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INTERIM REMEDIAL MEASURES WORK PLAN
90-02 QUEENS BOULEVARD
QUEENS, NEW YORK
NYSDEC SITE NO. 241249

Prepared by:
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Prepared for:
9002 Commercial Unit LLC
New York, New York

File No. 0208933-000
October 2025



Certifications

I, Scott A. Underhill, certify that I am currently a New York State (NYS)-registered Professional Engineer and that this Interim Remedial Measures Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

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



October 28, 2025

NYS Professional Engineer #075332 | Date | Signature

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 NYS-licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

Table of Contents

Page

Certifications i
List of Tables iv
List of Figures iv
List of Appendices v
List of Acronyms and Abbreviations vi

1. Introduction 1

1.1 OVERVIEW 1
1.2 PURPOSE 1

2. Background 3

2.1 SITE LOCATION AND DESCRIPTION 3
2.2 SITE HISTORY 3
2.3 PROPOSED RENOVATION PLAN 3
2.4 SURROUNDING LAND USE 4
2.5 PREVIOUS ENVIRONMENTAL REPORTS 4
2.5.1 Phase I ESA Report dated December 27, 2013, prepared by HydroTech 5
2.5.2 Phase II ESA dated January 14, 2014, prepared by HydroTech 5
2.5.3 Focused Subsurface Investigation dated August 5, 2015, prepared by HydroTech 6
2.5.4 Subsurface Investigation Report dated September 15, 2015, prepared by HydroTech 6
2.5.5 Focused Subsurface Investigation dated March 27, 2017, prepared by HydroTech 6
2.5.6 Documentation of Tank Abandonment and Groundwater Quality dated February 17, 2020, prepared by HydroTech 7
2.5.7 EFR Results dated February 2020 and March 2020, prepared by HydroTech 7
2.5.8 Phase I ESA dated January 26, 2023, prepared by NPV 8
2.5.9 Limited Phase II ESI Report dated August 21, 2023, prepared by Haley & Aldrich of New York 9
2.5.10 SCR dated April 10, 2025, prepared by Haley & Aldrich of New York 9
2.6 PREVIOUS REMEDIAL ACTIONS 16

3. Interim Remedial Measures Work Plan 17

3.1 IRM OBJECTIVES AND RATIONALE 17
3.2 GENERAL PROJECT INFORMATION 17
3.2.1 Remediation Engineer 17
3.3 SUMMARY OF PROPOSED INTERIM REMEDIAL MEASURES 17
3.4 INTERIM REMEDIAL MEASURE ACTIVITY 18
3.4.1 Site Preparation 18

3.4.2 Product Recovery 19
3.4.3 CVOC Treatment 20
3.4.4 Groundwater Sampling 20
3.4.5 Soil Vapor Intrusion Monitoring 21
3.4.6 Waste Management 21
3.5 SITE-SPECIFIC HASP 22
3.6 COMMUNITY AIR MONITORING PLAN 23
3.7 GREEN AND SUSTAINABLE REMEDIATION 24

4. Reporting 26

4.1 CONSTRUCTION COMPLETION REPORT 26
4.2 QUARTERLY OM&M REPORTS 26
4.3 ANNUAL OM&M REPORTS 26
4.3.1 LNAPL Recovery Program 27
4.3.2 Groundwater Monitoring Program 27

5. Schedule 28

References 29

List of Tables

Table No.	Title
1	Groundwater Cleanup Objectives

List of Figures

Figure No.	Title
1	Project Locus
2	Site Plan
3	Sample Location Map
4	Groundwater Contour Map
5	Soil Results Exceedance Map
6	Groundwater Results Exceedance Map
7	Soil Vapor, Indoor and Ambient Air Results Summary Map
8	Proposed Interim Remedial Measures Plan

List of Appendices

Appendix	Title
A	Sipper System Specifications
B	Zero Valent Iron Product Information
C	Quality Assurance Project Plan
D	Site-Specific Health and Safety Plan
E	Project Personnel Resumes
F	Community Air Monitoring Plan and Special Requirements CAMP
G	Environmental Footprint Analysis
H	Climate Screening Checklist

