open Spaces
- Limited Truck Zone

LEGEND

- TRUCK INGRESS
- TRUCK EGRESS
- CONSTRUCTION ENTRANCE
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, 19 OCTOBER 2021

N

0 30 60

SCALE IN FEET

HALEY ALDRICH

REMEDIAL ACTION WORK PLAN
556 BALTIC STREET
BROOKLYN, NEW YORK

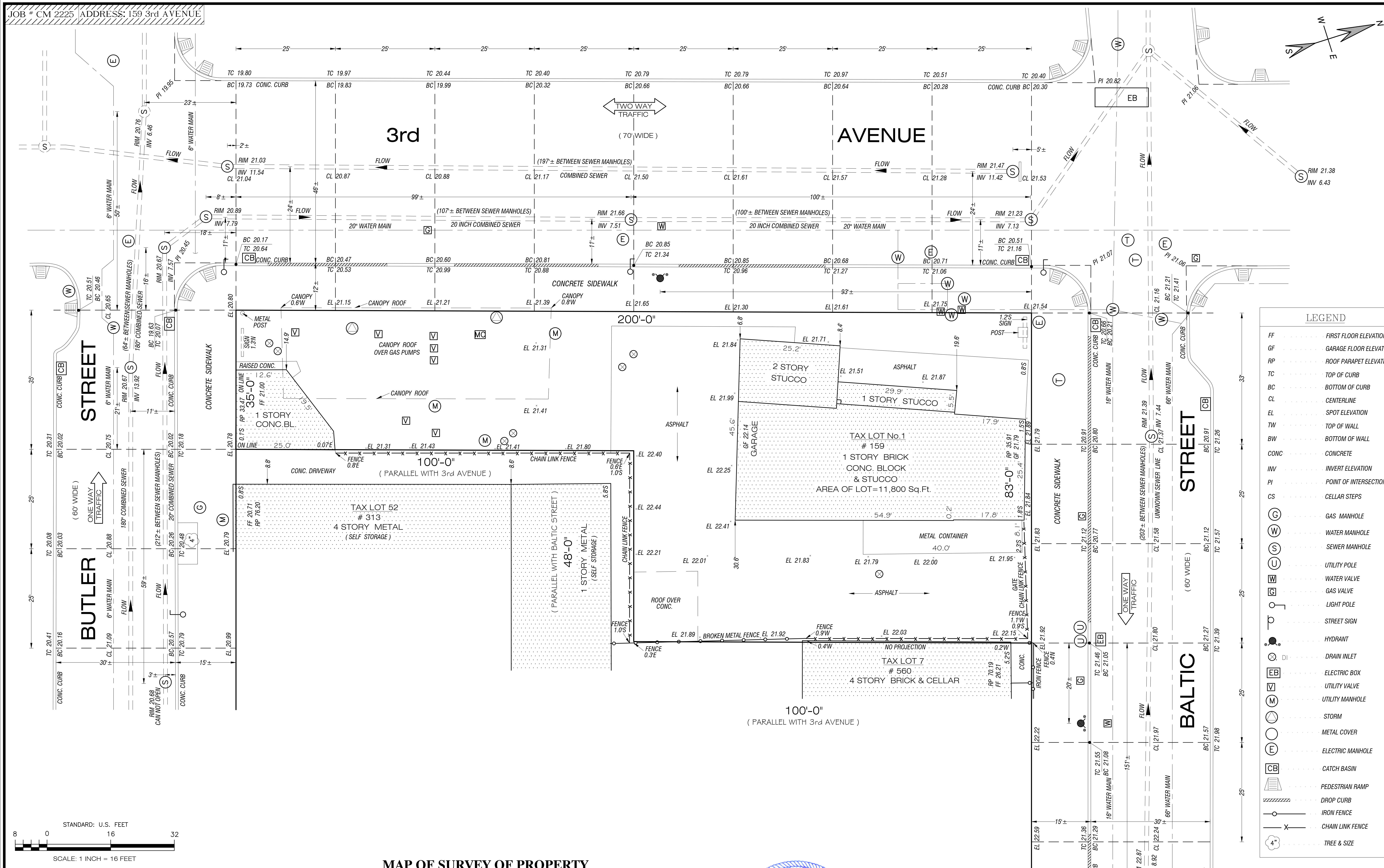
TRUCK ROUTE MAP

APRIL 2023

FIGURE 12

GIS: \\haleyaldrich.com\share\CF\Projects\0204090\GIS\Maps\2023_04_RAWP\204090_000_0013_TRUCK_ROUTE_MAP.mxd - khensen - 4/12/2023 2:43:18 PM

APPENDIX A
Survey Map



GENERAL NOTES:
1. This survey was prepared only for the party (parties) and purpose indicated hereon.
2. Property corner monuments or markers were (not) placed as part of this survey.
3. Certifications on this survey map signify that the map was prepared in accordance with the current existing Code of Practice for Land Surveys adopted by the New York State Association of Professional Land Surveyors, Inc. Said certifications are limited to the party (parties) for whom the survey is prepared and are not transferable.
4. The location and nature of underground structures, internal walls and improvements or encroachments not visible to the surveyor are not covered under this certification.
5. Easements of record are only guaranteed if an Abstract of Title is furnished to the surveyor.
6. This is to certify that there are no streams nor natural water courses on the property except as shown on this survey.
7. Elevations refer to NAVD 1988 datum.

CAPTION	ARCHITECTURAL SURVEY			
DATE	REVISIONS			
11/22/2021	ARCHITECTURAL SURVEY			
	DATE	BY	DATE	BY
SURVEYED	11/22/2021	V.B & V.J	DRAWN 11/28/2021	A.K

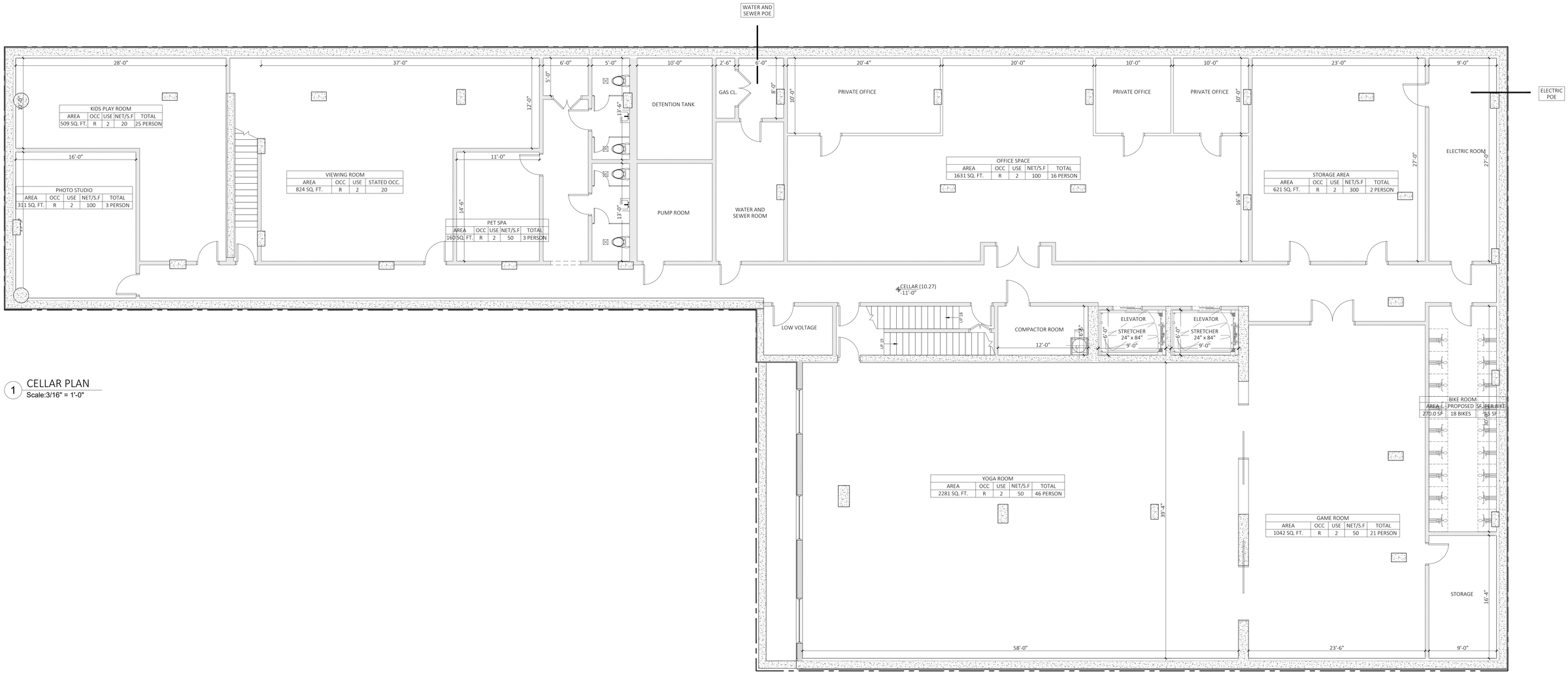
MAP OF SURVEY OF PROPERTY
IN THE BOROUGH AND COUNTY OF BROOKLYN
CITY AND STATE OF NEW YORK
TAX MAP: BLOCK 407 LOT 1

CITY MAPPING, INC.
114-34 122nd STREET
SOUTH OZONE PARK
NY 11420
TEL: 718-751-6871
email: citymapping@yahoo.com

STATE OF NEW YORK VINCENT TEUTONICO 050307 LICENSED LAND SURVEYOR

VINCENT TEUTONICO, L.S.
NEW YORK LICENSE 050307

APPENDIX B
Proposed Redevelopment Plans



1 CELLAR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS & ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

CELLAR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

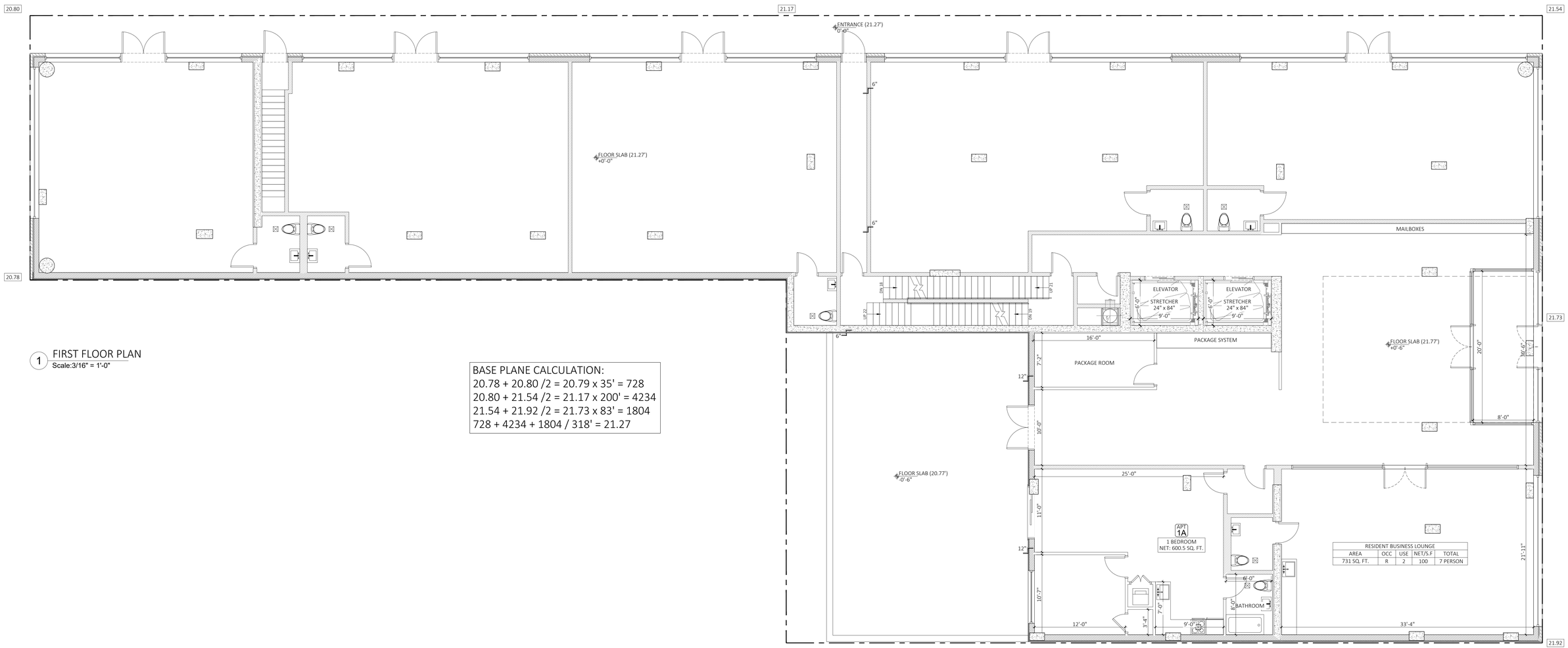
SEAL AND SIGNATURE

DRAWING NO.

A-100.00

SHEET NO.

09 OF 27



1 FIRST FLOOR PLAN
Scale:3/16" = 1'-0"

BASE PLANE CALCULATION:
20.78 + 20.80 /2 = 20.79 x 35' = 728
20.80 + 21.54 /2 = 21.17 x 200' = 4234
21.54 + 21.92 /2 = 21.73 x 83' = 1804
728 + 4234 + 1804 / 318' = 21.27

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

FIRST FLOOR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023
DRAWING BY Chaim kohl

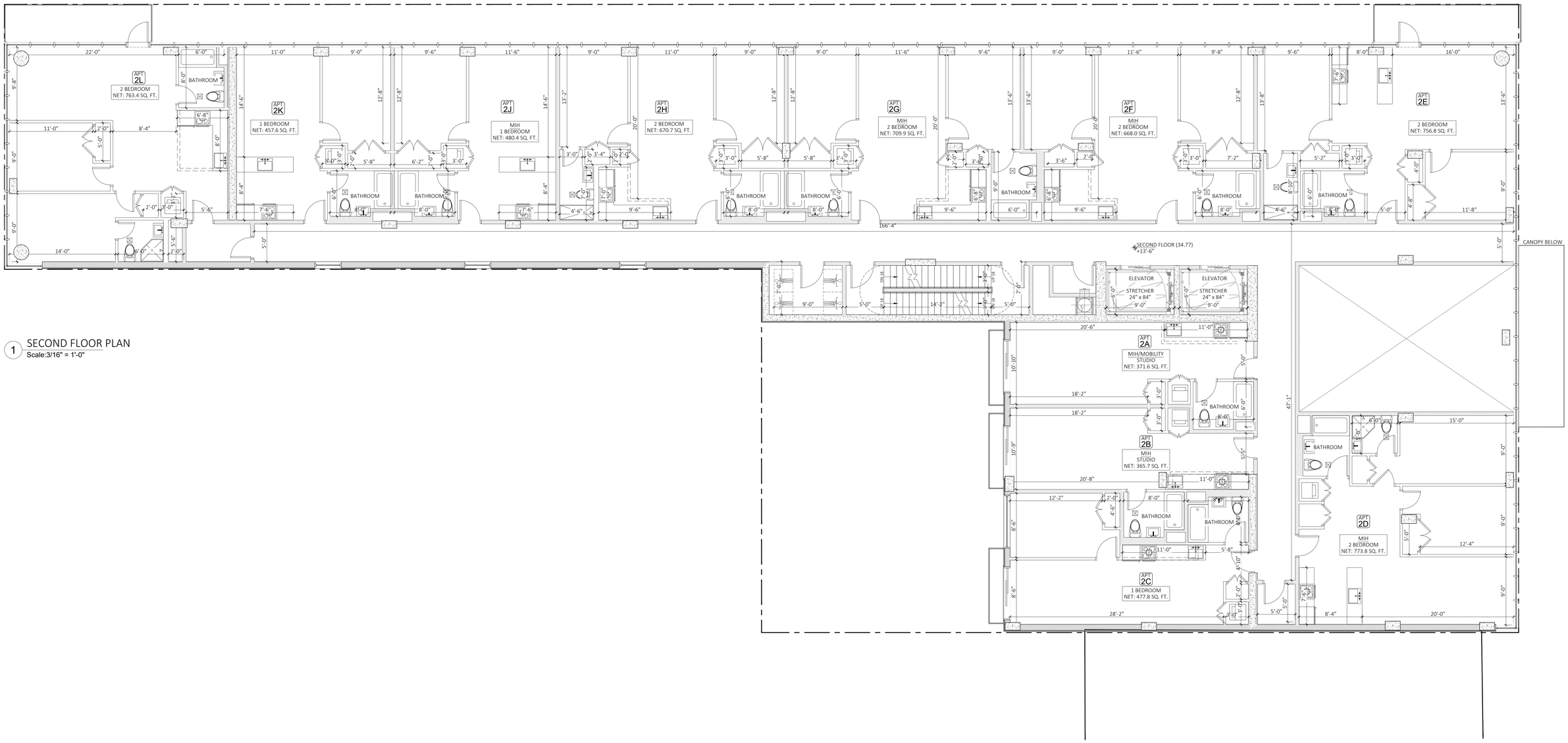
SEAL AND SIGNATURE

DRAWING NO.

A-101.00

SHEET NO.

10 OF 27



1 SECOND FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

SECOND FLOOR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

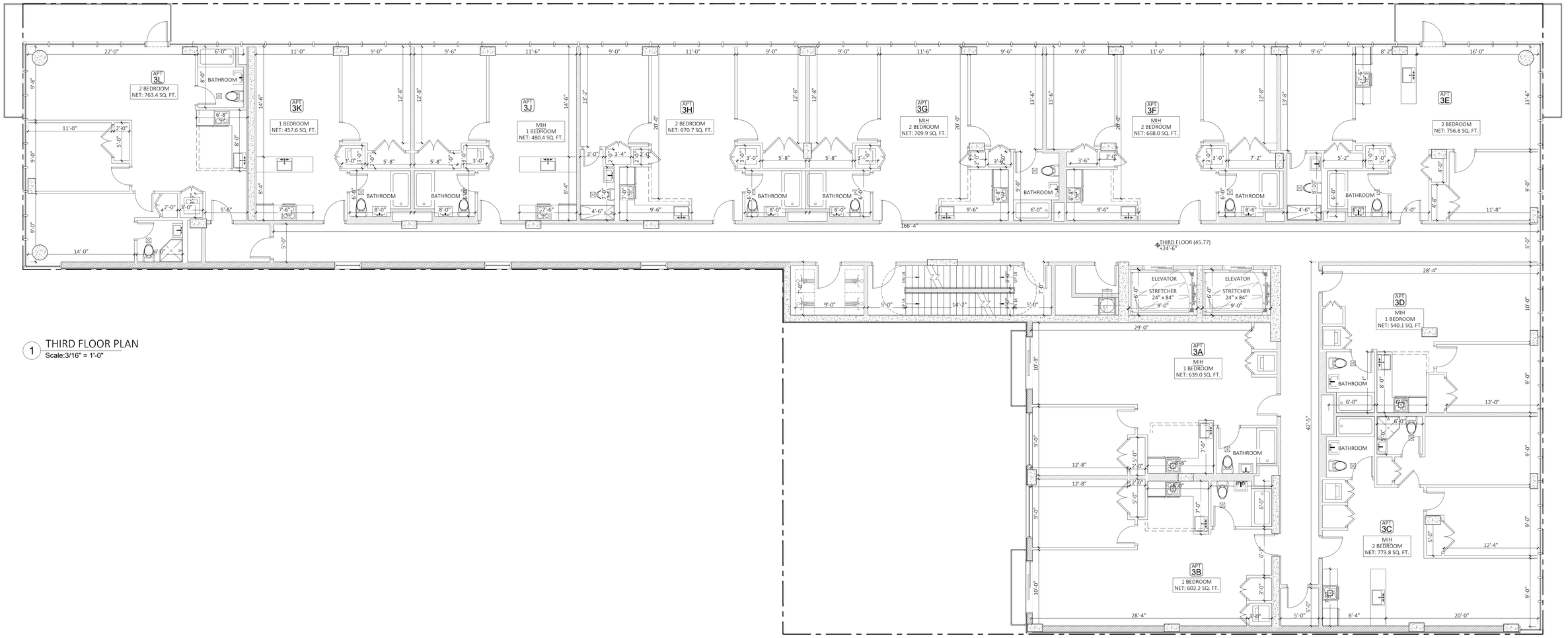
SEAL AND SIGNATURE

DRAWING NO.

A-102.00

SHEET NO.