List of Acronyms and Abbreviations

Abbreviation	Definition
µg/m^3	micrograms per cubic meter
A	
AWQS	Ambient Water Quality Standards
B	
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
btoc	below top of casing
C	
CAMP	Community Air Monitoring Plan
CCR	Construction Completion Report
CFR	Code of Federal Regulations
CVOC	chlorinated volatile organic compound
D	
DER	Division of Environmental Remediation
DER-10	Division of Environmental Remediation-10 *(specifically "May 2010 NYSDEC Technical Guidance for Site Investigation and Remediation")*
E	
ECL	Environmental Conservation Law
EDD	Electronic Data Deliverable
EE	Environmental Easement
EFR	Enhanced Fluid Recovery
ELAP	Environmental Laboratory Approval Program
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
F	
FSP	Field Sampling Plan
ft	feet/foot
G	
g/L	grams per liter
GV	Guidance Value
H	
Haley & Aldrich of New York	H & A of New York Engineering and Geology, LLP
HASP	Health and Safety Plan
HREC	Historical Recognized Environmental Condition
HydroTech	Hydro Tech Environmental, Corp.

List of Acronyms and Abbreviations (cont.)

Abbreviation	Definition
I	
IRM	Interim Remedial Measure
IRMWP	Interim Remedial Measures Work Plan
ISCR	In-situ Chemical Reduction
L	
L/min	liters per minute
LNAPL	light non-aqueous phase liquid
LUST	leaking underground storage tank
M	
mg/kg	milligrams per kilogram
MW	monitoring well
N	
ND	not detected/non-detect
NPV	Nelson Pope Voorhis, LLC
NYCRR	New York Codes, Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O	
O&M	Operation & Maintenance
OM&M	Operation, Maintenance & Monitoring
OSHA	Occupational Safety and Health Administration
P	
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	perchloroethylene/tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PGWSCOs	Protection of Groundwater Soil Cleanup Objectives
PID	Photoionization Detector
PM-10	particulate matter less than 10 micrometers in diameter
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
ppt	parts per trillion

List of Acronyms and Abbreviations (cont.)

Abbreviation	Definition
Q	
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
R	
RE	Remediation Engineer
ROI	Radius of Influence
RRSCO	Restricted Residential Soil Cleanup Objective
S	
SC	Site Characterization
SCO	Soil Cleanup Objective
SCR	Site Characterization Report
SCWP	Site Characterization Work Plan
SEFA	Spreadsheets for Environmental Footprint Analysis
Site	90-02 Queens Boulevard, Queens, New York
sq ft	square feet
SVI	soil vapor intrusion
SVOC	semi-volatile organic compound
T	
TCE	trichloroethene
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
UST	underground storage tank
UUSCO	Unrestricted Use Soil Cleanup Objective
V	
VC	vinyl chloride
VOC	volatile organic compound
Z	
ZVI	zero-valent Iron

1. Introduction

1.1 OVERVIEW

H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) has been retained to develop an Interim Remedial Measures Work Plan (IRMWP) on behalf of 9002 Commercial Unit LLC for the 90-02 Queens Boulevard Site located at 90-02 Queens Boulevard in Queens, New York (Site, Figure 1). This document is being submitted under a February 2024 New York State Department of Environmental Conservation (NYSDEC) Consent Order (Index No. R2-202205130104) between the NYSDEC and 90-02 QB Holdings LLC & 9002 Commercial Unit LLC.

This IRMWP was designed to facilitate, to the extent possible, the removal of petroleum-related light non-aqueous phase liquid (LNAPL) from an on-site groundwater monitoring well and to implement zero-valent iron (ZVI) injections in the eastern portion of the Site to address chlorinated volatile organic compound (CVOC) contamination in groundwater. The Site Characterization Report (SCR) for this Site did not identify fish and wildlife resources.

1.2 PURPOSE

Previous investigations conducted at the Site identified the presence of LNAPL and elevated concentrations of volatile organic compounds (VOCs) and CVOCs in groundwater and soil vapor at the Site. More specifically, previous investigations related to Spill Case No. 1504881 revealed LNAPL in several permanent groundwater monitoring wells near a closed-in-place underground storage tank (UST). Additionally, groundwater concentrations of petroleum-related VOCs and CVOCs, including trichloroethene (TCE) and tetrachloroethene (PCE), exceed the New York Technical and Operational Guidance Series (T.O.G.S.) 1.1.1 Class GA Ambient Water Quality Standards (AWQS). Based on a meeting with the NYSDEC on September 20, 2023, due to the elevated VOC concentrations in groundwater at the Site, additional investigation was required to understand the extent of contamination on the Site, evaluate potential on-site sources, and identify remedial options.