11 OF 27



1 THIRD FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

THIRD FLOOR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

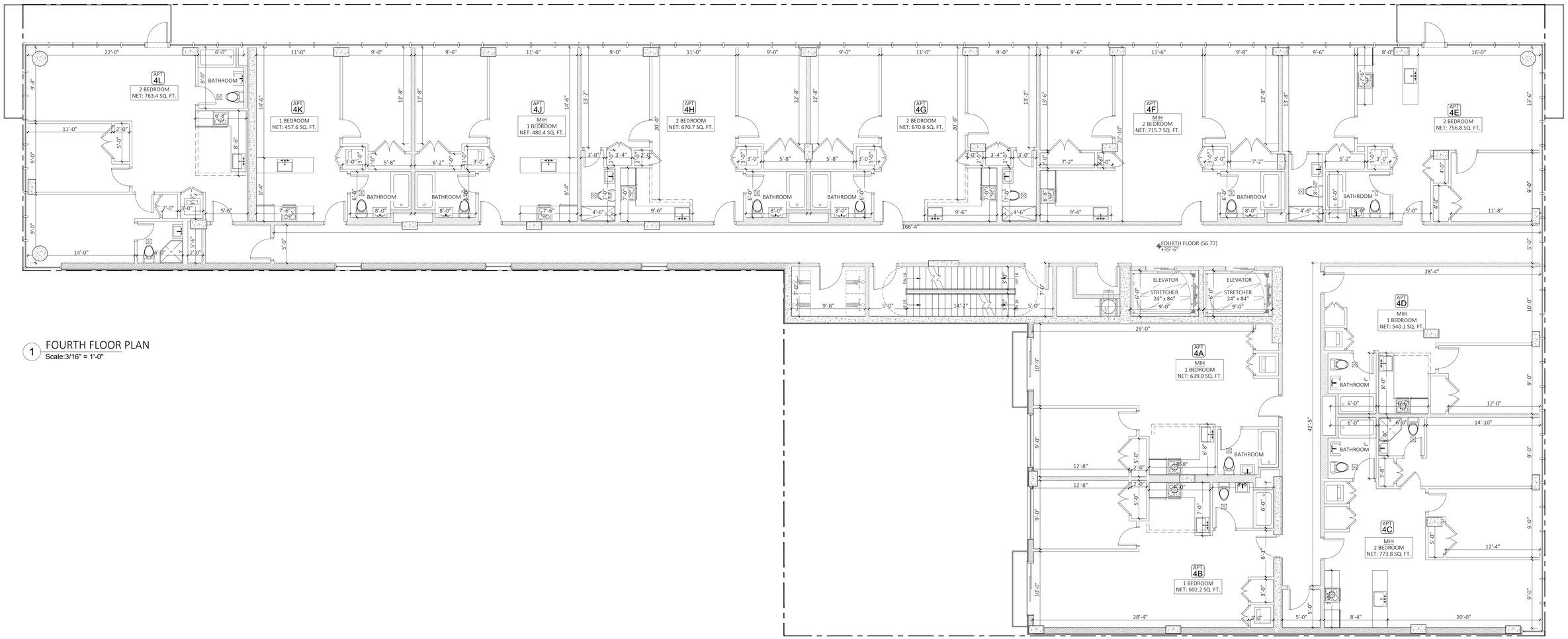
SEAL AND SIGNATURE

DRAWING NO.

A-103.00

SHEET NO.

12 OF 27



1 FOURTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

FOURTH FLOOR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

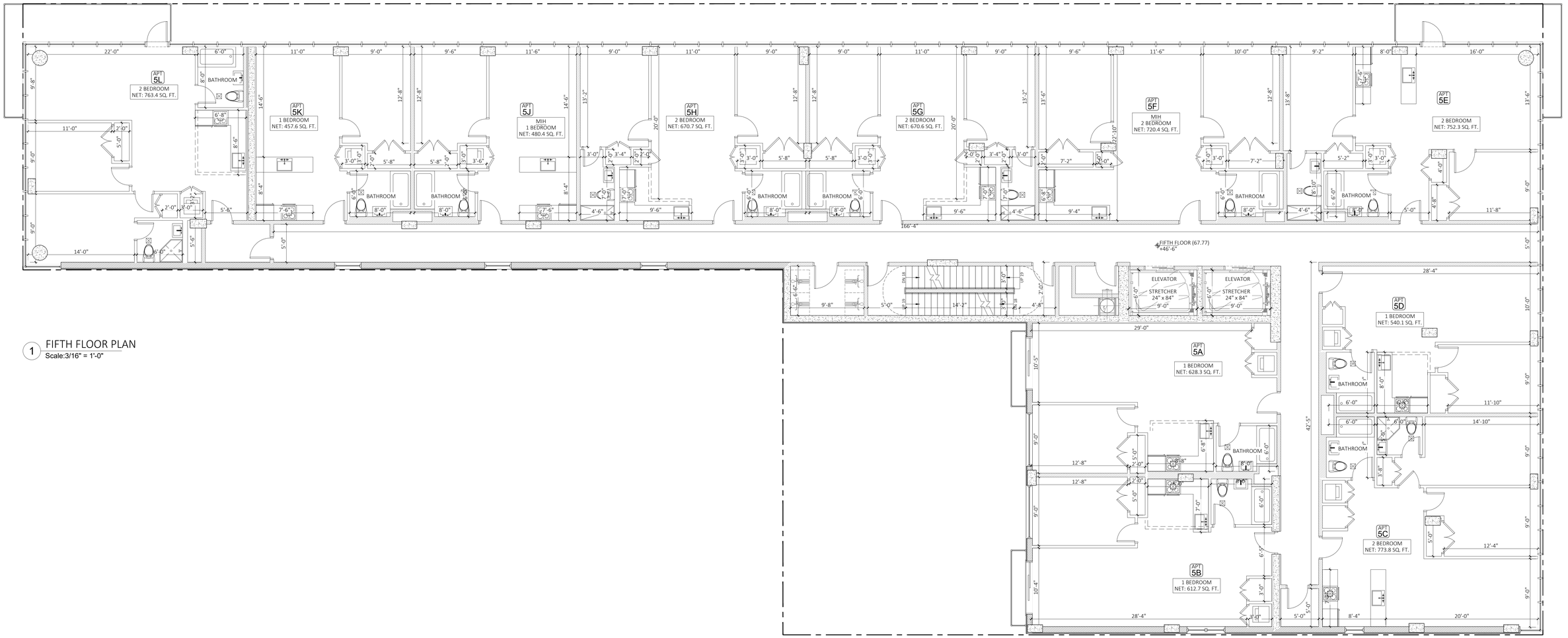
SEAL AND SIGNATURE

DRAWING NO.

A-104.00

SHEET NO.

13 OF 27



1 FIFTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

FIFTH FLOOR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

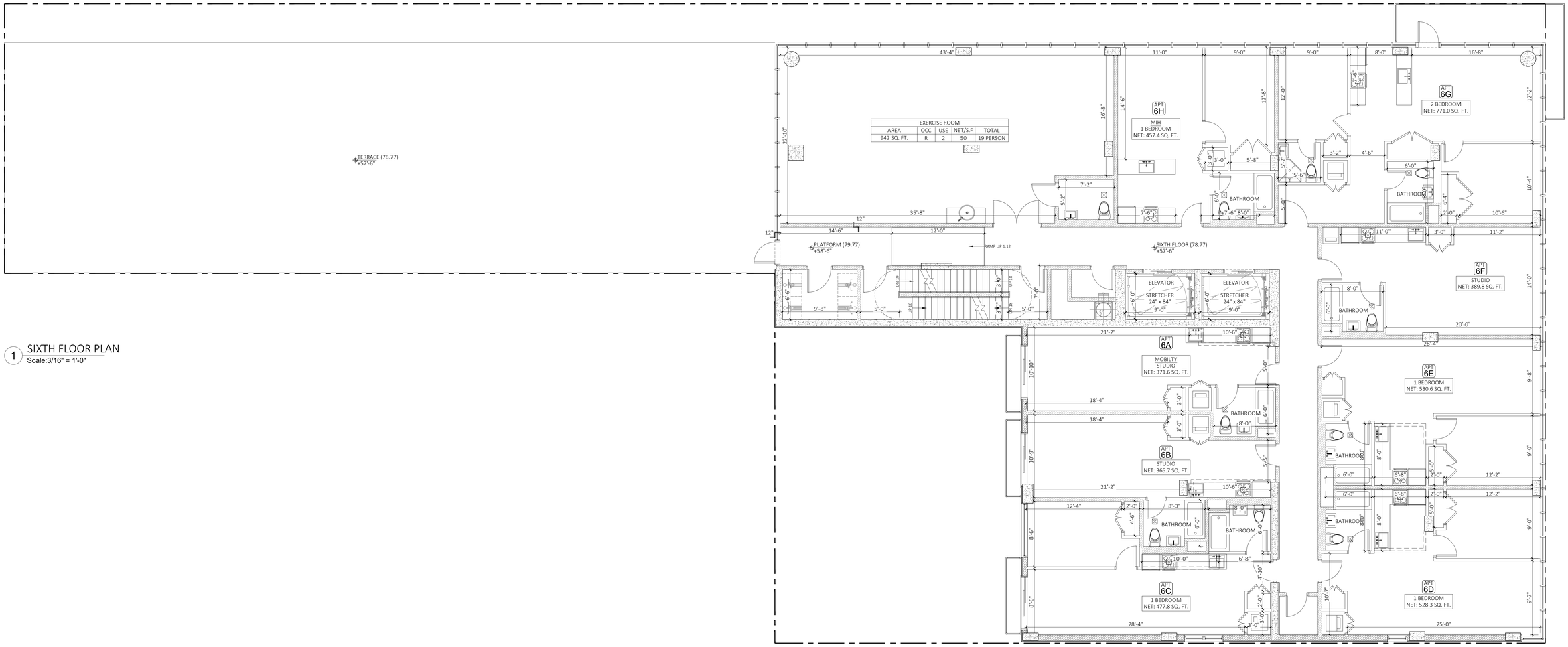
SEAL AND SIGNATURE

DRAWING NO.

A-105.00

SHEET NO.

14 OF 27



1 SIXTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS & ENGINEERING

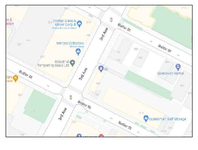
LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

SIXTH FLOOR PLAN

SITE MAP



NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

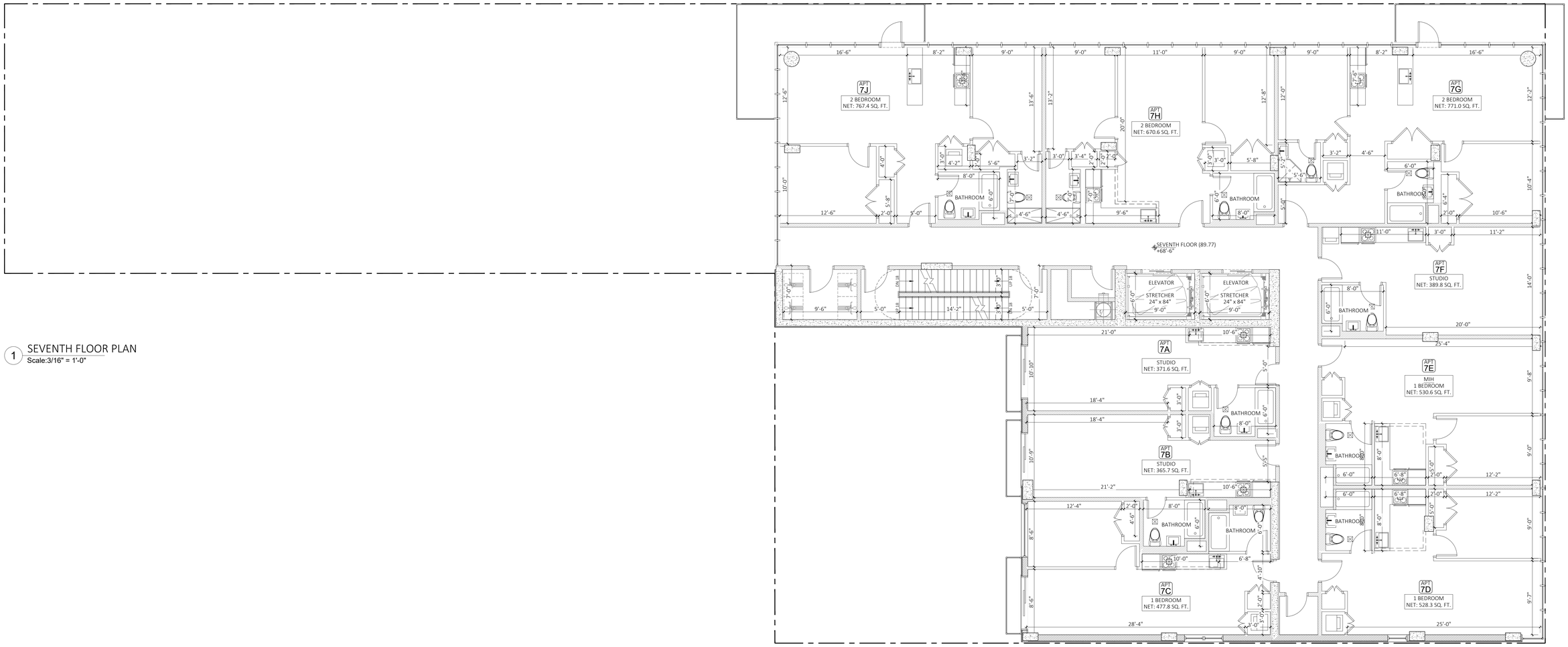
SEAL AND SIGNATURE

DRAWING NO.

A-106.00

SHEET NO.

15 OF 27



1 SEVENTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

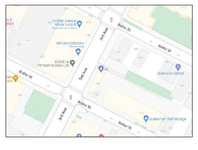
LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

SEVENTH FLOOR PLAN

SITE MAP



NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

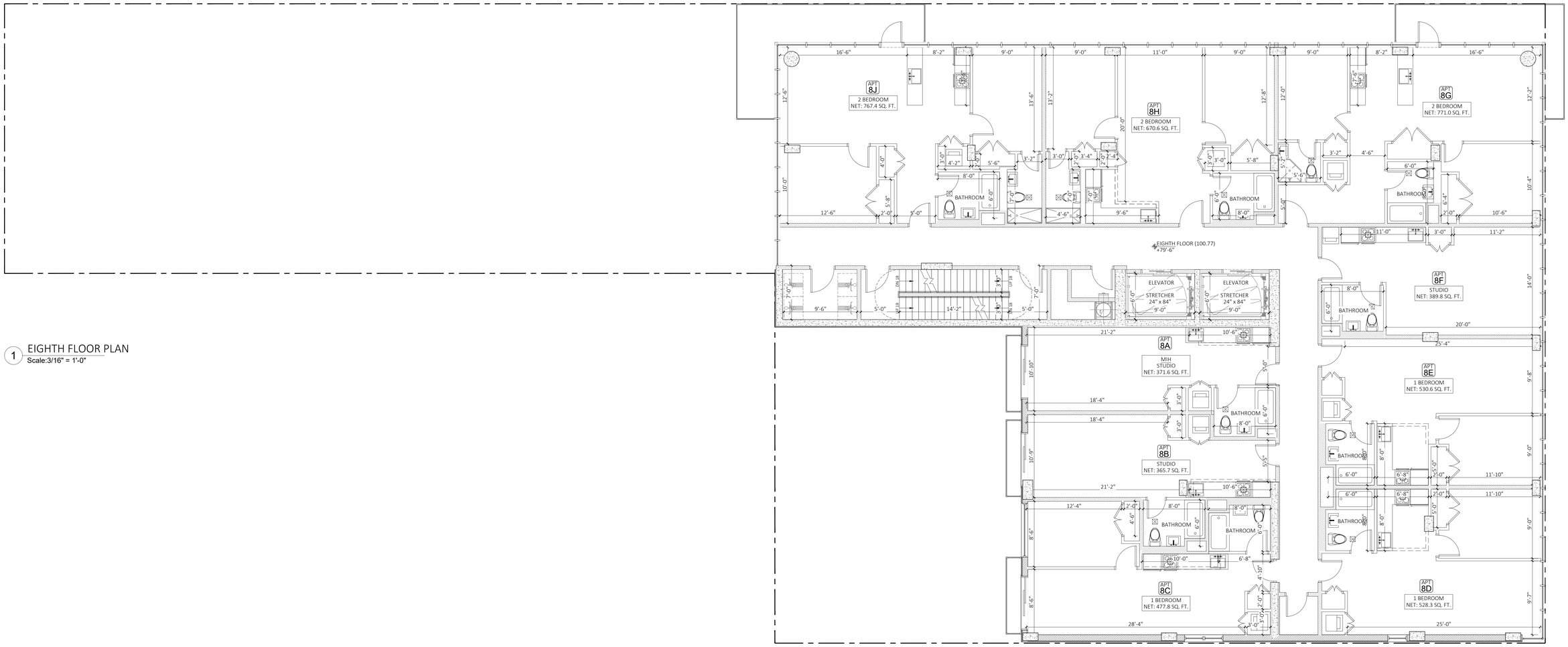
SEAL AND SIGNATURE

DRAWING NO.

A-107.00

SHEET NO.

18 OF 27



1 EIGHTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

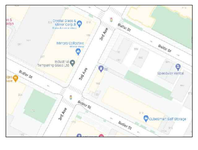
LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

EIGHTH FLOOR PLAN

SITE MAP



NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

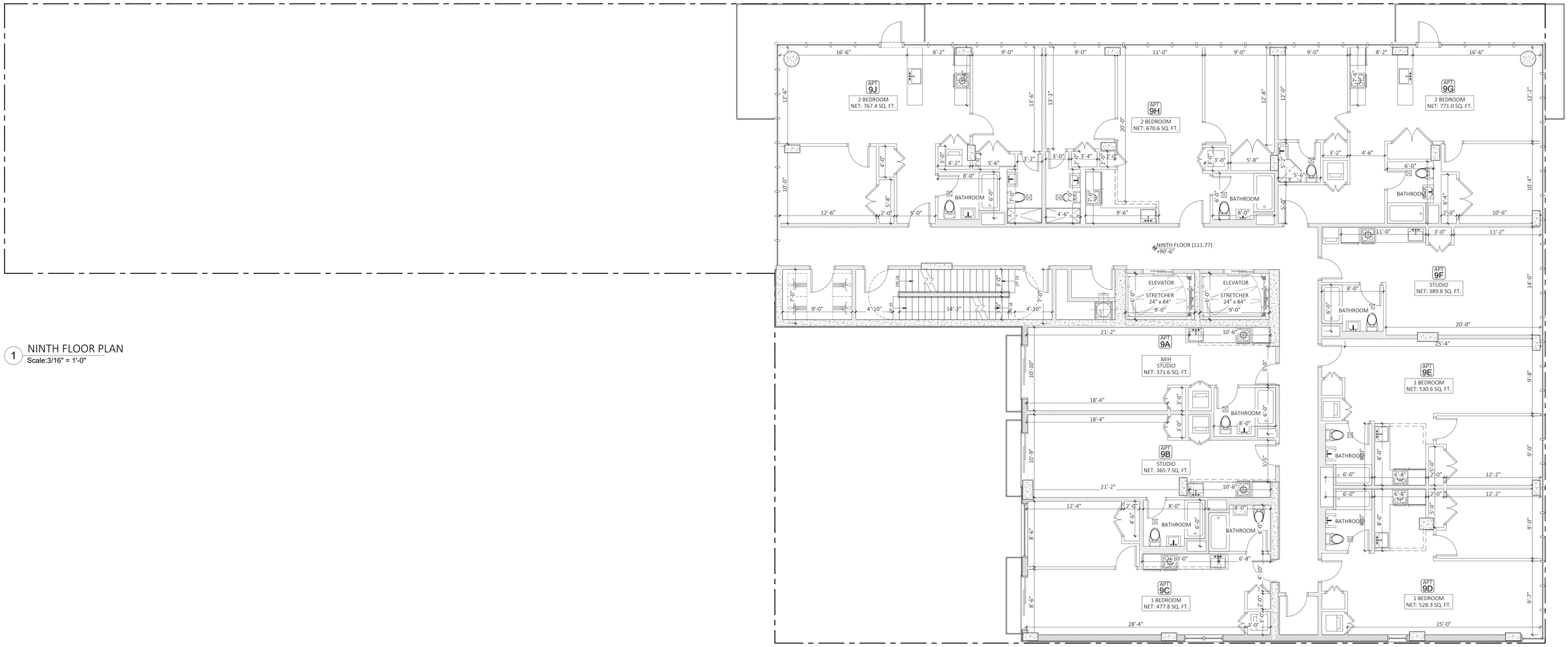
SEAL AND SIGNATURE

DRAWING NO.

A-108.00

SHEET NO.

17 OF 27



1 NINTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

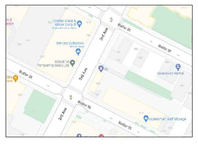
LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

NINTH FLOOR PLAN

SITE MAP



NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

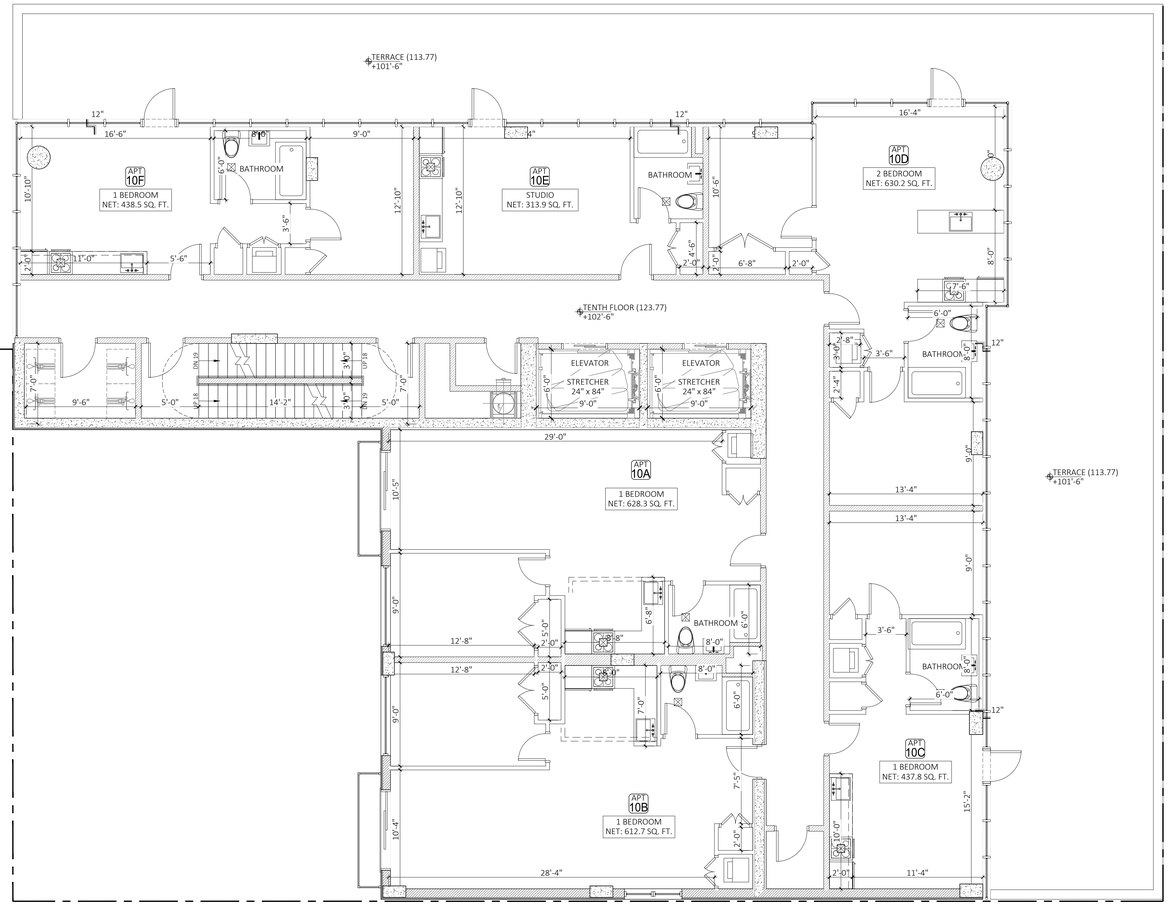
SEAL AND SIGNATURE

DRAWING NO.

A-109.00

SHEET NO.

18 OF 27



1 TENTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

TENTH FLOOR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023
DRAWING BY Chaim kohl

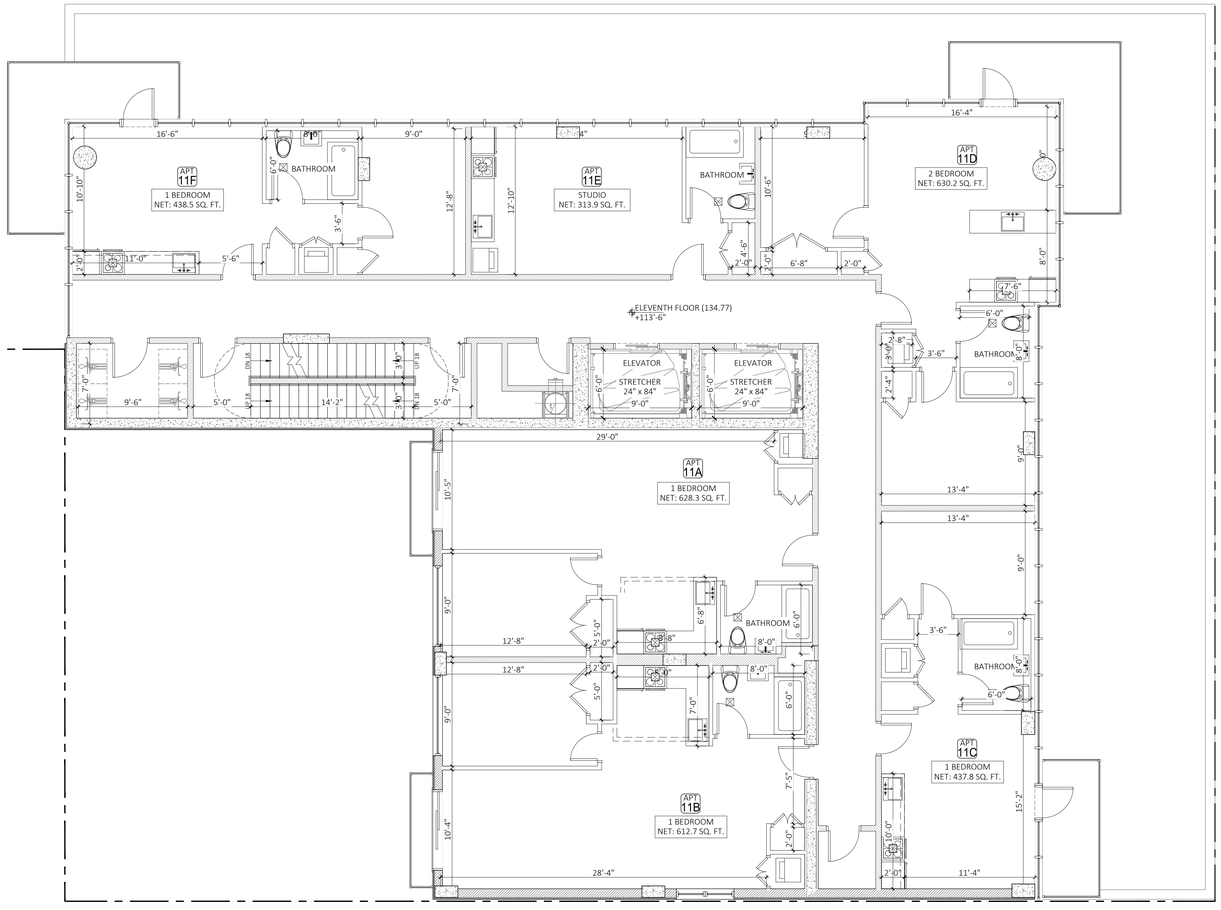
SEAL AND SIGNATURE

DRAWING NO.

A-110.00

SHEET NO.

19 OF 27



1 ELEVENTH FLOOR PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

ELEVENTH FLOOR PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

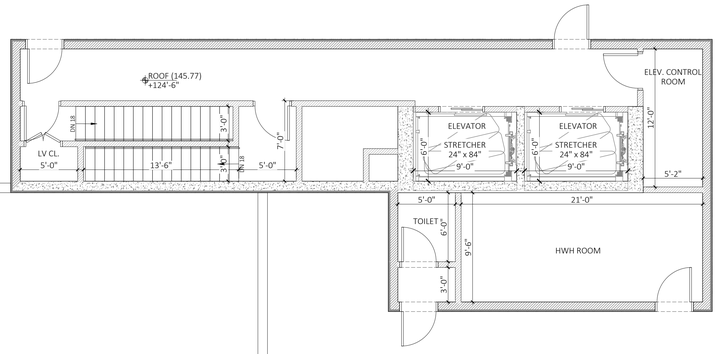
SEAL AND SIGNATURE

DRAWING NO.

A-111.00

SHEET NO.

20 OF 27



1 BULKHEAD PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

ROOF PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

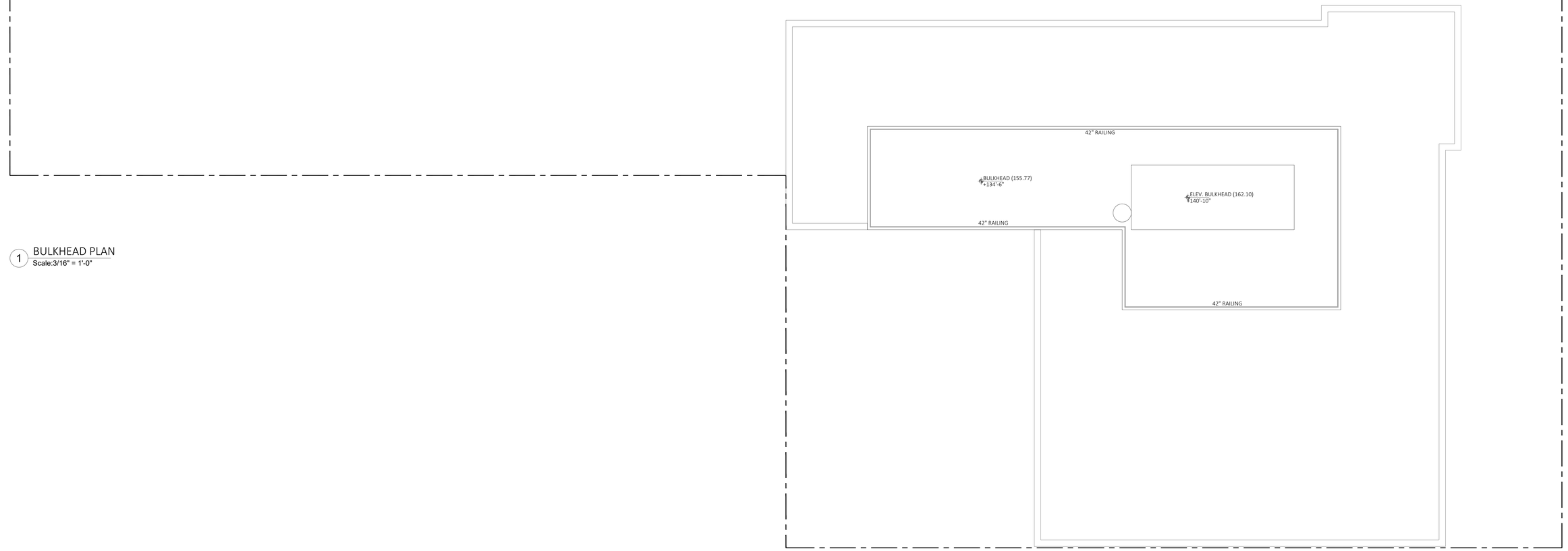
SEAL AND SIGNATURE

DRAWING NO.

A-112.00

SHEET NO.

21 OF 27



1 BULKHEAD PLAN
Scale:3/16" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

BULKHEAD PLAN

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

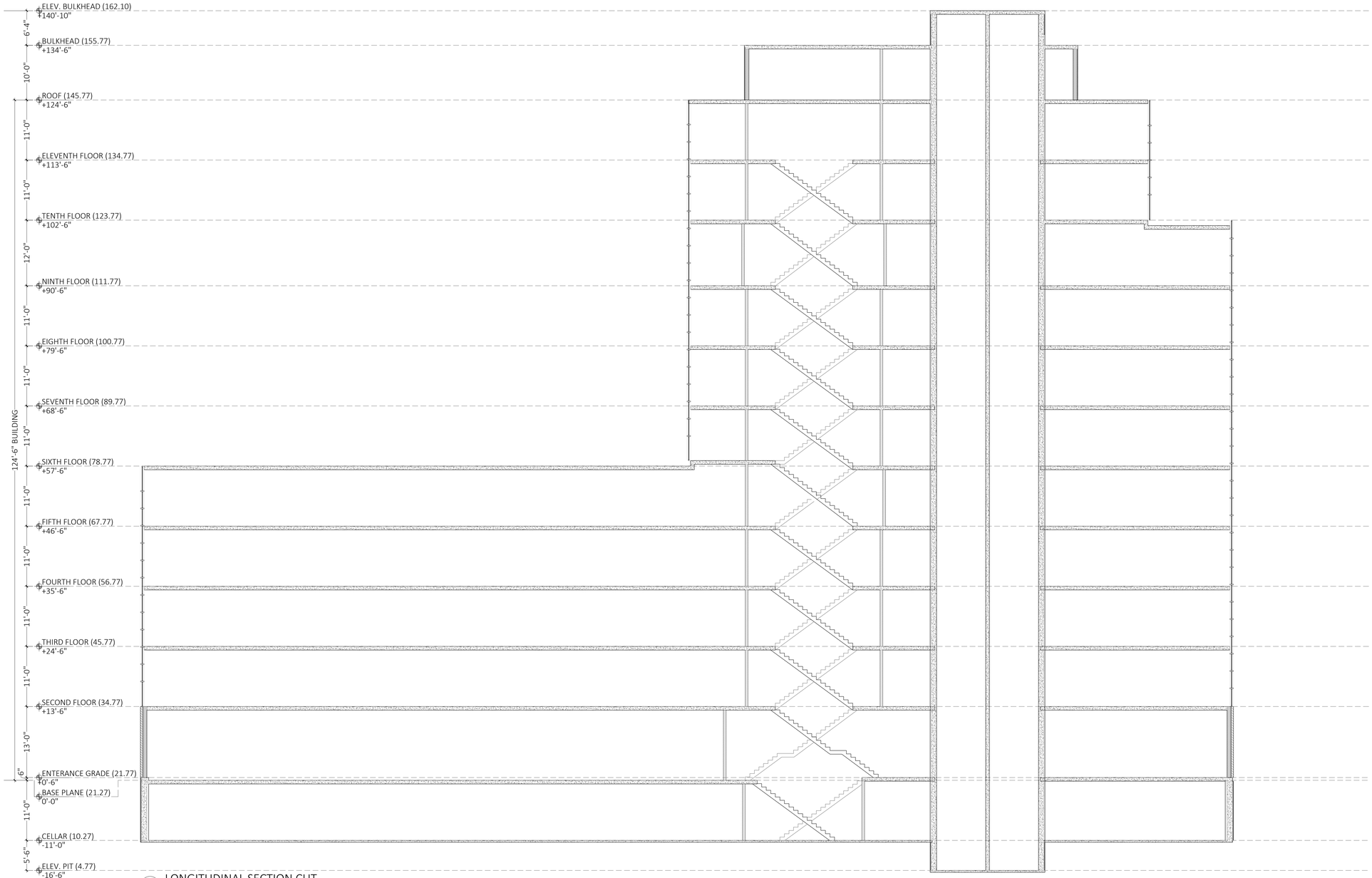
SEAL AND SIGNATURE

DRAWING NO.

A-113.00

SHEET NO.

21 OF 27



1 LONGITUDINAL SECTION CUT
Scale:1/8" = 1'-0"

JAY ARCHITECTS
& ENGINEERING

LOCATION

556 BALTIC STREET
BROOKLYN N.Y. 11217

DRAWING TITLE

LONGITUDINAL SECTION CUT

SITE MAP

NO.	DATE	ISSUE OR REVISION

B00678425-I1

PE'S APPROVAL

DOB SCAN

DATE 4/4/2023

DRAWING BY Chaim kohl

SEAL AND SIGNATURE

DRAWING NO.

A-300.00

SHEET NO.

21 OF 27

APPENDIX C
Remedial Investigation Report (Sharefile Link)

APPENDIX D
Construction Health and Safety Plan

HALEY & ALDRICH, INC.
SITE-SPECIFIC SAFETY PLAN

FOR

556 BALTIC STREET SITE – NYSDEC BCP SITE C224375

556 BALTIC STREET

BROOKLYN, NEW YORK

Project/File No. 0204090

Click to Select

Prepared By: Luke J. McCartney, P.G.	**Date: 4/25/2023**
Approvals: The following signatures constitute approval of this Health & Safety Plan.	
Insert Field Safety Managers electronic signature.	
Field Safety Manager: Brian Ferguson	**Date:** Click or tap to enter a date.
Insert Project Manager's electronic signature.	
Project Manager: Luke J. McCartney, P.G.	**Date: 4/25/2023**
HASP Valid Through: Insert date	

Table of Contents

Attachments

STOP WORK AUTHORITY

In accordance with Haley & Aldrich (Haley & Aldrich) Stop Work Authority Operating Procedure (OP1035), any individual has the right to refuse to perform work that he or she believes to be unsafe without fear of retaliation. He or she also has the authority, obligation, and responsibility to stop others from working in an unsafe manner.

STOP Work Authority is the stop work policy for all personnel and subcontractors on the Site. When work has been stopped due to an unsafe condition, Haley & Aldrich site management (e.g., Project Manager [PM], Site Health & Safety Officer [SHSO], etc.) and the Haley & Aldrich Senior Project Manager (SPM) 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.
- An Haley & Aldrich subcontractor is in breach of site safety requirements and/or their own site HASP.
- Identifying a substandard 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/activities stopped, the duration, person stopping work, person in-charge of stopped activity/activities, and the corrective action agreed to and/or taken. Once work has been stopped, only the Haley & Aldrich SPM or SHSO can give the order to resume work. Haley & Aldrich senior management is committed to support anyone who exercises his or her “Stop Work” authority.

ISSUANCE AND COMPLIANCE

This HASP has been prepared in accordance with Occupational Safety and Health Administration (OSHA) regulations (CFR 29, Parts 1904, 1910, and 1926) if such are applicable.

The specific requirements of this HASP include precautions for hazards that exist during this project and may be revised as new information is received or as site conditions change.

- This HASP must be signed by all Haley & Aldrich personnel involved in implementation of the SOW (Section 2 of this HASP).
- This HASP, or a current signed copy, must be retained at all times when Haley & Aldrich staff are present.
- Revisions to this HASP must be outlined within the contents of the HASP. If immediate or minor changes are necessary, the Field Safety Manager (FSM), Haley & Aldrich, SSO and/or Project Manager (PM) may use Attachment 1 (HASP Amendment Form), presented at the end of this HASP. Any revision to the HASP requires employees and subcontractors to be informed of the changes so that they understand the requirements of the change.
- Deviations from this HASP are permitted with approval from the Haley & Aldrich FSM, PM, or Senior Health & Safety Manager (SHSM). Unauthorized deviations may constitute a violation of Haley & Aldrich company procedures/policies and may result in disciplinary action.
- This HASP will be relied upon by Haley & Aldrich's subcontractors and visitors to the site. Haley & Aldrich's subcontractors must have their own HASP which will address hazards specific to their trade that is not included in this HASP. This HASP will be made available for review to Haley & Aldrich's subcontractors and other interested parties (e.g. Facility personnel and regulatory agencies) to ensure that Haley & Aldrich has properly informed our subcontractors and others of the potential hazards associated with the implementation of the SOW to the extent that Haley &Aldrich is aware.

This site-specific HASP provides only site-specific descriptions and work procedures. General safety and health compliance programs in support of this HASP (e.g., injury reporting, medical surveillance, personal protective equipment (PPE) selection, etc.) are described in detail in the Haley &Aldrich Corporate Health and Safety Program Manual and within Haley & Aldrich's Standard Operating Procedures Both the manual and SOPs can be located on the Haley & Aldrich's Company Intranet. When appropriate, users of this HASP should always refer to these resources and incorporate to the extent possible. The manual and SOPs are available to clients and regulators upon request.

EMERGENCY EVENT PROCEDURES

1 - ASSESS THE SCENE

- **STOP WORK**
- Review the situation and ascertain if it's safe to enter the area.
- Evacuate the site if the conditions are unsafe.

2 - EVALUATE THE EMERGENCY

- **Call 911, or designated emergency number, if required.**
- **Provide first aid for the victim if qualified and safe to do so.**
    - First aid will be addressed using the onsite first aid kit. *
        - If providing first aid, remember to use proper first aid universal precautions if blood or bodily fluids are present.
- **If exposure to hazardous substance is suspected, immediately vacate the contaminated area.**
    - Remove any contaminated clothing and/or equipment.
    - Wash any affected dermal/ocular area(s) with water for at least 15 minutes.
    - Seek immediate medical assistance if any exposure symptoms are present.

* *Note: Haley & Aldrich employees are not required or expected to administer first aid / CPR to any Haley & Aldrich staff member, Contractor, or Civilian personnel at any time; it is Haley & Aldrich´s position that those who do are doing so on their own behalf and not as a function of their job.*

3 - SECURE THE AREA

- **Cordon off the incident area, if possible.**
    - Notify any security personnel, if required.
    - Escort all non-essential personnel out of the area, if able.

4 - REPORT ON-SITE ACCIDENTS / INCIDENTS TO PM / SSO

- **Notify the PM and SSO as soon as it is safe to do so.**
    - Assist PM and SSO in completing any additional tasks, as required.

5 - INVESTIGATE / REPORT THE INCIDENT

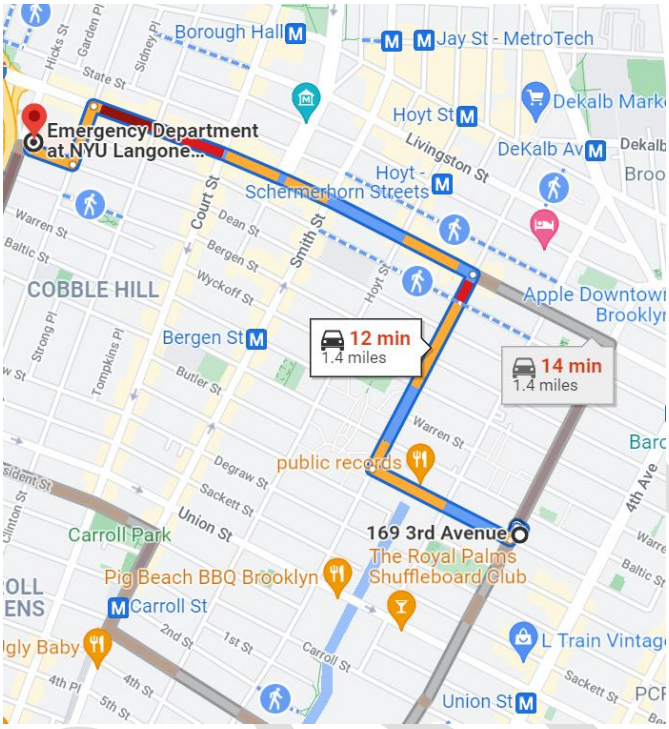
- **Record details of the incident for input to the Gensuite.**
    - Complete any additional forms as requested by the PM and SSO.

6 - TAKE CORRECTIVE ACTION

- **Implement corrective actions per the PM following root cause analysis.**
    - Complete Lessons Learned form.