Haley & Aldrich of New York completed a Site Characterization (SC) investigation on behalf of 9002 Commercial Unit LLC to understand the extent of contamination at the Site, evaluate potential on-site sources, and identify potential remedial options. The investigation was performed from May 15, 2024, through June 13, 2024, and included the installation of five soil borings, three 2-inch permanent monitoring wells, and the installation of eight temporary soil vapor probes. A total of ten soil samples (plus quality assurance/quality control [QA/QC] samples), nine groundwater samples (plus QA/QC samples), one ambient air sample, and eight sub-slab soil vapor samples with co-located indoor air samples were collected. LNAPL was observed in one permanent monitoring well (MW-3) within the vicinity of the former UST. Analytical results identified CVOCs in groundwater and petroleum-related VOCs and CVOCs in sub-slab soil vapor.

NYSDEC requested the collection of additional samples in a letter sent via email on January 17, 2025, which was discussed in a meeting between NYSDEC and Haley & Aldrich on January 30, 2025. Based on the discussion in the January 30, 2025, meeting and the SC data, NYSDEC requested supplemental characterization sampling to more fully understand the extent of the contamination at the Site, evaluate

potential on-site sources, and identify potential remedial options. The scope of the supplemental characterization was confirmed via email correspondence between Haley & Aldrich of New York and NYSDEC on February 20, 2025, and finalized in a NYSDEC-approved February 2025 Site Characterization Work Plan (SCWP) Addendum. The investigation was performed from February 26, 2025, through March 12, 2025, and included the installation of three soil borings, two 2-inch permanent monitoring wells, and ten temporary sub-slab soil vapor probes. A total of six supplemental soil samples (plus QA/QC samples), two groundwater samples from the newly installed monitoring wells (plus QA/QC samples), five groundwater samples from existing monitoring wells (plus QA/QC samples), one ambient air sample, eight sub-slab soil vapor samples with co-located indoor air samples, and two off-site sub-slab soil vapor samples were collected. An LNAPL sheen was observed in one permanent monitoring well (MW-3) within the vicinity of the former UST. Analytical results identified CVOCs in groundwater and petroleum-related VOCs and CVOCs in sub-slab soil vapor.

2. Background

2.1 SITE LOCATION AND DESCRIPTION

The Site, identified as Block 2857, Lot 36 on the New York City tax map, is located in the Elmhurst neighborhood of Queens and is comprised of one, approximately 54,500-square-foot (sq ft) tax lot. The Site is bounded by Queens Boulevard, followed by commercial and office buildings to the north; Hoffman Drive, followed by a parking facility, a park, and multi-family walk-up residential buildings to the south; a vacant lot to the east; and commercial and office buildings to the west. The Project Locus is shown on Figure 1, and existing Site features are displayed on the Site Plan provided as Figure 2.

The Site is zoned in a residential (R6) zoning district with a C1-2 commercial overlay. The Site is located in an urban area surrounded by commercial, residential, and vacant lot properties served by municipal water. The Site is currently improved with a six-story, mixed-use commercial and residential building with a full cellar level. An abandoned 7,500-gallon heating oil UST is present beneath the southeast-adjacent sidewalk. The cellar is currently vacant. The first floor was recently renovated and is currently occupied by a commercial tenant. The second floor is currently occupied by multiple commercial tenants, including a daycare. The remaining floors consist of occupied multi-family residential units.

2.2 SITE HISTORY

Based on information presented in a Phase I Environmental Site Assessment (ESA) completed by HydroTech Environmental, Corp. (HydroTech) in December 2013 and a Phase I ESA completed by Nelson Pope Voorhis, LLC (NPV) in January 2023, the Site was developed as early as 1897 with a single building of unidentified use, and in 1900, the property was occupied by four dwellings and four accessory structures consisting of sheds and co-ops. Occupation of the property by dwellings continued until 1950, when the eastern end of the property was developed into Horace Harding Hospital. In the 1970s, one of the dwellings was depicted on Sanborn Maps as being converted into a store, and the hospital had been expanded to the west and was identified as St. Johns-Queens Hospital. The last remaining dwelling and store were demolished in the 1980s, and the Site was depicted on Sanborn Maps as a parking lot. At the time of the Phase I, completed in 2023, the Site consisted of the first floor (Unit C-1) and semi-basement (Unit C-2) of a larger residential apartment building. Both units were undergoing renovation for retail and/or office use during the Site reconnaissance. In addition, the western end of Unit C-1 was occupied by a recreation room, fitness room, and mail room, and the western end of Unit C-2 contained locked storage spaces.