PROJECT INFORMATION AND CONTACTS	
Project Name: 556 BALTIC STREET SITE – NYSDEC BCP SITE C224375	**Haley & Aldrich File No.:** 0204090
Location:	
Client/Site Contact: Phone Number:	159 Third Realty LLC 347.731.3400
Haley & Aldrich Field Representative: Phone Number: Emergency Phone Number:	Sarah Commisso 646.277.5693 516.317.9861
Haley & Aldrich Project Manager: Phone Number: Emergency Phone Number:	Luke J. McCartney, P.G. 646.568-9357 202.341.3722
Field Safety Manager: Phone Number: Emergency Phone Number:	Brian Ferguson 617.886.7439 617.908.2761
Subcontractor Project Manager: Phone Number:	N/A N/A
Nearest Hospital: Address: (see map on next page) Phone Number:	NYU Langone 83 Amity Street Brooklyn, NY 11201 718.603.7185
Nearest Occ. Health Clinic: http://www.talispoint.com/liberty/ext/ Address: (see map on next page) Phone Number:	Medrite Urgent Care – Midtown East, NYC 919 2nd Avenue Brooklyn, NY 10017 212.935.3333
Liberty Mutual Claim Policy	**WC6Z11254100033**
Emergency Response Number:	**911**
Other Local Emergency Response Number:	N/A
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	911

DIRECTIONS TO THE NEAREST HOSPITAL



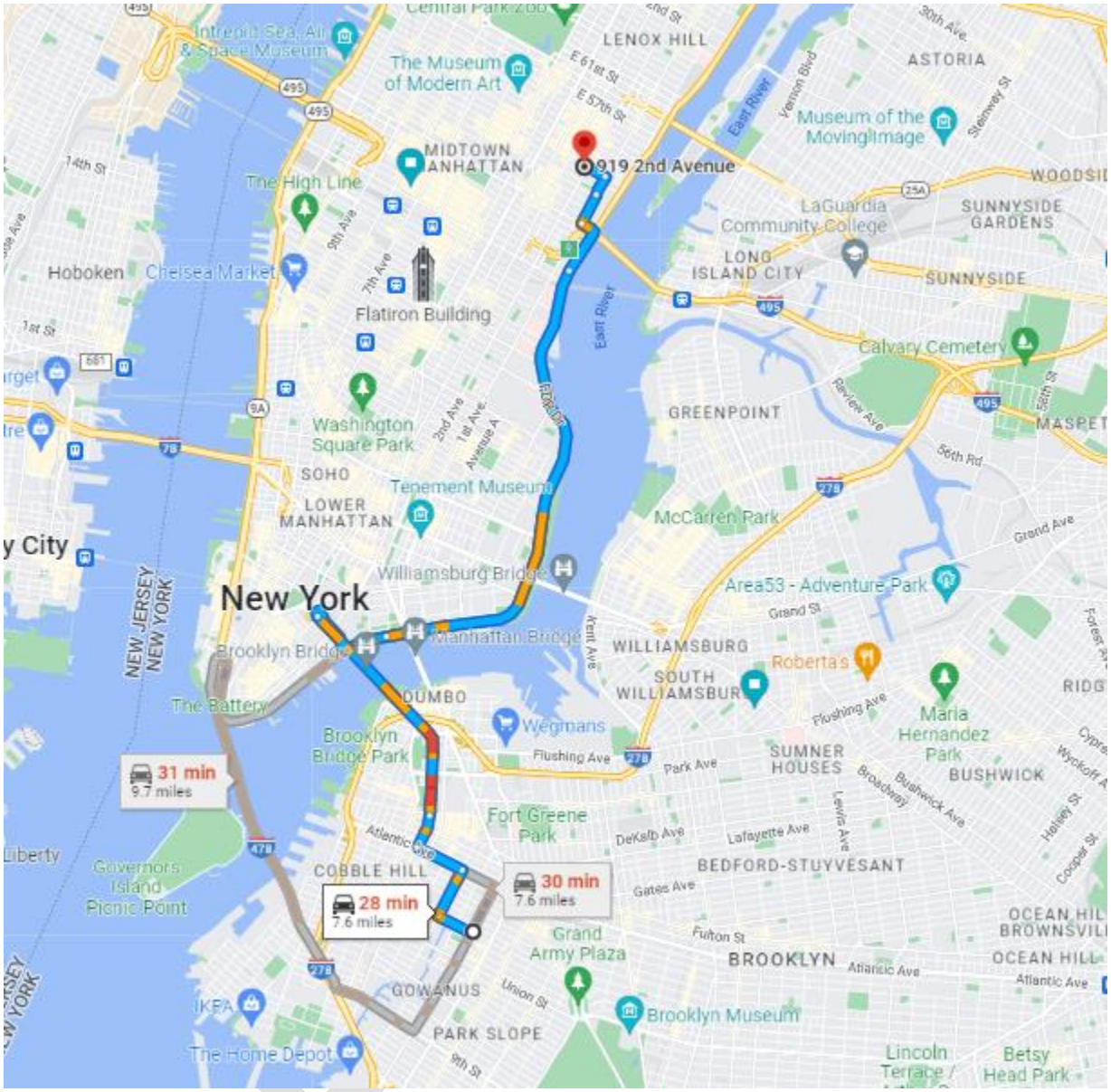
Directions to the Nearest Hospital:

169 3rd Ave
Brooklyn, NY 11217

- Head northwest toward 3rd Ave
  ⚠ Restricted usage road
  52 ft
- Turn left onto 3rd Ave
  125 ft
- Turn right at the 1st cross street onto Butler St
  0.2 mi
- Turn right onto Bond St
  0.3 mi
- Turn left onto Atlantic Ave
  0.7 mi
- Turn left onto Henry St
  0.1 mi
- Turn right onto Amity St
  ⓘ Destination will be on the right
  371 ft

Emergency Department at NYU Langone Health—Cobble Hill
83 Amity St, Brooklyn, NY 11201

DIRECTIONS TO THE NEAREST URGENT CARE



Directions to the Nearest Occupational Clinic:

169 3rd Ave
Brooklyn, NY 11217

Take Butler St, Bond St, Atlantic Ave and Boerum Pl to Adams St/Brooklyn Bridge Blvd

8 min (1.2 mi)

1. Head northwest toward 3rd Ave
   ⚠ Restricted usage road

52 ft

2. Turn left onto 3rd Ave

125 ft

3. Turn right at the 1st cross street onto Butler St

0.2 mi

4. Turn right onto Bond St

0.3 mi

5. Turn left onto Atlantic Ave

0.3 mi

6. Turn right onto Boerum Pl

0.2 mi

Continue on Brooklyn Bridge Blvd. Take FDR Dr to 1st Ave./United Nations Plaza in Manhattan. Take exit 9 from FDR Dr

12 min (6.0 mi)

7. Continue onto Adams St/Brooklyn Bridge Blvd
   ℹ Continue to follow Brooklyn Bridge Blvd

1.6 mi

8. Use the right 2 lanes to take the F D R Dr North exit

0.7 mi

9. Merge onto FDR Dr

3.3 mi

10. Take exit 9 for E 42nd St

0.4 mi

Follow 1st Ave./United Nations Plaza and E 49th St to 2nd Ave

3 min (0.5 mi)

11. Turn right onto 1st Ave./United Nations Plaza

0.2 mi

12. Slight left to stay on 1st Ave./United Nations Plaza

0.1 mi

13. Turn left onto E 49th St

0.1 mi

14. Turn left at the 1st cross street onto 2nd Ave
    ℹ Destination will be on the right

115 ft

919 2nd Ave
New York, NY 10017

1. WORK SCOPE

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 Haley & Aldrich's experience with other similar project sites. The scope of work includes the following:

Remedial Oversight, Soil & Soil Vapor Sampling (if required), and Dewatering Oversight.

Project Task Breakdown

Task No.	Task Description	Employee(s) Assigned	Work Date(s) or Duration
1.	Remedial Oversight	Sarah Commisso	6 to 12 months
2.	Soil Sampling	Sarah Commisso	6 to 12 months
3.	Soil Vapor Sampling (if required)	Sarah Commisso	6 to 12 months
4.	Dewatering Oversight	Sarah Commisso	6 to 12 months

Subcontractor(s) Tasks

Firm Name	Work Activity	Work Date(s) or Duration
N/A	Enter task description.	Enter dates/duration.

Projected Start Date: 8/1/2023

Projected Completion Date: 8/1/2024

2. SITE OVERVIEW / DESCRIPTION

Site Classification

Commercial

Site Description

The Site is located in the Gowanus neighborhood of Brooklyn at 169 3rd Avenue, Brooklyn, NY and is identified as Block 407 and Lot 1 on the New York City tax map. The rectangular shaped Site is 11,800 square feet in size and is bound to the north by Baltic Street followed by a multi-story residential buildng, to the west by Third Avenue followed by a single-story commerical/manufacturing building, to the east by a four-story residential building and a Cube Smart storage building, and to the south by Butler Street followed by a hotel.

Background and Historic Site Usage

The Site was used as a ladder storage from the 1940s through 1970s. Since the 1970s the site has been used for auto rental, car wash, and as a service station. Currently, the Site is vacant and was most recently operated by a BP Gas Station which ceased operations in early 2022.

Site Status

Indicate current activity status and describe operations at the site:

Inactive

Vacant

Site Plan

Is a site plan or sketch available? Yes

Work Areas

List and identify each specific work areas(s) on the job site and indicate its location(s) on the site plan:

The work area consists of the entire property.

Site Plan

3. HAZARD ASSESSMENT

Indicate all hazards that may be present at the site and for each task. If any of these potential hazards are checked, it is the Project Manager's responsibility to determine how to eliminate / minimize the hazard to protect onsite personnel.

Site Chemical Hazards

Is this Site impacted with chemical contamination? Yes

Source of information about contaminants: Previous Investigation

Contaminant of Concern	Location/Media	Concentration	Units
Benzene	**Soil**	**3.9**	**mg/kg**
Naphthalene	**Soil**	**25**	**mg/kg**
Benzo(a)pyrene	**Soil**	**15**	**mg/kg**
Arsenic	**Soil**	**51**	**mg/kg**
Lead	**Soil**	**5,320**	**mg/kg**
Mercury	**Soil**	**15.4**	**mg/kg**
Zinc	**Soil**	**3,450**	**mg/kg**
Urban Fill	**Soil**		Select Units
Choose an item.	Select Media.		Select Units

Benzene: Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death. The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection. Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men. Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

Naphthalene: is a colorless or white/brown solid in flake or cake form, with mothball odor. Commonly found in coal tar, gasoline, or diesel fuels. Used to make mothballs and lubricants. This is a carcinogen and should be handled with extreme caution. Is a combustible solid and when heated is a dangerous fire hazard. Finely dispersed particles can form explosive mixtures. Absorption will cause irritation or burning to skin or eyes. Inhalation will cause irritation to nose and throat. High exposures will lead to headache, fatigue, tremors, and nausea. May also cause damage to liver and kidneys. The PEL 10 ppm averaged over an 8 hour shift.

Arsenic: The Occupational Safety and Health Administration has set limits of 10 microgram arsenic per cubic meter of workplace air (10 µg/m3) for 8 hour shifts and 40 hour work weeks. Several studies have shown that inorganic arsenic can increase the risk of lung cancer, skin cancer, bladder cancer, liver cancer, kidney cancer, and prostate cancer. The World Health Organization (WHO), the Department of Health and Human Services (DHHS), and the EPA have determined that inorganic arsenic is a human carcinogen.

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs. Ingesting high levels of inorganic arsenic can result in death. Lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Lead: The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system. Long-term exposure to lead can result in decreased performance in some tests measuring functions of the nervous system in adults. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys and ultimately cause death.

Mercury: is an odorless, silver metallic liquid. It can be inhaled or absorbed through the skin. Contact may cause irritation to the skin or eyes. Toxic if ingested. Fume inhalation may cause irritation in the nose, throat or lungs. This is a corrosive chemical. Symptoms of poisoning include, muscle tremors, loss of appetite, and nausea. Long-term exposure may have effects on the central nervous system and kidneys. The PEL is 0.1 mg/m^3 averaged over an 8 hour shift.

Zinc: is an odorless, bluish-white powder. It is typically used in paints and can be mixed with other metals to make bass and other types of alloys. Zinc can produce flammable gases when in contact with water, sometimes creating vigorous or explosive reactions. It can also create gaseous hydrogen in

contact with water or moist air. Inhalation will cause irritation to eyes and respiratory system. Exposures cause flu-like symptoms, called “metal fume fever”, which can sometimes be delayed up to 48 hours after initial exposure.

Click + Add Additional Chemical Language

Site Hazards Checklist			
Weather			
Hot Temperatures	Cold Temperatures	Lightning Storms	Select Hazard
Select Hazard	Select Hazard	Select Hazard	Select Hazard

Hot Temperatures

Heat stress may occur at any time work is being performed at elevated ambient temperatures. Because heat stress is one of the most common and potentially serious illnesses associated with outdoor work during hot seasons, regular monitoring and other preventative measures are vital. Site workers must learn to recognize and treat the various forms of heat stress. The best approach is preventative heat stress management.

H&A employees and their subcontractors should be aware of potential health effects and/or physical hazards of working when there are hot temperatures or a high heat index. Refer OP1015-Heat Stress for a discussion on hot weather hazards.

Lightning Storms

Where the threat of electrical storms and the hazard of lightning exist staff shall ensure site procedures exist to: (1) detect when lightning is in the near vicinity and when there is a potential for lightning and (2) to notify appropriate site personnel of these conditions and (3) implement protocols to stop work and seek shelter.

The 30-30 Rule states that if time between seeing the lightning and hearing the thunder is less than 30 seconds, you are in danger and must seek shelter. You must also stay indoors for more than 30 minutes after hearing the last clap of thunder.

Cold Temperatures

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

Refer to OP1003-Cold Stress for additional information and mitigation controls.

Biological			
Small Mammals	Mosquitoes	Stinging Insects	Choose an item.
Choose an item.	Choose an item.	Choose an item.	Choose an item.
Choose an item.	Choose an item.	Choose an item.	Choose an item.

Small Mammals

Rodents, are the most abundant order of mammals. There are hundreds of species of rats; the most common are the black and brown rat. Other rodents you may encounter are mice, beavers, squirrels, guinea pigs, capybaras and coypu.

The Brown Rat has small ears, blunt nose, and short hair. It is approximately 14-18" long (with tail). They frequently infest garbage/rubbish, slaughterhouses, domestic dwellings, warehouses, and supermarkets. They also frequent any space with an easy meal and potential nesting sites. The Black Rat is identified by its tail, that is always longer than the length from the head to the body. It is also slimmer and more agile than the Brown rat. Its size varies according to its environment and food supply.

The House Mouse has the amazing ability to adapt and can frequently be found in human dwellings. In buildings, mice will live anywhere and difficult to keep out. Mice are omnivorous, they will eat anything. Rats and mice often become a serious problem in cold winter months when they seek food and warmth inside buildings. They may suddenly appear in large numbers when excavation work disturbs their in-ground nesting locations or their food source is changed.

Some major problems caused by rats and mice are contaminating the food they eat with urine and excrement. Gnawing into materials such as paper, wood, or upholstery, to use as nest material. Also gnawing plastic, cement, soft metals such as lead and aluminum, and wiring, which may cause a fire hazard. Occasionally biting people and may kill small animals. They, or the parasites they carry, like fleas, mites and worms, spread many diseases such as salmonella, trichinosis, rat bite fever, hantavirus, Weil's disease, and bubonic plague. They damage ornamental plants by burrowing among the roots or feeding on new growth. They also eat garden vegetables, such as corn and squash. These rodents have been a problem for centuries, because of their incredible ability to survive and are so difficult to eliminate. In addition, they are extremely compatible with human behavior and needs.

Avoid contact with rodents, if possible. Avoid contact with rodent excrement. Do not eat food or water that may have encountered rodent excrement. If exposed, wash hands and avoid touching your face with your hands.

Mosquitos

Work outdoors with temperatures above freezing will likely bring staff into contact with mosquitos. There are a variety of mosquito species that can transmit a range of diseases. Birds act as reservoirs for the viruses that can be collected by the mosquito and transmitted to a person. Majority of mosquitos are mainly a nuisance but staff need to take appropriate precautions to minimize the potential transmission of a virus that can result in one of the following diseases: West Nile, Eastern Equine Encephalitides and Western Encephalitides. Knowing some key steps that can minimize the risk of mosquito bites is, therefore, important in reducing the risks. Workers working outdoors should be aware that the use of PPE techniques is essential to preventing mosquito bites especially when working at sites where mosquitoes may be active and biting.

Use repellents containing DEET, picaridin, IR3535, and some oil of lemon eucalyptus and para-menthane-diol products provide longer-lasting protection. To optimize safety and effectiveness, repellents should be used according to the label instructions. Cover as much of your skin as possible by wearing shirts with long-sleeves, long pants, and socks whenever possible. Avoid use of perfumes and colognes when working outdoors during peak times when mosquitoes may be active; mosquitoes may be more attracted to individuals wearing perfumes and colognes.

Stinging Insects

Stinging Insects fall into two major groups: Apidae (honeybees and bumblebees) and vespids (wasps, yellow jackets, and hornets). Apidae are docile and usually do not sting unless provoked. The stinger of the honeybee has multiple barbs, which usually detach after a sting. Vespids have few barbs and can inflict multiple stings.

There are several kinds of stinging insects that might be encountered on the project site. Most stings will only result in a temporary injury. However, sometimes the effects can be more severe, even life-threatening depending on where you are stung and what allergies you have. Being stung in the throat area of the neck may cause edema (swelling caused by fluid build-up in the tissues) around the throat and may make breathing difficult.

In rare cases, a severe allergic reaction can occur. This can cause "anaphylaxis" or anaphylactic shock with symptoms appearing immediately or up to 30 minutes later. Symptoms include; Hives, itching and swelling in areas other than the sting site, swollen eyes/eyelids, wheezing, chest tightness, difficulty breathing, hoarse voice, swelling of the tongue, dizziness or sharp drop in blood pressure, shock, unconsciousness or cardiac arrest. Reactions can occur the first time you are stung or with subsequent

stings. If you see any signs of reaction, or are unsure, call or have a co-worker call emergency medical services (e.g., 911) right away. Get medical help for stings near the eyes, nose or throat. Stay with the person who has been stung to monitor their reaction.

Staff who are allergic to bee stings are encouraged to inform their staff/project manager. If staff member carries an Epi-pen (i.e., epinephrine autoinjector) they are encouraged to inform their colleagues in case they are stung and are incapable of administering the injection. Examine site for any signs of activity or a hive/nest. If you see several insects flying around, see if they are entering/exiting from the same place. Most will not sting unless startled or attacked. Do not swat, let insects fly away on their own. If you must, walk away slowly or gently "blow" them away. If a nest is disturbed and you hear "wild" buzzing, protect your face with your hands and run from the area immediately. Wear long sleeves, long pants, and closed-toed boots. Wear light colored clothes such as khakis. Avoid brightly colored, patterned, or black clothing. Tie back long hair to avoid bees or wasps from entanglement. Do not wear perfumes, colognes or scented soaps as they contain fragrances that are attractive. If bee or wasp is found in your car, stop and leave windows open.

Click + to Add Additional Hazard Language

Click + to Add Additional Hazard Language

Location/Terrain			
Slip/Trip/Falls	SIMOPS	Choose an item.	Choose an item.

Slips, Trips & Falls

Slip and trip injuries are the most frequent injuries to workers. Statistics show most falls happen on the same level resulting from slips and trips. Both slips and trips result from unintended or unexpected change in the contact between the feet and the ground or walking surface. Good housekeeping, quality of walking surfaces (flooring), awareness of surroundings, selection of proper footwear, and appropriate pace of walking are critical for 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 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.

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. Keep work areas clean and free of clutter. Communicate hazards to on-site personnel and remove hazards as appropriate.

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.

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

Coordinate project with site activities. Identify and understand the hazards associated with the host and 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.

Click + to Add Additional Hazard Language

Miscellaneous			
Extended Shift	Choose an item.	Choose an item.	Choose an item.

Extended Shift

An extended shift can include extending a workday beyond eight hours. Extended or unusual work shifts may be more stressful physically, mentally, and emotionally. Non-traditional shifts and extended work hours may disrupt the body's regular schedule, leading to increased fatigue, stress, and lack of concentration. This leads to an increased risk of operator error, injuries and/or accidents. The degree to which an individual is exposed to fatigue risk factors depends upon the work schedule. As both the duration of the workday and the number of days worked increase so does the fatigue risk factors. Staff Managers need to be aware of the fatigue risk factors and ensure projects are structured to mitigate these factors. Staff Members also have a responsibility to manage the personal fatigue risk factors that they can control outside of work (e.g, duration and quality of sleep, diet, drugs, and alcohol)

Fatigue is a message to the body to rest and can be eliminated with proper rest. However, if rest is not possible, fatigue can increase and becomes distressing and eventually debilitating. Fatigue symptoms, both mental and physical, vary and depend on the person and degree of overexertion. Examples include: weariness, sleepiness, irritability, reduced alertness, lack of memory, concentration and motivation, increased susceptibility to illness, depression, headache, loss of appetite, and digestive problems.

When possible, managers should limit use of extended shifts and increase the number of days worked. Working shifts longer than 8 hours generally result in reduced productivity and alertness. Additional

breaks and meals should be provided when working extended shift periods. Tasks requiring heavy physical labor or intense concentration should be performed at the beginning of the shift if possible. This is an important consideration for pre-emergency planning.

Make efforts, when feasible, to ensure that unavoidable extended work shifts and shift changes allow affected employees time for adequate rest and recovery. Project Managers need to plan to have an adequate number of personnel available to enable workers to take breaks, eat meals, relax, and sleep.

Plan for regular and frequent breaks throughout the work shift. If at remote sites, ensure if possible, that there is a quiet, secluded area designated for rest and recuperation. In addition to formal breaks such as lunch or dinner, encourage use of micro breaks to change positions, move about, and shift concentration. Personnel should look to obtain an adequate quantity and quality of sleep.

Task Hazard Summary

Select task from drop down menu. Click + to add additional tasks. Please ensure any project specific information is added to the task.

Task X – Excavation/Trenching

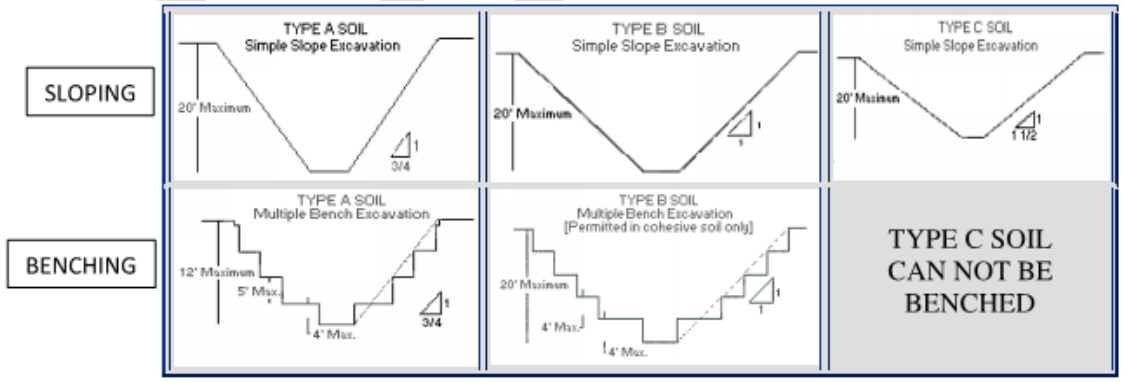
There are multiple hazards associated with working in and around excavations and trenches including cave-ins, potential running soils, dislodged excavated soils, lack of proper access and egress. Nonfatal, and even fatal, injuries may occur in association with excavation and trenching activities with a greater frequency than one might expect. Causes of bodily injury, illness, or death include asphyxiation, internal injuries due to physical crushing, falling objects and toxic exposures.

Excavations five (5) feet deep or greater require a protective system unless the excavation is made entirely in stable rock. If the depth is less than five (5) feet deep, a competent person may determine that a protective system is not required. Trenches 20 feet deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional.

H&A Staff Members shall not enter a trench that is five feet deep or greater unless a protective system is used or the soil(s) have been characterized and benched and/or sloped appropriately.

The following are list identifies the types of protective measures that can be used in the event a staff member is required to enter an excavation or trench.

- **Sloping** involves cutting back the trench wall at an angle inclined away from the excavation.
- **Benching** means a method of protecting workers from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near vertical surfaces between levels. Benching cannot be done in Type C soil. Below is a diagram indicating the appropriate slope angle for both sloping and benching.



- **Shoring** requires installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins.
- **Shielding** protects workers by using trench boxes or other types of supports to prevent soil cave-ins.

Designing a protective system can be complex because you must consider many factors: soil classification, depth of cut, water content of soil, changes caused by weather or climate, surcharge loads (e.g., spoil, other materials to be used in the trench) and other operations in the vicinity.

See OP 1001 Excavation and Trenching Safety for more information.

Task X - Hauling Soils Off-site

Hauling Soils Off-site is conducted for a range of services that can include but are not limited to: building, foundation, utility excavation and environmental cleanup. Familiarity with basic heavy construction safety is an essential component of all hauling projects. Potential hazards related to hauling soils off-site operations include, but are not limited to encountering underground or overhead utilities, traffic and heavy equipment, generated waste, and the use or unexpected encountering of toxic or hazardous substances. While staff members do not operate heavy equipment, they may work in close proximity to the equipment and may be exposed to many of the same hazards as the Contractor. Care should be taken during loading of truck/container that the staff is not in the line of fire of the loading equipment (swing radius/traffic pattern) or of the falling spoils/soil from the loading bucket or truck bed. The staff should be aware at all times of subsurface stability as a truck may tip during truck loading and unloading due items such as but not limited to uneven surface, poorly or uncompacted subsurface, thawing soils, saturated soils and proximity to excavation. It is imperative that staff are aware of emergency / communication protocols with the Contractor prior to the start of work.

Task X – Soil Sampling

Soil sampling by H&A staff on active construction sites can be conducted in conjunction with a wide range activities such as building construction, earthwork and soil management related 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 while entering and exiting excavations or trenches, and when accessing (climbing up or down) soil stockpiles, 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.

Task X - Steel Sheeting

Installation of Steel sheeting is typically conducted for foundations and utility trenches. Familiarity with basic heavy construction safety is an essential component of all piles installation. Potential hazards related to steel sheeting installation include, but are not limited to encountering line of fire, underground or overhead utilities, noise, traffic and heavy equipment, and overhead work, Cranes or Lifting Equipment. While staff members do not operate heavy equipment, they will work in close proximity to the equipment and may be exposed to many of the same hazards as the Contractor. Care should be taken during unloading of piles from delivery trucks or hoisting of piles onto the rig as staff may often be in the line of fire or swing radius of the cranes. Staff should be aware at all times of all overhead hoisting operations even during pile installation. Staff should always maintain a safe distance to the pile driving rig during installation as the pile/hammer/accessories may break free of the rig due to vibration/impact. Always have an "exit strategy" in mind when working near the pile driving hammer. It is imperative that staff are aware of emergency / communication protocols with the Contractor prior to the start of work.

Task X – Soil Vapor

Soil gas sampling is employed as an indirect indicator of contamination in soil or groundwater particularly over and around landfill waste sites, or groundwater plumes. Soil gas sampling points can be installed manually using a slam bar or power driven mechanical devices (e.g., demolition hammer or Geoprobe) may be used based on site conditions (i.e., pavement, frozen ground, very dense clays, etc.). Soil gas samples can be drawn through the probe itself, or through Teflon tubing inserted through the probe and attached to the probe point. Samples are collected and analyzed as described below. Other field air monitoring devices, such as the Combustible Gas Indicator (CGI) and the Organic Vapor Analyzer (OVA), can also be used, depending on specific site conditions.

Because the sample is being drawn from underground, and no contamination is introduced into the breathing zone, soil gas sampling usually occurs in Level D. Nevertheless, ambient air should be constantly monitored to obtain background and breathing zone readings during the sampling procedure in the event the seal around the sampling point is breached. As long as the levels in ambient air do not rise above background, no upgrade of the level of protection is needed. Also, an underground utility search must be performed prior to sampling.

Task X - Soldier Pile and Lagging

Installation of soldier pile and lagging is typically conducted for foundations and utility trenches. Familiarity with basic heavy construction safety is an essential component of all piles installation. Potential hazards related to soldier pile and lagging installation include, but are not limited to

encountering line of fire, underground or overhead utilities, noise, traffic and heavy equipment, and overhead work, Cranes or Lifting Equipment. While staff members do not operate heavy equipment, they will work in close proximity to the equipment and may be exposed to many of the same hazards as the Contractor. Care should be taken during unloading of piles from delivery trucks or hoisting of piles onto the rig as staff may often be in the line of fire or swing radius of the cranes. Staff should be aware at all times of all overhead hoisting operations even during pile installation. Staff should always maintain a safe distance to the pile driving rig during installation as the pile/hammer/accessories may break free of the rig due to vibration/impact. Always have an "exit strategy" in mind when working near the pile driving hammer or drill rig. During soil excavation and installation of the lagging the staff should be aware of the slope stability on both the up and down hill side of the excavation if applicable. It is imperative that staff are aware of emergency / communication protocols with the Contractor prior to the start of work.

Task X - Stockpiling

Stockpiling of soils is conducted for a range of services that can include but are not limited to: building, foundation, utility excavation, drilling spoils containment and environmental cleanup. Familiarity with basic heavy construction safety is an essential component of all hauling projects. Potential hazards related to stockpiling operations include, but are not limited to encountering underground or overhead utilities, traffic and heavy equipment, and the use or unexpected encountering of toxic or hazardous substances. While staff members do not operate heavy equipment, they may work in close proximity to the equipment and may be exposed to many of the same hazards as the Contractor. Care should be taken during material stockpiling that the staff is not in the line of fire of the loading equipment (swing radius/traffic pattern). The staff should be aware of any setback requirements of stockpile surcharges near trenches and excavations.

Task X - System Repairs

Conducting repairs on a water treatment system can expose staff members and/or contractors to a range of hazards depending upon the scope of work which can also influence the required safety training and specific PPE requirements. Staff need to have an understanding of the system and how it operates before conducting the work. The three most critical safety considerations when conducting repairs on a system include personal protective equipment, Lock Out/Tag Out, and potentially confined space entry (depending upon system design). An additional consideration is potential exposure to treatment chemicals or the effluent or contaminated water itself. Outage or repair plans should be made in advance so that staff with appropriate training and knowledge of the system can be identified.

Treatment systems may be located in remote locations which may result in staff working alone. Check in and out protocols are required when this occurs. Ensure facility requirements are reviewed and understood prior to accessing the client site and/or system.

Task X – Water Sampling

Environmental water sampling could include activities such as groundwater sampling from permanent or temporary wells, or surface water sampling from streams, rivers, lakes, ponds, lagoons, and surface impoundments.

Sampling tasks could involve uncapping, purging (pumping water out of the well), and sampling, and/or monitoring, new or existing monitoring wells. A mechanical pump may be used to purge the wells and can be hand-, gas-, or electric-operated. Water samples taken from the wells are then placed in containers and shipped to an analytical laboratory for analysis. The physical hazards of these operations are primarily associated with the collection methods and procedures used.

When sampling bodies of water containing known or suspected hazardous substances, adequate precautions must be taken to ensure the safety of sampling personnel. The sampling team member collecting the sample should not get too close to the edge, where ground failure or slips, trips or falls may cause him/her to lose his/her balance. The person performing the sampling should have fall restraint or protection for the task. When conducting sampling from a boat in an impoundment or flowing waters, appropriate vessel safety procedures should be followed. Avoid lifting heavy coolers with back muscles; instead, use ergonomic lifting techniques, team lift or mechanical lifts. Wear proper gloves, such as when handling sample containers to avoid contacting any materials that may have spilled out of the sample containers.

Inhalation and absorption of COCs are the primary routes of entry associated with water sampling, due to the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. During this project, several different groundwater sampling methodologies may be used based on equipment accessibility and the types of materials to be sampled. These sampling methods may include hand or mechanical bailing. The primary hazards associated with these specific sampling procedures are not potentially serious; however, other operations in the area or the conditions under which samples must be collected may present chemical and physical hazards. The hazards directly associated with groundwater sampling procedures are generally limited to strains or sprains from hand bailing, and potential eye hazards. Exposure to water containing COCs is also possible. All tools and equipment that will be used at the site must be intrinsically safe (electronics and electrical equipment) and non-sparking or explosion-proof (hand tools).

Select task from drop down menu. Click + to add additional tasks. Please ensure any project specific information is added to the task.

Task Physical Hazards Checklist				
Potential Task Hazards	**Task 1** **Remedial Oversight**	**Task 2** **Soil Sampling**	**Task 3** **Soil Vapor Sampling**	**Task 4** **Dewatering Oversight**
Excavation/Trenching	☒	☐	☐	☐

Energized Equipment	☒	☒	☐	☒
Ergonomics	☐	☒	☒	☐
Generated Wastes	☒	☐	☐	☒
Ground Disturbance	☒	☐	☐	☐
Hand/Power Tools	☐	☒	☒	☐
Heavy Equipment	☒	☐	☐	☐
Manual Lifting	☒	☒	☒	☐
Noise	☒	☐	☐	☒
Overhead Utilities	☒	☐	☐	☐
Slippery Surfaces	☒	☒	☒	☒
Sharp Objects	☒	☒	☐	☐
Underground Utilities	☒	☐	☐	☐
Congested Area	☒	☒	☐	☒
Other: Specify	☐	☐	☐	☐

Summary of Physical Hazards & Controls

Excavation & Trenches

There are multiple hazards associated with working in and around excavations and trenches including cave-ins, potential running soils, dislodged excavated soils, lack of proper access and egress. Nonfatal, and even fatal, injuries may occur in association with excavation and trenching activities with a greater frequency than one might expect. Causes of bodily injury, illness, or death include asphyxiation, internal injuries due to physical crushing, falling objects and toxic exposures.

See OP1001 Excavation and Trenching Safety for more information.

Controls

- Do not enter an exaction unless it has been inspected and has appropriate protective measures in place: shoring, benching, or sloping.
    - Protective measures are required for excavations that are 5 feet or deeper.
- If entry is required verify with the on-site competent person that:
    - no atmospheric hazards exist or have the potential to exist
    - there is no standing water or water removal operations are in place
    - the daily inspection has occurred
    - spoil piles, equipment or other is at least 2 feet from the edge

    - There is safe access and egress to the excavation which can include ladders, steps, ramps or other safe means. The means of access and egress shall be no more than 25’ away.
- If there is any doubt about the safety of the excavation personnel will not enter the excavation or trench and will contact the PM and the Regional Safety Manager.
- Do not stand on the long side of the cut. If required ensure there are no tension cracks.

Energized Equipment

Energy sources including electrical, mechanical, hydraulic, pneumatic, or other sources in machines and equipment can be hazardous to workers. During servicing and maintenance of machines and equipment, the unexpected startup or release of stored energy can result in serious injury or death to workers.

Staff members that are required to work on energized equipment must first ensure that the source of energy is isolated and/or de-energized. In addition, any stored energy must also be released. Staff must ensure that the process to de-energize and isolate energy sources is documented and communicated to those who are working on the equipment. Staff must be trained on and understand the procedure.

See OP 1032 Control of Hazardous Energy for more information.

Controls

- Document process to de-energize or isolate energy sources.
- Ensure staff are appropriately trained to conduct work requiring LOTO.
- Affix log or tag to equipment to ensure improper start-up or release of energy.
- Execute an Energy Isolation Permit.

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 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.

See OP1053 Ergonomics for more information.

Controls

- Ensure workstations are ergonomically correct so bad posture is not required to complete tasks.
- Take periodic breaks over the course of the day.
- Stretch during break times.
- Break up tasks that require repetitive motion.

- Contact Corporate H&S with any ergonomic concerns

Generated Waste

Activities on environmental sites may generate waste that requires regulated handling and disposal. Excess sample solids, decontamination materials, poly sheeting, used PPE, 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.

Controls

- Manage waste properly through good work practices.
- Collect, store, containerize waste, and dispose of it properly.
- 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.
- 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.

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.

Hand and Power Tools

Hand and power tools can expose staff to a wide range of hazards depending upon the tool used. Hazards can include but are not limited to: falling, flying, abrasive, and splashing objects, or harmful dusts, fumes, mists, vapors, or gases.

Serious accidents often occur before steps are taken to evaluate and avoid or eliminate tool-related hazards. Staff must recognize the hazards associated with the different types of tools and the safety precautions necessary to prevent those hazards.

See OP 1026 Hand and Power Tools for more information.

Controls

- Keep all tools in good condition with regular maintenance.
- Use the right tool for the job. Do not use a tool for a task which it was not designed for.
- Examine each tool for damage before use and do not use damaged tools.
- For tools that are damaged or defective, red tag the tool and take out of service.
- Operate tools per the manufacturers' instructions.
- Use the appropriate personal protective equipment.
- All electrically powered tools will be connected through a ground fault circuit interrupter (GFCI).
- All personnel must be trained on the use of the tool they are utilizing.

Choose a building block.

Heavy Equipment

Staff must be careful and alert when working around heavy equipment, failure or breakage and limited visibility can lead to accidents and worker injury. Heavy equipment such as cranes, drills, haul trucks, or other can fail during operation increasing chances of worker injury. Equipment of this nature shall be visually inspected and checked for proper working order prior to commencement of field work. Those operating heavy equipment must meet all requirements to operate the equipment. Haley & Aldrich, Inc. staff that supervise projects or are associated with 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., operator places the bucket on the ground).
- Always maintain visual contact with operators 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 all equipment and never go beneath a hoisted load.
- Avoid fumes created by heavy equipment exhaust.

Manual Lifting/Moving

Most materials associated with investigation, remedial, or construction-related activities are moved by hand. The human body is subject to damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process.

Controls

- Under no circumstances should any one person lift more than 49 pounds unassisted.
- Always push, not pull, the object when possible.
- Size up the load before lifting. If it is heavy or clumsy, get a mechanical aid or help from a worker.
- Bend the knees; it is the single most important aspect of lifting.
- When performing the lift:
    - Place your feet close to the object and center yourself over the load.
    - Get a good handhold.
    - Lift straight up, smoothly and let your legs do the work, not your back!
    - Avoid overreaching or stretching to pick up or set down a load.
    - Do not twist or turn your body once you have made the lift.
    - Make sure beforehand that you have a clear path to carry the load.
    - Set the load down properly.

Noise

Working around heavy equipment (drill rigs, excavators, etc.) often creates excessive noise. The effects of noise 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 working within 25 feet of operating heavy equipment 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.

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	10/6.1
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.

Slippery Surfaces

Both slips and trips result from unintended or unexpected change in the contact between the feet and ground or walking surface. Good housekeeping, quality of walking surfaces, selection of proper footwear, and appropriate pace of walking are critical for preventing fall accidents. Slips happen where there is too little friction or traction between the footwear and walking surface.

Common causes of slips are wet or oily surfaces, spills, weather hazards, loose unanchored rugs or mats and flooring or other walking surfaces that do not have same degree of traction in all areas.

Weather-related slips and falls become a serious hazard as winter conditions often make for wet or icy surfaces outdoors. Even wet organic material or mud can create hazardous walking conditions. Spills and leaks can also lead to slips and falls.

Controls

- Evaluate the work area to identify any conditions that may pose a slip hazard.

- Address any spills, drips or leaks immediately.
- Mark areas where slippery conditions exist.
- Select proper footwear or enhance traction with additional PPE.
- Where conditions are uncertain or environmental conditions result in slippery surfaces walk slowly, take small steps, and slide feet on wet or slippery surfaces.

Sharp Objects

Workers who handle sharp edged objects like sheets of steel or glass are at risk of cuts. Workers who handle sharp edged objects are also at risk of cuts. Injuries may occur to hands, fingers, or legs when they are in the way of the blade, when the blade slips, or if an open blade is handled unexpectedly. Other hazards at job sites include stepping on sharp objects (e.g. wooden boards with protruding nails, sharp work-tools, chisels, etc.) and colliding with sharp and/or protruding objects.

Controls

Always be alert when handling sharps. Never look away or become distracted while handling sharp objects. Use caution when working with tools; use right tool for the job. Keep tools sharp, dull blades are a safety hazard, requiring more force to make cuts which can lead to tool slippage. Wear appropriate PPE and do not handle sharp objects (i.e., broken glass) with bare hands. Use mechanical devices, when possible. Stay away from building debris; avoid handling site debris or placing your hand where you cannot see. Watch out for barbed wire and electrical fences; cover with a car mat or equivalent to cross or walk around; use the buddy system to avoid entanglement; wear gloves. Do not leave unprotected sharps unattended. Use protective shields, cases, styrofoam blocks, etc. Pass a sharp by handing it over carefully by the handle with the blade down or retracted. Fixed open blades are prohibited. Always cut away from the body, making several passes when cutting thicker materials. Make sure blades are fitted properly into the knife. Never cut items with a blade or other sharp object on your lap. Never try to catch a blade or cutting tool that is falling.

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 SHSO, 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 locations with the property owner or knowledgeable site representative;
- Perform a geophysical survey to locate utilities;
- Hire a private line locating firm to determine 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.

Congested Areas

Working in congested areas can expose both workers and the public to a wide range of hazards depending upon the specific activities taking place. Staff Members need to understand the work scope, work areas, equipment on-site, and internal traffic patterns to minimize or eliminate exposure potential.

Controls

- Provide barricades, fencing, warning signs/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 should always wear high visibility clothing.
- 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.

4. PROTECTIVE MEASURES

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

Required Safety & Personal Protective Equipment

Required Personal Protective Equipment (PPE)	**Task 1**	**Task 2**	**Task 3**	**Task 4**
	Remedial Oversight	Soil Sampling	Soil Vapor Sampling	Dewatering Oversight
Hard hat	☒	☒	☒	☒
Safety Glasses	☒	☒	☒	☒
Safety Toed Shoes	☒	☒	☒	☒
Class 2 Safety Vest	☒	☒	☒	☒
Hearing Protection	☒	☐	☐	☐
Nitrile Gloves	☒	☒	☒	☒
Cut Resistant Gloves	☒	☒	☒	☒
Level of protection required	D	D	D	D
Required Safety Equipment				
First Aid Kit	☒	☒	☒	☒
Choose an item.	☐	☐	☐	☐

5. TRAINING REQUIREMENTS

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

Site Specific Training Requirements
HAZWOPER - 40 Hour (Initial)
HAZWOPER - 8 Hour (Annual Refresher)
Choose an item.

Task Specific Training Requirements				
Required Training Type	**Task 1**	**Task 2**	**Task 3**	**Task 4**
	Remedial Oversight	Soil Sampling	Soil Vapor Sampling	Dewatering Oversight
RCRA Haz Waste Generator	☒	☐	☐	☐

6. AIR MONITORING PLAN AND EQUIPMENT

Exposures to airborne substances shall be fully characterized throughout project operations to ensure that exposure controls are effectively selected and modified as needed.

Is air/exposure monitoring required at this work site for personal protection? Choose an item.

Is perimeter monitoring required for community protection? Choose an item.

Air monitoring plan not applicable Choose an item.

Air Monitoring/Screening Equipment Requirements

Photo-Ionization Detector (PID) 10.6eV

The required equipment listed above must be on site. Work shall not commence unless the equipment is present and in working order.

Monitoring Plans

Parameter/ Contaminant	Equipment	Action Level	Response Activity
VOCs	PID 10.6 eV	< 10 ppm	Continue work and monitoring.
		>10 ppm for 5 minutes	Clear Instrument and Re-Monitor the Area. Implement PPE upgrades
		>10 ppm for >5 minutes	Evacuate the area and call the RHSM and/or PM for further guidance. Implement engineering controls.

Zone Location and Monitoring Interval
Breathing zone and edge of Exclusion Zone.

Enter any content that you want to repeat, including other content controls. You can also insert this control around table rows in order to repeat parts of a table.
Enter any content that you want to repeat, including other content controls. You can also insert this control around table rows in order to repeat parts of a table.

***If chemical does not have an action level use TLV or REL, whichever is lowest, to be used as an action level. If TLV or REL are the same as PEL, cut the PEL in half for an action level.**

Parameter/ Contaminant	Equipment	Action Level*	Response Activity
Choose an item.	Choose an item.		