2.3 PROPOSED RENOVATION PLAN

The proposed project will consist of renovating the cellar for commercial and/or office use, consistent with surrounding property use and zoning. The building is currently used for, and will continue to be used for, mixed residential and commercial purposes. The current development includes a partial cellar level, paved with an impervious surface (concrete).

2.4 SURROUNDING LAND USE

The Site is located in an urban area of the Elmhurst neighborhood of Queens. The Site is located in a mixed-use commercial, residential, and industrial area. The Site is bounded by Queens Boulevard, followed by commercial and office buildings to the north; Hoffman Drive, followed by a parking facility, a park, and multi-family walk-up residential buildings to the south; a vacant lot to the east; and commercial and office buildings to the west.

Four sensitive receptors are within a 500-foot (ft) radius of the Site:

1) Happy Little Bear Daycare, 94-25 57th Avenue, Elmhurst, New York 11373
2) John F. Kennedy Jr. School, 57-12 94th Street, Queens, New York 11373
3) Central Queens Academy Charter School, 88-14 Justice Avenue, Queens, New York 11373
4) P.S. 013 Clement C. Moore, 55-01 94th Street, Queens, New York 11373

Properties immediately surrounding the Site consist of residential, commercial, manufacturing, industrial, and institutional uses.

2.5 PREVIOUS ENVIRONMENTAL REPORTS

The following previous reports have been prepared for the Site:

1. Phase I ESA Report dated December 27, 2013, prepared by HydroTech.
2. Phase II ESA dated January 14, 2014, prepared by HydroTech.
3. Focused Subsurface Investigation dated August 5, 2015, prepared by HydroTech.
4. Subsurface Investigation Report dated September 15, 2015, prepared by HydroTech.
5. Focused Subsurface Investigation dated March 27, 2017, prepared by HydroTech.
6. Documentation of Tank Abandonment and Groundwater Quality dated February 17, 2020, prepared by HydroTech.
7. Enhanced Fluid Recovery (EFR) Results – February and March 2020, dated May 7, 2020, prepared by HydroTech.
8. Phase I ESA dated January 26, 2023, prepared by NPV.
9. Limited Phase II Environmental Site Investigation (ESI) Report dated August 21, 2023, prepared by Haley & Aldrich of New York
10. SCR dated April 10, 2025, prepared by Haley & Aldrich of New York.

Prior investigation findings are included in Appendix A of the SCR dated April 10, 2025, prepared by Haley & Aldrich of New York.

2.5.1 Phase I ESA Report dated December 27, 2013, prepared by HydroTech

A Phase I ESA was completed by HydroTech in December 2013 for the purpose of identifying Recognized Environmental Conditions (RECs) in connection with the Site.

The Phase I ESA identified the following RECs in connection with the Site:

- The presence of an in-place abandoned UST at the Site
- The suspect presence of impact associated with a northwest-adjacent historical gasoline station
- The presence of suspect lead-based paint at the Site
- The presence of mold at the Site

The Phase I ESA did not identify other environmental concerns at the adjoining and surrounding properties that would have potential impacts on the Site condition.

2.5.2 Phase II ESA dated January 14, 2014, prepared by HydroTech

In January 2014, a Phase II ESA was completed by HydroTech at the Site and consisted of the following:

- Installation of four soil borings and collection of four soil samples analyzed for VOCs and semi-volatile organic compounds (SVOCs).
- Installation of one groundwater probe and collection of one groundwater sample analyzed for VOCs.
- Installation of three permanent groundwater monitoring wells and collection of three groundwater samples analyzed for VOCs and SVOCs.
- Installation of three soil vapor probes and collection of three soil vapor samples analyzed for VOCs.
- Collection of two indoor air samples and one ambient air sample analyzed for VOCs.

The Phase II ESA identified the following:

- Soil analytical results are summarized as follows:
  - No VOCs or SVOCs were detected above the NYSDEC Title 6 of the New York Code Rules and Regulations (NYCRR) Part 375-6 Unrestricted Use Soil Cleanup Objectives (UUSCOs) in the samples collected.
- Groundwater analytical results are summarized as follows:
  - Chlorinated solvents, including PCE, and its derivative compounds and petroleum-related compounds were detected in two groundwater samples at concentrations exceeding their respective New York T.O.G.S. 1.1.1 Class GA AWQS.
- Soil vapor and indoor air sample results are summarized as follows:
  - Petroleum hydrocarbons were detected in the sub-slab vapor samples collected beneath the western portion of the Site.

- No VOCs were identified in indoor air at concentrations exceeding New York State Department of Health (NYSDOH) Indoor Air Guidance Levels.

2.5.3 Focused Subsurface Investigation dated August 5, 2015, prepared by HydroTech

The Focused Subsurface Investigation identified the following:

- The UST in the southeast portion of the Site was not properly abandoned.
- Free product and dissolved VOCs were present near the UST. A spill was called in and assigned Spill No. 1504881.
- Dissolved chlorinated solvents were present in groundwater in the southeast portion of the Site.
- Petroleum and CVOCs were present in the sub-slab vapor beneath the building.
- Recommendations included proper UST closure, removal of free product, and reduction of the groundwater contamination. Additionally, a vapor barrier system and a sub-slab depressurization system were recommended.

2.5.4 Subsurface Investigation Report dated September 15, 2015, prepared by HydroTech

In September 2015, a Subsurface Investigation was completed by HydroTech at the Site and consisted of the following:

- Delineation of impacted groundwater associated with the UST located to the south of the property and chlorinated solvents in groundwater beneath the eastern and southeastern portion of the Site.
- Installation and sampling of eight soil probes, five of which were converted to permanent monitoring wells, and the sampling of eight monitoring wells.

The Subsurface Investigation identified the following:

- The soil to the north of the UST exhibited olfactory evidence of petroleum odors and low concentrations of organic vapors ranging between 3 and 61 parts per million (ppm). Additionally, visual evidence of impact (e.g., staining) was observed in the deepest soil samples.
- No CVOCs were identified in soil in the eastern portion of the Site.

Free product was observed in MW-3 (north of the UST).

- CVOCs in groundwater in the northern portion of the Site and petroleum-related VOCs in groundwater on the eastern portion of the Site exceed the AWQS.

2.5.5 Focused Subsurface Investigation dated March 27, 2017, prepared by HydroTech

Following a Remediation Work Plan (RWP) approval from NYSDEC in October 2015, a Focused Subsurface Investigation was completed by HydroTech at the Site in March 2017 and consisted of the following:

- Collection of 12 groundwater samples, installation and collection of three sub-slab vapor probes and samples, and collection of one indoor air sample and one outdoor air sample to determine the current levels of CVOCs in groundwater and soil vapors.

The Subsurface Investigation reported the following:

- Free product remains in the subsurface north of the UST.
- CVOCs in groundwater exceed the AWQS in the vicinity of MW-2 in the eastern portion of the Site.
- The NYSDEC-approved RWP to address the Spill No. 1504881 should be implemented.
- The NYSDEC Hazardous Remediation Section should be contacted to inquire if potential remedies for the CVOCs in groundwater are required and if mitigation measures for soil vapor intrusion (SVI) need to be implemented.

2.5.6 Documentation of Tank Abandonment and Groundwater Quality dated February 17, 2020, prepared by HydroTech

In May 2017, HydroTech took the following actions:

- A 7,500-gallon no. 2 fuel oil UST located in the southwest portion of the Site was closed-in-place.
- A total of 25.52 tons of non-hazardous impacted soil and concrete were removed and disposed.
- A total of 1,030 gallons of an oil/water mixture were removed and disposed.
- Two permanent monitoring wells (MW-13 and MW-14) were installed in the area of the closed tank.

HydroTech reported the following:

- Free product was observed in MW-3, MW-13, and MW-14. A petroleum sheen was observed in MW-6, MW-8, and MW-9 (north of the closed UST).
- Post-tank closure sidewall end-point samples indicated SVOCs were present to the south of the closed-in place UST at concentrations exceeding the UUSCOs.
- CVOCs remain in groundwater in the southeast portion of the Site in MW-2.