Zone Location		Monitoring Interval
Choose an item.	Choose an item.	Choose an item.

7. DECONTAMINATION & DISPOSAL METHODS

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.)

Personal Hygiene Safeguards

The following minimum personal hygiene safeguards shall be adhered to:

1. No smoking or tobacco products in any project work areas.
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.

It is recommended that personnel present on site shower or bathe at home at the end of each day of working on the site.

Decontamination Supplies

All decontamination should be conducted at the project site in designated zones or as dictated by Client requirements. Decontamination should not be performed on Haley & Aldrich owned or leased premises.

☐ Acetone	☒ Distilled Water	☐ Polyethylene Sheeting
☒ Alconox Soap	☐ Drums	☐ Pressure/Steam Cleaner
☒ Brushes	☐ Hexane	☒ Tap Water
☒ Disposal Bags	☐ Methanol	☐ Wash tubs
☒ 5 Gallon Buckets	☒ Paper Towels	☐ Other: Specify

Location of Decontamination Station

To be communicated during Site kick-off meeting.

Standard Personal Decontamination Procedures

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 Field 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 outer gloves were used)

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

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:

4. Wash using a solution of Alconox and water
5. Rinse with potable water
6. Rinse with methanol (or equivalent)
7. Rinse with distilled/deionized water

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

Disposal Methods
Procedures for disposal of contaminated materials, decontamination waste, and single use personal protective equipment shall meet applicable client, locate, State, and Federal requirements.
Disposal of Single Use Personal Protective Equipment
PPE that is not grossly contaminated can be bagged and disposed in regular trash receptacles. PPE that is grossly contaminated must be bagged (sealed and field personnel should communicate with the Project Manager to determine proper disposal.
• Contaminated soil cuttings and spoils must be containerized for disposal off-site unless otherwise specifically directed. • 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.

8. 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

Haley & Aldrich site personnel will communicate with other Haley & Aldrich staff member and/or subcontractors or contractors with:

Face to Face Communication

External

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

Cellular Phones

Visitors

Project Site

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

Yes

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.

Sarah Commisso is responsible for facilitating authorized visitor access.

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:

Cones
Barricades
Temporary Fencing

9. SITE SPECIFIC EMERGENCY RESPONSE PLAN

The Emergency Response Plan addresses potential emergencies at this site, procedures for responding to these emergencies, roles, responsibilities during emergency response, and training. This section also describes the provisions this project has made to coordinate its emergency response with other contractors onsite and with offsite emergency response organizations (as applicable).

During the development of this emergency response plan, local, state, and federal agency disaster, fire, and emergency response organizations were consulted (if required) to ensure that this plan is compatible and integrated with plans of those organizations. Documentation of the dates of these consultations are the names of individuals contacted is kept on file and available upon request.

The site has been evaluated for potential emergency occurrences, based on site hazards, and the major categories of emergencies that could occur during project work are:

- Fire(s)/Combustion
- Hazardous Material Event
- Medical Emergency
- Natural Disaster

A detailed list of emergency types and response actions are summarized in Table X below. Prior to the start of work, the SSO will update the table with any additional site-specific information regarding evacuations, muster points, or additional emergency procedures. The SSO will establish evacuation routes and assembly areas for the Site. All personnel entering the Site will be informed of these routes and assembly areas.

Pre-Emergency Planning

Before the start of field activities, the Project Manager will ensure preparation has been made in anticipation of emergencies. Preparatory actions include the following:

Meeting with the subcontractor/and or client concerning the emergency procedures in the event a person is injured. Appropriate actions for specific scenarios will be reviewed. These scenarios will be discussed, and responses determined before the sampling event commences. A form of emergency communication (i.e.; Cell phone, Air horn, etc.) between the Project Manager and subcontractor and/or client will be agreed on before the work commences.

A training session (i.e., “safety meeting”) given by the Project Manager or their designee informing all field personnel of emergency procedures, locations of emergency equipment and their use, and proper evacuation procedures.

Ensuring field personnel are aware of the existence of the emergency response HASP and ensuring a copy of the HASP accompanies the field team(s).

Onsite Emergency Response Equipment

Emergency procedures may require specialized equipment to facilitate work rescue, contamination control and reduction or post-emergency cleanup. Emergency response equipment stocked

Table 9.1 Emergency Equipment and Emergency PPE			
Emergency Equipment	**Specific Type**	**Quantity Stocked**	**Location Stored**
First Aid Kit	Enter text	1	Site Trailer
Emergency PPE	**Specific Type**	**Quantity Stocked**	**Location Stored**
Select	Enter text	Enter text	Enter text

EVACUATION ALARM
Will be communicated during the Onsite Kickoff Meeting
EVACUATION ROUTES
Will be given a map after site specific training
EVACUATION MUSTER POINT(S)/ SHELTER AREA(S)
Will be given a locations after site specific training
EVACUTION RESPONSE DRILLS
The Site relies on outside emergency responders and a drill is not required.

Table 9-2 – Emergency Planning

Emergency Type	Notification	Response Action	Evacuation Plan/Route
Chemical Exposure	Report event to SSO immediately	Refer to Safety Data Sheet for required actions	Remove personnel from work zone
Fire - Small	Notify SSO and contact 911	Use fire extinguisher if safe and qualified to do so	Mobilize to *Muster Point*
Fire – Large/Explosion	Notify SSO and contact 911	Evacuate immediately	Mobilize to *Muster Point*
Hazardous Material – Spill/Release	Notify SSO; SSO will contact PM to determine if additional agency notification is	If practicable don PPE and use spill kit and applicable procedures to contain the release	See Evacuation Map for route, move at least 100 ft upwind of spill location
Medical – Bloodborne Pathogen	Notify SSO	If qualified dispose in container or call client or city to notify for further instruction.	None Anticipated
Medical – First Aid	Notify SSO	If qualified perform first aid duties	None Anticipated
Medical – Trauma	If life threatening or transport is required call 911, immediately	Wait at site entrance for ambulance	Noe Anticipated
Security Threat	Notify SSO who will call 911 as warranted	Keep all valuables out of site and work zones delineated.	None Anticipated
Weather – Earthquake/Tsunami's	STOP WORK and evacuate Site upon any earthquake	Turn off equipment and evacuate as soon as is safe to do so	Mobilize to *Shelter Location*
Weather – Lightning Storm	STOP WORK	Work may resume 30 minutes after the last observed lightning.	None Anticipated
Weather – Tornadoes/Hurricanes	Monitor weather conditions STOP WORK and evacuate the site	Evacuate to shelter location or shelter in place immediately	Mobilize to *Shelter Location*
MUSTER POINT To be communicated during Site kick-off meeting		*SHELTER LOCATION* To be communicated during Site kick-off meeting	
In case of site emergencies, site personnel shall be evacuated per this table and will not participate in emergency response activities. Site emergencies shall be reported to local, state, and federal governmental agencies as required.			

10. HASP ACKNOWLEDGEMENT FORM

All Haley & Aldrich employees onsite must sign this form prior to entering the site.

I hereby acknowledge receipt of, and briefing on, this HASP prior to the start of on-site work. I declare that I understand and agree to follow the provisions, processes, and procedures set forth herein at all times while working on this site.

Printed Name	Signature	Date

ATTACHMENT A
HASP AMENDMENT FORM

HASP AMENDMENT FORM

This form is to be used whenever there is an immediate change in the project scope that will require an amendment to the HASP. For project scope changes associated with "add-on" tasks, the changes must be made in the body of the HASP. Before changes can be made, a review of the potential hazards must be initiated by the Haley & Aldrich Project Manager.

This original form must remain on site with the original HASP. If additional copies of this HASP have been distributed, it is the Project Manager's responsibility to forward a signed copy of this amendment to those who have copies.

Amendment No.	
Site Name	
Work Assignment No.	
Date	
Type of Amendment	
Reason for Amendment	
Alternate Safeguard Procedures	
Required Changes in PPE	

Project Manager Name (Print)	Project Manager Signature	Date

Health & Safety Approver Name (Print)	Health & Safety Approver Signature	Date

ATTACHMENT B
TRAINING REQUIREMENTS

TRAINING REQUIREMENTS

Health and Safety Training Requirements

Personnel will not be permitted to supervise or participate in field activities until they have been trained to a level required by their job function and responsibility. Haley & Aldrich staff members, contractors, subcontractors, and consultants who have the potential to be exposed to contaminated materials or physical hazards must complete the training described in the following sections.

The Haley & Aldrich Project Manager/FSM will be responsible for maintaining and providing to the client/site manager documentation of Haley & Aldrich staff members' compliance with required training as requested. Records shall be maintained per OSHA requirements.

40-Hour Health and Safety Training

The 40-Hour Health and Safety Training course provides instruction on the nature of hazardous waste work, protective measures, proper use of personal protective equipment, recognition of signs and symptoms which might indicate exposure to hazardous substances, and decontamination procedures. It is required for all personnel working on-site, such as equipment operators, general laborers, and supervisors, who may be potentially exposed to hazardous substances, health hazards, or safety hazards consistent with 29 CFR 1910.120.

8-hour Annual Refresher Training

Personnel who complete the 40-hour health and safety training are subsequently required to attend an annual 8-hour refresher course to remain current in their training. When required, site personnel must be able to show proof of completion (i.e., certification) at an 8-hour refresher training course within the past 12 months.

8-Hour Supervisor Training

On-site managers and supervisors directly responsible for, or who supervise staff members engaged in hazardous waste operations, should have eight additional hours of Supervisor training in accordance with 29 CFR 1910.120. Supervisor Training includes, but is not limited to, accident reporting/investigation, regulatory compliance, work practice observations, auditing, and emergency response procedures.

Additional Training for Specific Projects

Haley & Aldrich personnel will ensure their personnel have received additional training on specific instrumentation, equipment, confined space entry, construction hazards, etc., as necessary to perform their duties. This specialized training will be provided to personnel before engaging in the specific work activities including:

- Client specific training or orientation
- Competent person excavations
- Confined space entry (entrant, supervisor, and attendant)
- Heavy equipment including aerial lifts and forklifts
- First aid/ CPR
- Use of fall protection
- Use of nuclear density gauges
- Asbestos awareness

ATTACHMENT C
ROLES AND RESPONSIBILITIES

SITE ROLES AND RESPONSIBILITIES

Haley & Aldrich Personnel

Field Safety Manager (FSM)

The Haley & Aldrich FSM 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 SHSOs on matter 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 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 FSM with updated information regarding environmental conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SHSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SHSO;
- Maintaining regular communications with the SHSO 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 Health & Safety Officer (SHSO)

The SHSO is responsible for field implementation of this HASP and enforcement of safety rules and regulations. SHSO functions may include some or all of the following:

- Act as Haley & Aldrich´s liaison for health and safety issues with client, staff, subcontractors, and agencies.
- Verify that utility clearance has been performed by Haley & Aldrich subcontractors.
- Oversee day-to-day implementation of the Safety Plan by Haley & Aldrich 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 Haley & Aldrich safety equipment, including calibration of air monitoring instrumentation used by Haley & Aldrich.
- Perform changes to HASP and document in Appendix A of the HASP as needed and notify appropriate persons of changes.
- Investigate and report on-site accidents and incidents involving Haley & Aldrich 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 Haley & Aldrich PM and FSM as needed.

The SHSO will conduct initial site safety orientations with site personnel (including subcontractors) and conduct toolbox and safety meetings thereafter with Haley & Aldrich employees and Haley & Aldrich subcontractors at regular intervals and in accordance with Haley & Aldrich policy and contractual obligations. The SHSO will track the attendance of site personnel at Haley & Aldrich 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 SHSO 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 SHSO 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 SHSO;
- Complying with the requirements of this safety plan and the requests of the SHSO; 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.

SUBCONTRACTOR PERSONNEL

Subcontractor Site Representative

Each contractor and subcontractor shall designate a Contractor Site Representative. The Contractor Site Representative will interface directly with Insert Staff Name Here, the Subcontractor Site Safety Manager, with regards to all areas that relate to this safety plan and safety performance of work conducted by the contractor and/or subcontractor workforce. Contractor Site Representatives for this site are listed in the Contact Summary Table at the beginning of the Safety Plan.

Subcontractor Site Safety Manager

Each contractor / subcontractor will provide a qualified representative who will act as their Site Safety Manager (Sub-SSM). This person will be responsible for the planning, coordination, and safe execution of subcontractor tasks, including preparation of job hazard analyses (JHA), performing daily safety planning, and coordinating directly with the Haley & Aldrich SHSO for other site safety activities. This person will play a lead role in safety planning for Subcontractor tasks, and in ensuring that all their employees and lower tier subcontractors are in adherence with applicable local, state, and/or federal regulations, and/or industry and project specific safety standards or best management practices.

General contractors / subcontractors are responsible for preparing a site-specific HASP and/or other task specific safety documents (e.g., JHAs), which are, at a minimum, in compliance with local, state, and/or federal other regulations, and/or industry and project specific safety standards or best management practices. The contractor(s)/subcontractor(s) safety documentation will be at least as stringent as the health and safety requirements of the Haley & Aldrich Project specific HASP.

Safety requirements include, but are not limited to: legal requirements, contractual obligations and industry best practices. Contractors/subcontractors will identify a site safety representative during times when contractor/subcontractor personnel are on the Site. All contractor/subcontractor personnel will undergo a field safety orientation conducted by the Haley & Aldrich SHSO and/or PM prior to commencing site work activities. All contractors / subcontractors will participate in Haley & Aldrich site safety meetings and their personnel will be subject to training and monitoring requirements identified in this Safety Plan. If the contractors / subcontractors means and methods deviate from the scope of work described in Section 1 of this Safety Plan, the alternate means and methods must be submitted, reviewed and approved by the Haley & Aldrich SHSO and/or PM prior to the commencement of the work task. Once approved by the Haley & Aldrich SHSO and/or PM, the alternate means and methods submittal will be attached to this Safety Plan as an Addendum.

ATTACHMENT D
JOB SAFETY ANALYSES

Safety
in everything we do

556 BALTIC STREET SITE – NYSDEC BCP SITE C224375

KEY TASK ENTER TASK NUMBER.**:** ENTER TASK NAME.

Subtask Category	Potential Hazards	Controls
Enter subtask information.	Choose category.	- Enter control(s) for each hazard.
Enter subtask information.	Choose category.	- Enter control(s) for each hazard.
Enter subtask information.	Choose category.	- Enter control(s) for each hazard.
Enter subtask information.	Choose category.	- Enter control(s) for each hazard.
Enter subtask information.	Choose category.	- Enter control(s) for each hazard.
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Enter subtask information.	Choose category.	- Enter control(s) for each hazard.

Enter subtask information.	Choose category.	• Enter control(s) for each hazard.

APPENDIX E
Citizen Participation Plan

NEW YORK STATE | Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan

for

556 Baltic Street Site
151-169 Third Avenue

December 2022

BCP Site No. C224375
151-169 Third Avenue
Brooklyn, NY 11217

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **159 Realty LLC, 159 Third Residence LLC, and Baltic Residence LLC ("Applicant")**
Site Name: **556 Baltic Street Site**
Site Address:**151-169 Third Avenue, Brooklyn, New York 11217**
Site County: **Kings County**
Site Number: **C224375**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html .

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision-makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision-making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC website. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- Residents, owners, and occupants of the site and properties adjacent to the site;
- The public water supplier which services the area in which the site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- Location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities
The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site

investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

No major issues of public concern have been identified at this point in the brownfields cleanup program process. Any future changes to this section will be detailed in the Scoping Sheet for Major Issues of Public Concern and submitted to the NYSDEC.

Contaminants of concern for the Site include volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), and metals. Issues of concern would be in regards to the nearby local residents and property owners. During ground intrusive activities, the community will be protected from contamination migration using air monitoring protocols and management of investigation derived waste as detailed in the Remedial Investigation Work. Additional details are provided in Section 4.

The Site is located in an Environmental Justice Area. Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

The site is located in a community with a sizable Hispanic-American and African American population nearby. Therefore all future fact sheets will be translated into Spanish.

For additional information, visit: https://statisticalatlas.com/tract/New-York/Kings-County/012700/Race-and-Ethnicity

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The Site is located at 169 Third Avenue in the urban setting of the Gowanus neighborhood in Brooklyn, NY. The Site is 11,800-square feet and is bounded by a commercial building and a multi-family residential building to the east. Currently, the

Site is vacant. The southern portion was most recently operated as Beyond Petroleum (BP) Gas Station, which ceased operations in 2022. The northern portion of the Site was most recently occupied by Baltic Street Car Wash and an auto detailing operation, which ceased operations in December 2021. The Site is improved with a one-story building formerly used by the car wash, a one-story office/storefront and three pump islands associated with the former gas station. The remainder of the Site is paved and was used for ingress/egress and parking.

History of Site Use, Investigation, and Cleanup

The Site was initially developed with multiple four-story commercial stores in the 1920s. By 1978, a car wash was constructed on the northern portion of the Site. The Site most recently operated as a gasoline service station, auto rental, and car wash from the 1970s until the cessation of operations in 2021-2022. Two 4,000-gallon underground storage tanks (USTs) containing gasoline were installed in 1972 and remain present on the Site. Additionally, a 550-gallon UST, installed in 1974, was reportedly closed and removed in 1997. No other tanks have been registered at the Site. Currently the Site is vacant.

A Phase I Environmental Site Assessment (ESA) was completed in September 2021 by GEI Consultants, a Limited Phase II Environmental Site Investigation (ESI) Report was completed on 17 December 2021 by Haley & Aldrich of New York, and a Remedial Investigation Report for the NYCOER was completed by completed by Haley & Aldrich of New York in January 2022. Previous investigations identified contaminants at the Site including petroleum and metals.

The Site was previously subject to groundwater remediation activities under DEC's oversight pursuant to Article 12 of the New York State Navigation Law due to a spill case (Spill No. 95-06588) which identified the subsurface to be contaminated with gasoline. Remedial systems, including enhanced bioremediation via microbes used to reduce contamination in groundwater, were implemented at the Site in October 2007. Quarterly monitoring of these systems and the groundwater quality continued through May 2019 when the spill case was closed.

Redevelopment of the site is anticipated to include excavation and off-site disposal of contaminated soil. During future ground intrusive activities, the community will be protected from contamination migration using air monitoring protocols which will be detailed in a forthcoming Remedial Action Work plan to be approved by NYSDEC.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for unrestricted purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant will conduct an investigation of the site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation workplan, which is subject to public comment.

The site investigation has several goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; and
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant has submitted a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC made the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is

needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a “significant threat,” it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the Final Engineering Report (FER). NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan (SMP).

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Ruth Curley, PE
NYSDEC
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-5060
(518) 402-9480
Ruth.curley@dec.ny.gov

Thomas V. Panzone
Public Participation Specialist
NYSDEC Region 2
47-40 21st Street,
Long Island City, NY 11101
(718) 482-4953
Thomas.panzone@dec.ny.gov

New York State Department of Health (NYSDOH):

Chris Budd
NYSDOH, Public Health Specialist
Bureau of Environmental Exposure
Investigation
Empire State Plaza, Corning Tower,
Room 1787
Albany, NY 12203
(518) 402-1769
beei@health.ny.gov

NYSDEC InfoTracker
https://www.dec.ny.gov/data/DecDocs/C224375/

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Brooklyn Community Board 6
250 Baltic Street
Brooklyn, NY 11201
Phone: 718-643-3027
Email: mike@bkcb6.org
infobkcb6@gmail.com
Attn: Michael Racioppo – District Manager
Peter D. Fleming - Chairperson
Hildegaard Link, Environmental Protection Co-Chair
Angelica Ramdhari, Environmental Protection Co-Chair

Pacific Branch - Brooklyn Public Library
25 Fourth Avenue at Pacific Street
Brooklyn, NY 11217
Phone: 718-638-1531
Email: cvasquez@bklynlibrary.org
Attn: Candace Vasquez
Hours: M, W, F – 10am-6pm
T – 1pm-8pm
Th – 10am-8pm
S – 10am-5pm
Su – Closed

Appendix B - Site Contact List

Government Officials

NYC Mayor
Hon. Eric Adams
City Hall
New York, NY 10007

NYC Department of City Planning
Daniel Garodnick
Commissioner Chair
120 Broadway 31st Floor
New York, NY 10271

Brooklyn Borough President
Hon. Antonio Reynoso
Brooklyn Borough Hall
209 Joralemon Street,
Brooklyn, NY 11201

New York City Council District 33
Hon. Lincoln Restler
410 Atlantic Avenue,
Brooklyn, NY 11217

NY Senate District 25 Senator
Hon. Jabari Brisport
The Shirley Chisholm State Office Building
55 Hanson Place, Suite 702,
Brooklyn, NY 11217

NY State Assembly District 052 Member
Hon. Jo Anne Simon
341 Smith Street,
Brooklyn, NY 11231

Hon. Brad Lander
NYC Comptroller
1 Centre Street
New York, NY 10007

Hon. Jumaane Williams
Public Advocate
1 Centre Street
New York, NY 10007

Hon. Nydia Velasquez
U.S. House of Representatives
266 Broadway, Suite 201
Brooklyn, NY 11211

Mark McIntyre, Acting Director/General Counsel
NYC Office of Environmental Remediation
100 Gold Street - 2nd Floor
New York, NY 10038

Public Water Supplier - Rohit Aggarwala
NYC Dept. of Environmental Protection
59-17 Junction Boulevard
Flushing, NY 11373

Hon Charles Schumer
U.S. Senator
780 Third Avenue, Suite 2301
New York, NY 11373

Hon. Kirsten Gillibrand
U.S. Senator
780 Third Avenue, Suite 2601
New York, NY 11373

Hon. Nancy T. Sunshine
Kings County Clerk
360 Adams Street - Room 189
Brooklyn, NY 11201

New York City Municipal Water Finance Authority
255 Greenwich Street, 6th Floor
New York, New York 10007

New York City Water Board
NYC Department of Environmental Protection
59-17 Junction Boulevard, 8th Floor
Flushing, New York 11373

Residents, Owners, and Occupants, of the Property and Adjacent Properties

Owner

ASTI Holding Corp

311 Norman Avenue,
Brooklyn, NY 11222

Occupants

Vacant

Adjacent Properties

Baltic Street Realty Corp
560 Baltic Street
Brooklyn, NY 11217

313 Butler Street, LLC
386 Third Avenue
Brooklyn, NY 11215

Freud Third Avenue Properties LLC
181 Third Avenue
Brooklyn, NY 11201

Fortune JD LLC
172 Third Avenue
Brooklyn, NY 11217

Gowanus Realty LLC
158 Third Avenue
Brooklyn, NY 11217

Gowanus Realty LLC
295 Butler Street
Brooklyn, NY 11217

Gowanus Realty LLC
538 Baltic Street
Brooklyn, NY 11217

Gowanus Realty LLC
156 Third Avenue
Brooklyn, NY 11217

New York City Housing Authority
120 Third Avenue
Brooklyn, NY 11217

New York City Housing Authority
131 Third Avenue
Brooklyn, NY 11217

Request for Contact

We are unaware of any requests for inclusion on the contact list.

Local News and Media

The Brooklyn Eagle
195 Montague Street, Suite 1414
Brooklyn, NY 11201

Spectrum 1 News
75 Ninth Avenue
New York, NY 10011

New York Daily News
270C Duffy Avenue
Hicksville, NY 11801

New York Post
1211 Avenue of the Americas
New York, NY 10036

Courier-Life Publications
1 Metrotech Center #10T
Brooklyn, NY 11201

The Brooklyn Papers
1 Metrotech Center
Brooklyn, NY 11201

Hoy Nueva York
15 Metrotech Center 7th Floor
Brooklyn, NY 11201

El Diario NY
15 Metrotech Center 7th Floor
Brooklyn, NY 11201

Schools and Daycare Facilities

Alonzo A. Daughtry Memorial Day Care Center
President/Executive Director/Principal
565 Baltic Street Brooklyn, NY 11217
718-596-1993
https://www.daughtrydaycare.org/

P.S.133 William A. Butler
President/Executive Director/Principal
https://www.ps133brooklyn.org/610 Baltic Street, Brooklyn, NY 11217
718-398-5320

The Math & Science Exploratory School, MS 447
President/Executive Director/Principal
https://ms447.org/contact-us/
345 Dean Street, Brooklyn, NY 11217
718-330-9328

P.S. 38 The Pacific School
President/Executive Director/Principal
https://ps38bklyn.org/450 Pacific Street, Brooklyn, NY 11217
718-330-9305

Brooklyn High School for the Arts
President/Executive Director/Principal
https://www.brooklynartshs.nyc/
345 Dean Street
Brooklyn, NY 11217
718-855-2412

PARK SLOPE CHRISTIAN ACADEMY
President/Executive Director/Principal
718-636-9363
98 5th Ave
Brooklyn, NY 11217

Rivendell School
President/Executive Director/Principal
https://www.rivendellnyc.org/
277 Third Avenue, Brooklyn, NY 11215
718-499-5667

P.S. K077
President/Executive Director/Principal
2163 Dean St, Brooklyn, NY 11233
718-789-1191

New Dawn Charter High School
President/Executive Director/Principal
https://www.ndchsbrooklyn.org/
242 Hoyt Street, Brooklyn, NY 11217
347-505-9101

P.S. 372 The Children's School
President/Executive Director/Principal
https://inclusions.org/contacting-our-staff/
512 Carroll Street, Brooklyn, NY 11215
718-624-5271

Strong Place for Hope Day Care – Boerum Hill
President/Executive Director/Principal
https://www.strongplaceforhopedaycare.com/contact
460 Atlantic Avenue 3rd Floor Brooklyn, NY 11217
718-522-1351

P.S. 282 Park Slope School
President/Executive Director/Principal
https://www.282parkslope.org/
180 6th Avenue, Brooklyn, NY 11217
718-622-1626

Community, Civic, Religious and Other Environmental Organizations:

Johari Jenkins – Director
Consolidated Edison Corporate Affairs
30 Flatbush Avenue
Brooklyn, NY 11217

78th Police Precinct Council
NYPD
Elicia Howard - President
65 6th Avenue
Brooklyn, NY 11217

Engine 219/Ladder 105
FDNY
494 Dean Street
Brooklyn, NY 11217

Brooklyn Chamber of Commerce
Randy Peers – President & CEO
rpeers@brooklynchamber.com
253 36th, Building 3, 4th Floor
Brooklyn, NY 11232

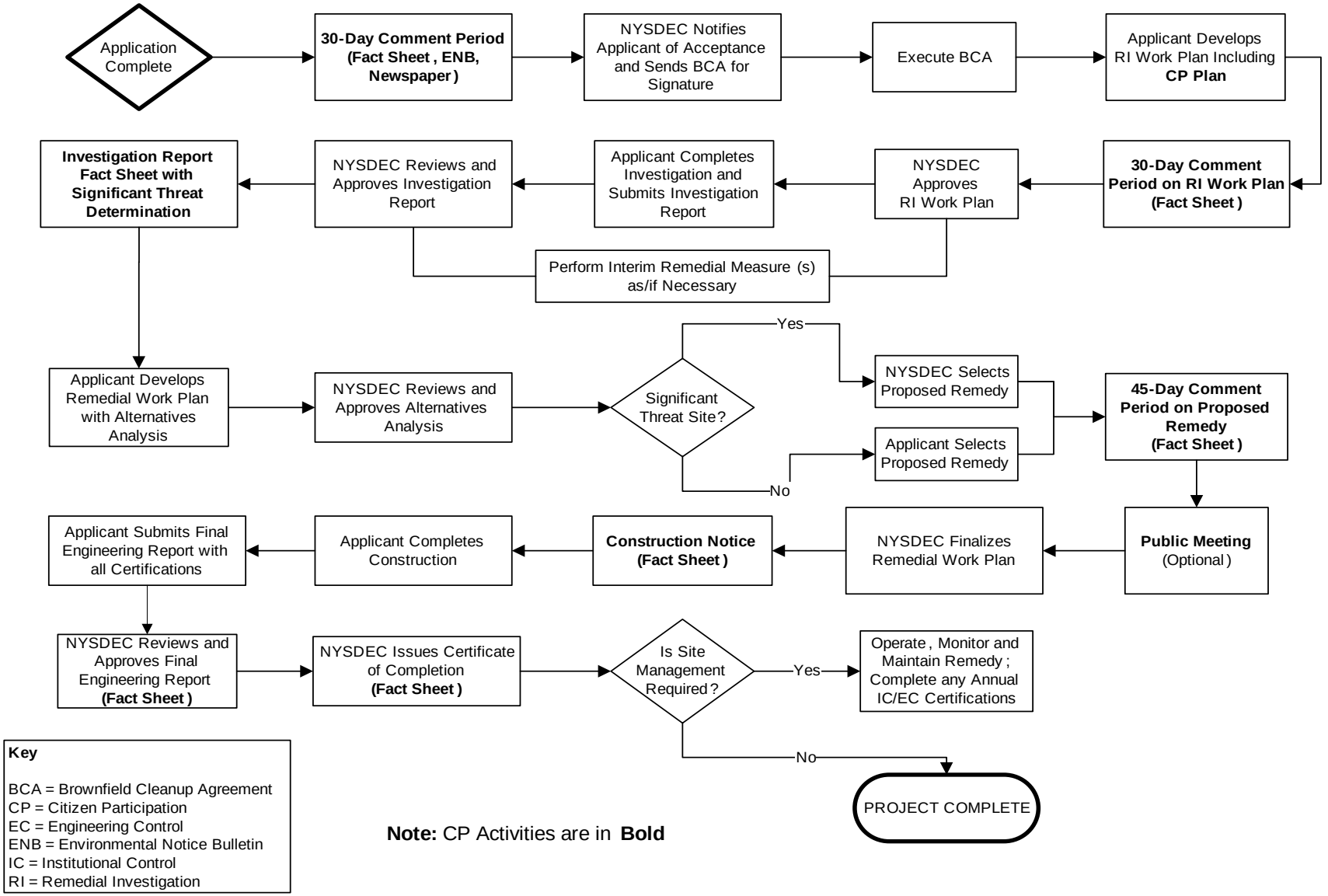
Gowanus Alliance
https://www.gowanusalliance.org/contact-us/
135 13th St #2
Brooklyn, NY 11215

Wyckoff Gardens Neighborhood Senior Center
280 Wyckoff Street
Brooklyn, NY 11217

Appendix C - Site Location Map

SITE BOUNDARY

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Instructions

This Scoping Sheet assesses major issues of public concern; impacts of the site and its remedial program on the community; community interest in the site; information the public needs; and information needed from the public.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the site's remedial process to more effectively implement the site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the site. It can be revisited and updated anytime during the site remedial process.
- Fill in site name and other information as appropriate.
- The Scoping Sheet may be prepared by DEC or a remedial party, but must be reviewed and approved by the DER site project manager or his/her designee.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be unique or appropriate to the site and the community to help complete the five Parts of this Scoping Sheet. Identify the issue stakeholders in Parts 1 through 3 and adjust the site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (e.g. Are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we recreate (fish, hunt, hike, etc. on/around the site?)
- How and when were the site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the site remedial process?
- Who has been contacted in the community about site remedial activities?
- What has been done to this point? What happens next and when?
- The site is going to be cleaned up for restricted use. What does that mean? We don't want redevelopment on a "dirty" site.

Part 2. List Important Information Needed <u>From</u> the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the site?
- Does the community have knowledge that the site may be significantly impacting nearby people, properties, natural resources, etc.?
- Are activities currently taking place at the site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Does the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated <u>to</u> the Community.

- Specific site investigation or remediation activities currently underway, or that will begin in the near future.
- The process and general schedule to investigate, remediate and, if applicable, redevelop the site.
- Current understanding about the site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the site's remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, site reports, site visits, "windshield surveys," other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this site? Such experiences could significantly affect public concerns and perspectives about the site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. In its remedial programs, DER seeks to integrate, and be consistent with, environmental justice principles set forth in *DEC Commissioner Policy 29 on Environmental Justice* and *DER 23 – Citizen Participation Handbook for Remedial Programs*. Is the site and/or affected community wholly or partly in an Environmental Justice (EJ) Area? Use the Search feature on DEC's public web site for "environmental justice". DEC's EJ pages define an EJ area, and link to county maps to help determine if the site and/or community are in an EJ area.

h. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.
- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public.

Individuals and organizations who need or want information and input can change during the site's remedial process. This need is influenced by real, potential, or perceived impacts of the site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial stages, or may only be interested in particular issues.

It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the site – and the issues that are important to them – will help to select and conduct appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the site. **Note: Adjust the site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage
- Current/proposed uses of site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: 556 Baltic Street Site

Site Number: C224375

Site Address and County: 151-169 Third Avenue, Brooklyn, Kings County, NY

Remedial Party(ies): 159 Realty LLC, 159 Third Residence LLC, and Baltic Residence LLC

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**

Based on the findings of the Limited Phase II ESI and Remedial Investigation (RI), the primary contaminants of concern for the Site are volatile organic compounds (VOCs) in soil vapor, and semi-volatile organic compounds (SVOC), including polycyclic aromatic hydrocarbons (PAHs), and metals in soil and groundwater. Impacts were observed to be widespread throughout the Site in shallow soils and soil vapor with specific areas of deeper contamination observed as well.

How were these issues and/or information needs identified?
These issues were identified through the previous subsurface investigations results and correspondence with NYSDEC.

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
Any historical uses of the property unknown from other available resources.

How were these information needs identified?
Historical use data gaps.

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.

Following acceptance into the BCP and approval of the RIWP, the Remedial Investigation will commence. Following implementation of the RIWP, a Remedial Investigation Report will be prepared and will describe the nature and extent of contamination at the site. A Remedial Action Work Plan (RAWP) will then be developed to describe the preferred remedy and alternatives analysis. The RAWP will be subject to a 45-day public comment period prior to NYSDEC approval. Following NYSDEC approval of the RAWP, the remedial contractor will mobilize to the site to begin implementation of the NYSDEC-approved remedy.

How were these issues and/or information needs identified?
These issues were identified through the previous subsurface investigations results and correspondence with NYSDEC.

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will

help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning at and around site:
☒ **Residential** ☐ **Agricultural** ☐ **Recreational** ☒ **Commercial** ☒ **Industrial**

b. Residential type around site:
☒ **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:
☒ **High** ☐ **Medium** ☐ **Low**

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☐ **Yes** ☒ **No**

h. Special considerations:
☒ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
There is a large Hispanic population near the Site. Therefore, all future fact sheets will be translated into Spanish.

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☐ **Non-Adjacent Residents/Property Owners:** Click here to enter text.

☒ **Local Officials:** Click here to enter text.

☒ **Media:** Click here to enter text.

☐ **Business/Commercial Interests:** Click here to enter text.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☒ **Citizens/Community Group(s):** Click here to enter text.

☐ **Environmental Justice Group(s):** Click here to enter text.

☐ **Environmental Group(s):** Click here to enter text.

☒ **Civic Group(s):** Click here to enter text.

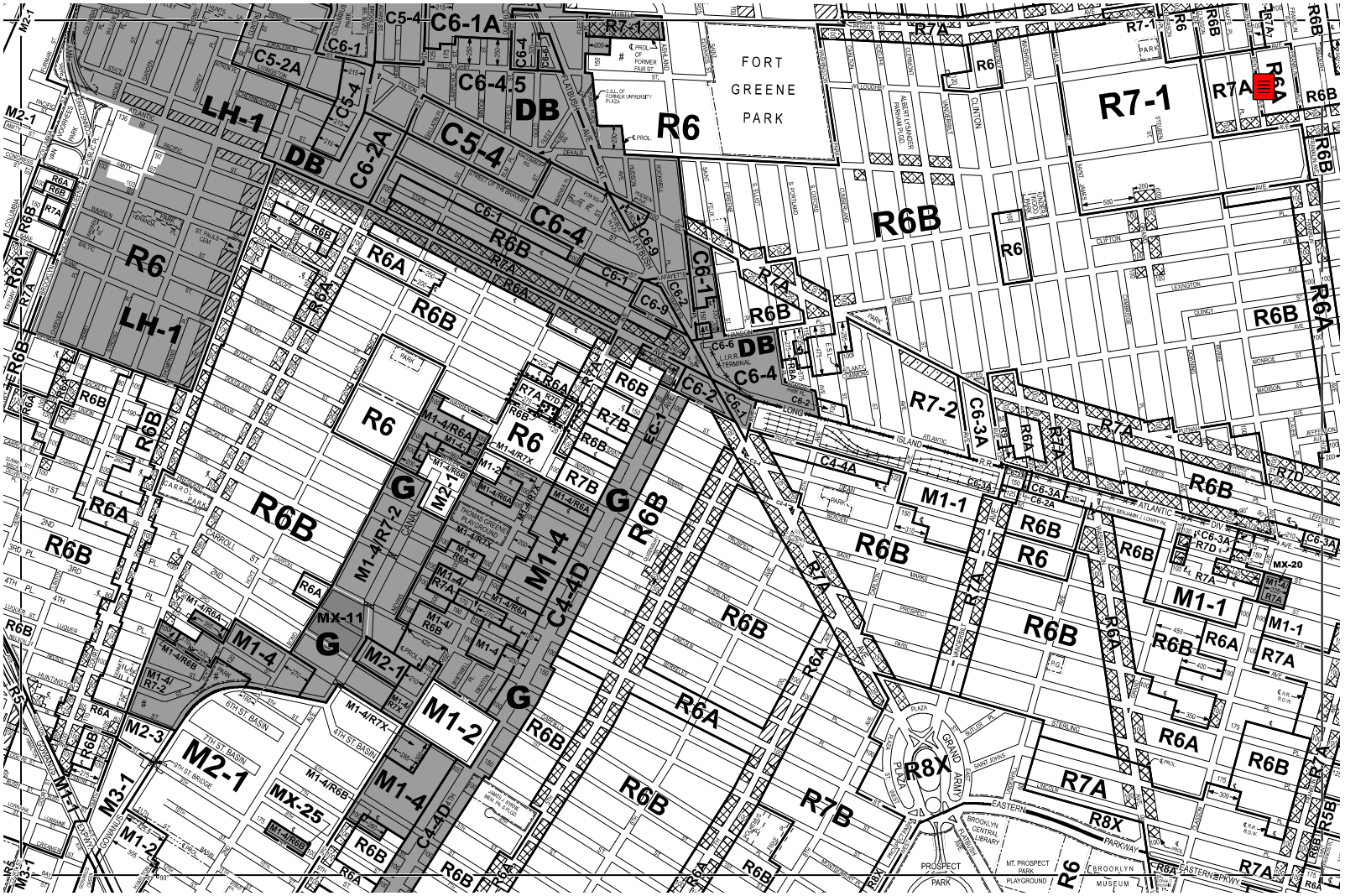
☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

Prepared/Updated By: Yanxia Lin **Date:** 15 September 2022

Reviewed/Approved By: Mari Conlon **Date:** 7 November 2022

APPENDIX F
Zoning Map



NOTE: STREETS FOR STREET MAP CHANGES (C 030514 MMK - C 030516 MMK AND C 210179 MMK - C 210180 MMK) AND ARE SHOWN ON THIS MAP PRIOR TO BECOMING EFFECTIVE IN ORDER TO LOCATE ZONING DISTRICT BOUNDARIES.

C1-1 C1-2 C1-3 C1-4 C1-5 C2-1 C2-2 C2-3 C2-4 C2-5

NOTE: Where no dimensions for zoning district boundaries appear on the zoning maps, such dimensions are determined in Article VII, Chapter 6 (Location of District Boundaries) of the Zoning Resolution.

ZONING MAP

THE NEW YORK CITY PLANNING COMMISSION

Major Zoning Classifications:
The number(s) and/or letter(s) that follows an **R**, **C** or **M** District designation indicates use, bulk and other controls as described in the text of the Zoning Resolution.

R - RESIDENTIAL DISTRICT

C - COMMERCIAL DISTRICT

M - MANUFACTURING DISTRICT

SPECIAL PURPOSE DISTRICT
The letter(s) within the shaded area designates the special purpose district as described in the text of the Zoning Resolution.

AREA(S) REZONED

Effective Date(s) of Rezoning:
12-07-2022 C 220188 ZMK

Special Requirements:

For a list of lots subject to CEQR environmental requirements, see APPENDIX C.

For a list of lots subject to "D" restrictive declarations, see APPENDIX D.

For Inclusionary Housing designated areas and Mandatory Inclusionary Housing areas on this map, see APPENDIX F.

MAP KEY

12b	12d	13b
16a	**16c**	17a
16b	16d	17b

ZONING MAP **16c**

NOTE: Zoning information as shown on this map is subject to change. For the most up-to-date zoning information for this map, visit the Zoning section of the Department of City Planning website: **www.nyc.gov/planning** or contact the Zoning Information Desk at (212) 720-3291.

APPENDIX G
Project Personnel 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.

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.

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.

LUKE MCCARTNEY, PG

Project Manager

EDUCATION

B.S., Water Resources/Geology (Hydrogeology Focus), State University of New York- Oneonta

PROFESSIONAL REGISTRATIONS

2018/NY: Professional Geologist (PG Reg. No. 000760)

PROFESSIONAL SOCIETIES

New York State Council of Professional Geologists (NYSCPG) – Member
American Institute of Professional Geologists (AIPG) – Member

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)
10 Hour OSHA Construction Safety and Health
DOT HazMat Certification
Permit Required Confined Space Entry Supervisor

Luke is a highly motivated and detail-oriented professional with more than 25 years of experience in the environmental and construction industry, including field and office-level management of multi-disciplinary teams and implementing projects. He excels at time management, subcontractor and schedule coordination, mentoring junior staff, preparation of technical reports, and maintaining communication/relations between all facets of the project team and clients. He has extensive field experience coordinating and inspecting earthwork, construction oversight, remediation of contaminated soil and groundwater, and remedial system design implementation and operation. He also commits his knowledge to office operations and developing standardized protocols, systems, and efficiencies for office and field teams.

RELEVANT PROJECT EXPERIENCE

Private Developer, New York State Department of Environmental Conservation (NYSDEC), Brownfield Cleanup Program (BCP), Willets Point, Queens, New York. As Field Manager, Luke was responsible for on-site field management of a 20+ acre redevelopment enrolled in the NYSDEC BCP with a significant history of landfilling and multiple sources and types of contamination. He managed daily operations and field staff performing inspections to ensure compliance with technical plans and construction specifications. He coordinated and attended weekly meetings with client and construction teams to provide technical, regulatory, and risk management status updates and guidance. Additionally, Luke ensured that project milestone schedules were achieved, prepared change orders and updated plans to efficiently manage out-of-scope field changes and coordinated and managed subcontractors to finalize scopes and project objectives. He also provided site training and skill development of junior staff.

Private Developer, New York City Office of Environmental Remediation (NYCOER), Greenpoint Landing, Brooklyn, New York. For this large-scale urban redevelopment project under regulatory oversight, Luke coordinated and managed the field effort during implementation of multiple Remedial Action Work Plans (RAWPs) supporting construction of one parking lot, one Combined Sewer Outfall (CSO) utility line, two new roadways, three affordable-housing residential buildings, and one, 38-story market-rate high rise. He trained and supported field staff during the work and interfaced daily with the project team and client to keep field efforts focused and on track. Additionally, Luke participated in project meetings with client, construction management teams, contractors, and regulatory agency personnel, assisted with project scheduling and issuance of work change orders, technical review of contractor environmental submittals to ensure compliance with RAWPs. He also completed environmental sampling throughout

the field activities including delineation and disposal coordination of hazardous metals in soil, completed oversight during the installation of site Engineering Controls (ECs) and commissioning of Sub-Membrane Depressurization (SMD) systems involving Indoor Air Quality (IAQ) Assessments and Sampling, reviewed and completed QA/QC on field-logs and data post-field.

Consolidated Edison (ConEd), Multiple Sites, New York. As Field Manager, Luke completed USEPA Spill Prevention, Control, and Countermeasure (SPCC) compliance inspections at 13 ConEd electrical substations in response to requirements of the NYSDEC. He also reviewed SPCC Plans, historical inspection reports, and facility plans to ascertain site-specific details and recommendations prior to conducting site visits. Additionally, Luke completed walk-throughs of each substation facility to identify and provide management team with detailed summaries and supporting photo-documentation of concerns at each site, participated in meetings with client project, operations, engineering, and legal teams.

Commercial Retail Property, Wayne, New Jersey. As Project Manager, Luke was responsible for environmental oversight and management during remedial activities related to a dense non-aqueous phase liquid (DNAPL) tetrachloroethylene (PCE) spill. He provided environmental investigation, oversight services, and management during Phase I and Phase II Environmental Site Assessments at the site, including soil and groundwater sampling, sample handling, sewer line video analysis, and soil excavation and disposal. He coordinated subcontractor scopes, reviewed invoices, and compiled a Remedial Investigation and Remedial Action Report for the site for submittal to the New Jersey Department of Environmental Protection (NJDEP)

Town of Putnam Valley, Hydrogeologic Assessment and Delineation of Aquifer Protection Zones, New York. As Project Manager, Luke completed a Hydrogeologic Assessment and Delineation of Aquifer Protection Zones that considered hillslopes, soils, surface waters, groundwater, open spaces, and existing land uses for inclusion in the Towns Master Plan and development of a Comprehensive Plan and Generic Environmental Impact Statement (GEIS). He also completed watershed boundary mapping, oversaw the implementation of aquifer pumping/yield tests, completed visual inspections of watershed features, participated in town meetings in a technical advisement capacity.

PUBLICATIONS

“Creation of Groundwater Resource Maps for Planning Future Development,” with W. Canavan, CPG, E. Sivers, and E. Wolley, *American Water Resources Association,* AWRA’s Annual Resource Conference, November 2001.

BRIAN A. FERGUSON

Senior Engineer

EDUCATION

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

PROFESSIONAL SOCIETIES

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

SPECIAL STUDIES AND COURSES

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

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

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

RELEVANT PROJECT EXPERIENCE

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

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

reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

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

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

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

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

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

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

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

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

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

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

BRIAN FITZPATRICK, CHMM

Corporate Director, Health and Safety

EDUCATION

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

CERTIFICATIONS

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

PROFESSIONAL SOCIETIES

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

SPECIAL STUDIES AND COURSES

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

AWARDS

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

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

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

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

RELEVANT PROJECT EXPERIENCE

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

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

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

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

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

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

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 H
Quality Assurance Project Plan

HALEY ALDRICH

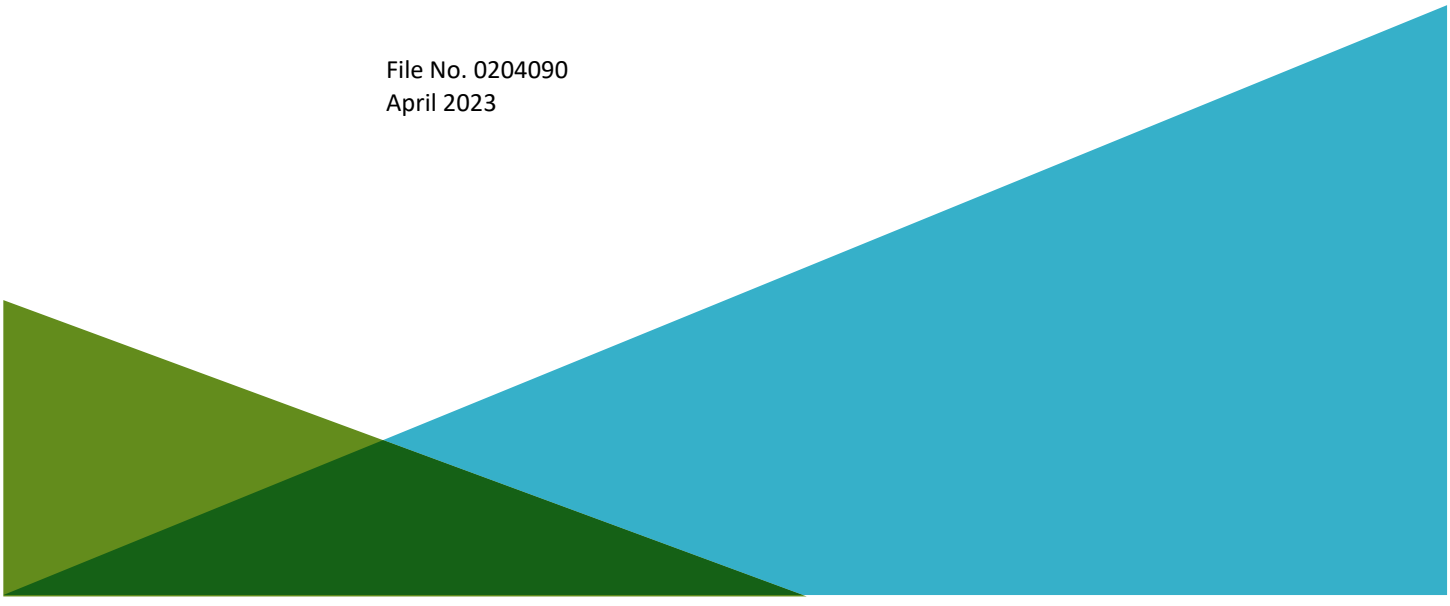
www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
556 BALTIC STREET SITE
BCP SITE C224375
556 BALTIC STREET
BROOKLYN, NEW YORK

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

for
159 Third Realty LLC, 159 Third Residence LLC, and Baltic Residence LLC
199 Lee Avenue
Brooklyn, New York

File No. 0204090
April 2023



Executive Summary

This Quality Assurance Project Plan (QAPP) outlines the scope of the quality assurance and quality control (QA/QC) activities associated with the site monitoring activities associated with the Remedial Action Work Plan (RAWP) for 556 Baltic Street (Site) in Brooklyn, New York.

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

Table of Contents

Table of Contents

Table of Contents

List of Tables

1. Project Description

This Quality Assurance Project Plan (QAPP) has been prepared as a component of the RAWP for the 556 Baltic Street Site in Brooklyn, New York.

1.1 PROJECT OBJECTIVES

The primary objective for data collection activities is to collect sufficient data necessary to confirm the results of the previous site characterization activities, potentially identify an on-site source, and to determine a course for remedial action. In addition, a qualitative exposure assessment will be conducted and will consider the nature of populations currently exposed or that have the potential to be exposed to Site-related contaminants both on- and off-site, along with describing the reasonably anticipated future land use of the site and affected off-site areas.

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 RAWP 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 USEPA method 8260C/5035
- Target Compound List semi-volatile organic compounds (SVOCs) using USEPA method 8270D
- Total Analyte List (TAL) Metals (including hexavalent chromium, and cyanide) using USEPA method 6010C/7471B/9010C/7196A
- Polychlorinated biphenyls (PCBs) using USEPA method 8082A
- TCL Pesticides and Herbicides using USEPA methods 8081B and 8151A for historic fill samples, respectively
- Per- and polyfluoroalkyl substances (PFAS) using USEPA method 1633
- 1,4-Dioxane using USEPA method 8270 SIM

The laboratory parameters for groundwater include:

- Target Compound List VOCs using USEPA method 8260B
- Target Compound List SVOCs using USEPA method 8270C
- Total Analyte List (TAL) Metals using USEPA method 6010/7471
- PCBs using USEPA method 8082
- Pesticides and herbicides by USEPA methods 8081B and 8151A, respectively
- PFAS using USEPA method 1633
- 1,4-Dioxane using USEPA method 8270D SIM isotope dilution

Note: 1,4-Dioxane and PFAS sampling techniques will be conducted following the NYSDEC Collection of Groundwater Samples for Per- and Polyfluoroalkyl Substances (PFAS) from Monitoring Wells Sample Protocol (June 2021).

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, indoor air and ambient air 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 RAWP provides the locations of soil borings, soil vapor points, indoor air/ambient air locations and/or groundwater monitoring well locations that may be sampled as part of implementation of the remedy.

2. Project Organization and Responsibilities

This section defines the roles and responsibilities of the individuals who will perform the RAWP 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 RAWP and monitoring and coordinating the collection of data. The Project Manager is responsible for technical quality control 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 monitoring activities; and
- Overall Site health and safety plan compliance.

2.2 QUALITY ASSURANCE RESPONSIBILITIES

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

2.2.1 Quality Assurance (QA) 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;
- 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 RAWP 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 staff 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 quality control 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 RAWP and in compliance with the Field Sampling Plan (FSP) provided in the NYSDEC-approved RIWP and QAPP.
- Immediately report any accidents and/or unsafe conditions to the Site Health & Safety Officer and take reasonable precautions to prevent injury.

3. Sampling Procedures

The FSP in the NYSDEC-approved RIWP provides the SOPs for sampling required by the RAWP. Sampling will be conducted in general accordance with the New York State Department of Conservation (NYSDEC) Technical Guidance for Site Investigation and Remediation (DER-10) and the Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (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 U.S. EPA, "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 in the NYSDEC-approved RIWP for the sample labeling procedures.

3.3 FIELD QC SAMPLE COLLECTION

3.3.1 Field Duplicate Sample Collection

3.3.1.1 Water Samples

Field duplicate samples will be collected by filling the first sample container to the proper level and sealing and then 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 sampled directly from acetate liners or from decontaminated, stainless-steel hand tools.
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
- 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
- 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 (6) 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 Health and Safety Plan (HASP). On-site air monitoring for health and safety purposes may be accomplished using a vapor detection device, such as a photoionization detector (PID).

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

5.2 LABORATORY INSTRUMENT CALIBRATION PROCEDURES

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

All solid chemicals and acids/bases used by the laboratory will be rated as "reagent grade" or better. All gases will be "high" purity or better. All Standard Reference Materials (SRMs) or Performance Evaluation (PE) materials will be obtained from approved vendors of the National Institute of Standards and Technology (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 volatile organic compounds (VOC) during the collection of soil samples.

6.2 LABORATORY ANALYTICAL PROCEDURES

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

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

6.2.1 List of Project Target Compounds and Laboratory Detection Limits

The 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 RAWP. 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 (QC) Criteria

Method specific quality control (QC) limits are provided by the laboratory. 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 quality control checks that will be employed for field and laboratory measurements.

7.1 FIELD QUALITY CONTROL

7.1.1 Field Blanks

Internal quality control 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 MS/MSD using the following equation.

$$\%\ Recovery = \frac{Spiked\ Sample - Background}{Known\ Value\ of\ Spike} x100\%$$

If the quality control 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 (LCS) Analyses

The laboratory will perform LCS analyses prepared from Standard Reference Materials (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 semi-volatile organics 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 quality control (QC) limits are provided by the laboratory. 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 RAWP 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 relative percent difference (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 reporting limit (RL).

8.1.3 Laboratory Precision Sample Objectives

Laboratory precision will be assessed through the analysis of laboratory control and laboratory control duplicate samples (LCS/LCSD) and matrix spike and matrix spike duplicate (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 reporting limit (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 (1) 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 reporting limits (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 Standard Reference Materials (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 (1) 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 (1) 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 (1) 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 (1) matrix spike/matrix spike duplicate (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

Quality control 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 Analytical Services Protocol (ASP) Category A and Category B data package requirements. The validator will determine whether the required items are present and request copies of missing deliverables (if necessary) from the laboratory.

9.3 DATA REPORTING

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

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

- Laboratory Data Reporting: The laboratory data reporting package will enable data validation based on the protocols described above. The final laboratory data report format will include the QA/QC sample analysis deliverables to enable the development of a 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
- 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
- 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
- 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
- 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
- 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
- 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 relative percent difference (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 quality assurance/quality control program will include the following elements:

- Precision, in terms of relative percent difference (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 percent (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.

- Standard Reference Materials (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 (QA) 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
- 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

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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.

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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, June 2021.

TABLES

TABLE 1

556 BALTIC STREET
BROOKLYN, NEW YORK
ANALYTICAL METHODS AND QUALITY ASSURANCE
SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Groundwater	Temperature, Turbidity, pH, ORP, Conductivity, Dissolved Oxygen	Part 375 and TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2; no headspace	Three 40-mL VOC vials with Teflon® -lined cap	Analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)1	1 per Shipment of VOC samples	NA	1 per 20 samples
		Part 375 and TCL SVOCs	EPA 8270D and 8270D with SIM	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract; 40 days after extraction to analyze			NA		
		Part 375 and TCL Pesticides	EPA 8081B	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract; 40 days after extraction to analyze					
		PCBs	EPA 8082A	Cool to 4°C							
		Part 375 and TAL Metals	EPA 6010C, 6020A, 7470A	Cool to 4°C; HNO_3 to pH <2	250 mL plastic	6 months, except Mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	250 mL plastic	24 Hours					
		Cyanide	EPA 9012B/SM4500 C/E	NaOH plus 0.6g ascorbic acid	250 mL plastic	14 days					
		PFAS	EPA 1633	Cool to 4°C; Trizma	Three 250-mL HDPE or polypropylene container	14 days to extract; 28 days after extraction to analyze		1 per sampling day			
		1,4-Dioxane as SVOC	EPA 8270D with SIM	Cool to 4°C	Two 250-mL Amber Glass	7 days to extract; 40 days after extraction to analyze		1 per sampling day			
Soil	Total VOCs via PID	Part 375 and TCL VOCs	EPA 8260C	Cool to 4°C	Two 40-mL VOC Vials with 5mL H_2O, one with MeOH	48 hours after sampling if not frozen to -70 or extruded into methanol. If frozen. analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per Shipment of VOC samples	NA	1 per 20 samples
		Part 375 and TCL SVOCs	EPA 8270D and 8270D with SIM	Cool to 4°C	4 oz. glass jar	14 days to extract; 40 days after extraction to analyze			NA		
		Part 375 and TCL Pesticides	EPA 8081B	Cool to 4°C	4 oz .glass jar	14 days to extract; 40 days after extraction to analyze					
		PCBs	EPA 8082A	Cool to 4°C							
		Part 375 and TAL Metals	EPA 6010C, 7471B	Cool to 4°C	2 oz. glass jar	6 months, except Mercury 28 days					
		PFAS	EPA 1633	Cool to 4°C; Trizma	One plastic 8 oz. jar	14 days to extract; 40 days after extraction to analyze		1 per sampling day			
		1,4-Dioxane as SVOC	EPA 8270D	Cool to 4°C	8 oz. glass jar	14 days		1 per sampling day			
		Percent Solids	SM 2540G	Cool to 4°C	2 oz. plastic container	NA		NA			NA
Soil Vapor	Total VOCs via PID	TO-15 Listed VOCs	EPA TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	NA	1 per 10 samples	NA
Indoor and Ambient Air	Total VOCs via PID	TO-15 Listed VOCs	EPA TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	NA	1 per 10 samples	NA

Notes:
ORP - Oxidation-Reduction Potential
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCBs - Polychlorinated Biphenyls
PFAS - Per- and Polyfluoroalkyl Substances
SIM - Selected Ion Monitoring
HCl - Hydrochloric Acid
HNO_3 - Nitric Acid
MeOH - Methanol
NaOH - Sodium Hydroxide

APPENDIX I
Proposed Remedial Action Project Schedule

Alternative II - Remedial Action Project Schedule

556 Baltic Street, Brooklyn, NY

BCP Project C224375

PROJECT SCHEDULE		2023											2024					
Task	**Description**	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec		Feb	March	April	May	June
1	Design, Investigation and Permitting																	
2	NYSDEC RAWP Review																	
3	45-Day Public Comment Period																	
4	Implementation of RAWP																	
6	Preparation of FER and SMP (if required)																	
7	SVI Evaluation																	
8	NYSDEC/NYSDOH Review of FER, SMP (if required), SVI Evaluation																	
9	Issuance of COC																	

Notes:

1. Schedule is estimated and subject to change.
2. Implementation of RAWP does not include completion of building construction
3. NYSDEC - New York State Department of Environmental Conservation
4. NYSDOH - New York State Department of Health
5. BCP - Brownfield Cleanup Program
6. RAWP - Remedial Action Work Plan
7. FER - Final Engineering Report
8. SMP - Site Management Plan
10. SVI - Soil Vapor Intrusion
9. COC - Certificate of Completion
10. COC issuance estimated for June 2024

APPENDIX J
Request to Import/Reuse Form

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e). Use of this form is not a substitute for reading the applicable Technical Guidance document.

SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that would pass a size 10 sieve? Choose an item

Does it contain less than 10%, by weight, material that would pass a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

_____

Firm

Revised August 2014

APPENDIX K
TSI-FSA™ Safety Data Sheet

Terra Systems, Inc. Sodium and Potassium Persulfate For In Situ Chemical Oxidation (ISCO)

Part of Our Comprehensive Soil and Groundwater Remediation Treatment Train Solutions

Terra Systems, Inc. is pleased to announce that it is now an authorized distributor of sodium and potassium persulfate from United Initiators, Inc. (UI) within the United States environmental remediation market. The combined resources of UI and Terra Systems bring together decades of both biological and chemical experience and expertise to the soil and groundwater remediation marketplace.

Terra Systems Inc. has expanded its product portfolio to include the activation of persulfates as part of our recommended comprehensive soil and groundwater "*Treatment Train Program*." Our team of innovative scientists and engineers evaluate and make recommendations for many complex sites that could benefit from a combination of ISCO-bio processes such as activated persulfate chemical oxidation for source areas and hot spots, coupled with enhanced bioremediation for the diffuse plume..

We wanted persulfate activation methods that are safer and provide a shorter site recovery time than traditional activation methods, like sodium hydroxide. We have been working with a new activation method using ferrous sulfide (TSI-FSA™) that provides a much safer work environment for the site and injection crew, minimize damage to injection tooling while achieving successful treatment and significant project cost savings.

Sodium or potassium persulfate activated with TSI-FSA™ is injected into the groundwater to produce an in-situ mixture of reactants including persulfate anion $S_2O_8^-$ and the more powerful oxidative radicals $SO_4^-\bullet$ and $OH\bullet$ and reductive radical $O_2^-\bullet$:

Sodium or potassium persulfate + TSI-FSA™ → $S_2O_8^-$, $SO_4^-\bullet$, $OH\bullet$, $O_2^-\bullet$

Activated sodium persulfate is commonly used for environmental applications because the persulfate anion is one of the strongest oxidants and yields a higher oxidative power relative to other oxidants as the table below illustrates. Each oxidant is compared relative to chlorine. Activated persulfate also has the advantages of providing both oxidative and reductive pathways for mineralization in a single amendment; the end-product of persulfate reaction is

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For More Information Call Michael Free at 302-798-9553 or Email: mfree@terrasystems.net

sulfate, readily supportive of ongoing biological processes and facilitating geochemical and microbial stabilization.

Table I: Reactive Species Associated with Oxidant Chemicals (Huling and Pivetz, 2007)

Reactive Species	Formula	Standard Reduction Potential (V)
Hydroxyl radical	$OH•$	+2.8
Sulfate radical	$SO_4^{-}•$	+2.6
Ozone	O_3	+2.1
Persulfate anion	$S_2O_8^{2-}$	+2.1
Hydrogen peroxide	H_2O_2	+1.77
Permanganate anion	MnO_4^-	1.7
Perhydroxyl radical	$HO_2•$	+1.7
Oxygen	O_2	+1.23
Hydroperoxide anion	HO_2^-	-0.88
Superoxide radial	$O_2•^-$	-2.4

Reference Huling, S. G. and B. Pivetz. In-Situ Chemical Oxidation--Engineering Issue. EPA/600/R-06/072, 2007.

Multiple radicals result in the rapid destruction of compounds including:

- BTEX
- MTBE
- Petroleum hydrocarbons (TPHs, GRO, DRO)
- Polyaromatic hydrocarbons (PAHs)
- Chlorinated ethenes (TCE, PCE, DCE and vinyl chloride)
- Chlorinated ethanes (TCA and DCA)
- Chlorinated methanes (chloroform and methylene chloride)
- 1,4-dioxane
- Pesticides

Key Communication Points

- Safer activation methods are available.
- The persulfates can be applied at sites where activation is not required such as manufactured gas

- Ideal for the remediation of higher concentration media such as source areas and hot spots
- Lower pH injections result in greater safety for the injection crew
- Provides extended activation of the persulfates in groundwater
- Easy to inject
- Less wear and tear on the driller's equipment since the injectate pH is not lower than 2

Table II: Sodium and Potassium Persulfate Specification and Benefit

Sodium Persulfate Specification	Sodium Persulfate Benefits
Free of Nitrogen	Produced directly from sodium sulfate and not by conversion of ammonia salts
High Solubility (more than 500 g/L at 20˚C)	Convenient handling and preparation of aqueous solutions
High Oxidation Potential, Facile Activation	Effective and rapid destruction of contaminants
High Purity	>99%

Potassium Persulfate Specification	Potassium Persulfate Benefits
Free of Nitrogen	Produced directly from potassium salts without the use of ammonium and does thus not contribute to an increase of the nitrogen load in soils
High Fineness, Lower Solubility in Water	Facilitates dosing and allows preparation of aqueous slurries
Increases Longevity After Injection In-Situ	Has a much longer controlled persulfate release and radical generation
High Oxidizing Potential, Facile Activation	Effective sustained destruction of contaminants
High Purity	>99%

Terra Systems can help optimize your comprehensive soil and groundwater remediation treatment train solution. Contact Michael Lee, PhD (mlee@terrasystems.net).