2.5.7 EFR Results dated February 2020 and March 2020, prepared by HydroTech

In February and March 2020, EFR events were conducted by HydroTech, which reported the following:

- A total of 558 gallons of free product and contaminated water were removed from monitoring wells MW-3, MW-8, MW-9, MW-13, and MW-14.
- Free product remaining in MW-3 was thought likely to be an isolated residual impact since none of the surrounding upgradient or downgradient wells exhibited evidence of free product.
- Evidence of petroleum hydrocarbons in the form of a sheen or a thin film of product in MW-3, MW-8, MW-13, and MW-14 revealed a relatively minimal impact that HydroTech thought would remediate over time via natural biodegradation.

2.5.8 Phase I ESA dated January 26, 2023, prepared by NPV

A Phase I ESA was completed by NPV in January 2023. The Phase I ESA identified the following RECs in connection with the Site:

- Spill no. 1504881, which was under active investigation by the NYSDEC, was considered to be a REC due to the presence of dissolved petroleum and chlorinated solvent contamination in groundwater and soil vapor. The most recent Phase II investigation conducted in 2014 recommended additional investigation, periodic monitoring of groundwater wells for free product, and vapor intrusion mitigation measures, such as a sub-slab depressurization system.
- Spill no. 9615014 was considered to be an off-site REC due to the potential for soil vapor impacts to the Site from former Mobil Station no. 17, situated at 89-30 Queens Boulevard, adjacent to the west of the Site, which had identified petroleum impacts in soil and groundwater. The spill incident was closed by NYSDEC in 2012; however, impacts to the Site from this incident were noted, and based on the spill incident report, it does not appear that off-site vapor impacts were evaluated. Further, according to the Air Discharge database, a remediation system appeared to be actively operating in response to potential uncontrolled emissions from the former release.

The Phase I ESA identified the following additional environmental concerns at the adjoining and surrounding properties that could have potential impacts on the Site:

- Closed leaking underground storage tank (LUST) incident, which occurred on the Site and was assigned Spill no. 8801243, was considered a Historical Recognized Environmental Condition (HREC) that had been addressed to the satisfaction of the NYSDEC.
- Closed LUST incident, which occurred on the Site and was assigned Spill no. 0511055, was considered an HREC that had been addressed to the satisfaction of the NYSDEC.
- Closed Spill incident, which occurred on the Site and was assigned Spill no. 9908947, was considered an HREC that had been addressed to the satisfaction of the NYSDEC.
- Closed Spill incident, that occurred adjacent to the Site and was assigned Spill no. 0808306, was considered an off-Site HREC that had been addressed to the satisfaction of the NYSDEC.
- Closed Spill incident, which occurred adjacent to the Site and was assigned Spill no. 0509905, was considered an off-Site HREC that had been addressed to the satisfaction of the NYSDEC.
- Closed Spill incident, which occurred adjacent to the Site and was assigned Spill no. 0302793, was considered an off-Site HREC that had been addressed to the satisfaction of the NYSDEC.
- Closed LUST incident, which occurred adjacent to the Site and was assigned Spill no. 9104895, was considered an off-site HREC that had been addressed to the satisfaction of the NYSDEC.
- Closed LUST incident, which occurred adjacent to the Site and was assigned Spill no. 908424, was considered an off-site HREC that had been addressed to the satisfaction of the NYSDEC.

2.5.9 Limited Phase II ESI Report dated August 21, 2023, prepared by Haley & Aldrich of New York

The Phase II Limited ESI Report identified the following environmental findings:

- Fill material generally consisting of light gray to dark brown sand and clay with varying amounts of silt and gravel was observed from surface grade to approximately 6 ft below ground surface (bgs). The fill layer was underlain by gray to brown sand extending to at least 9 ft bgs, the maximum depth of exploration.
- Groundwater was encountered between 3 and 6 ft below the cellar level.
- Approximately 1 ft of free product was observed in MW-3.
- Soil analytical results were summarized as follows:
  - Acetone was detected above the UUSCO in two soil samples.
  - No other VOCs were detected above the UUSCOs in the samples collected.
- Groundwater analytical results were summarized as follows:
  - Chlorinated solvents, including PCE, its derivative compounds, and petroleum-related compounds, were detected in two groundwater samples at concentrations exceeding the AWQS.
- Soil vapor sample results were summarized as follows:
  - Petroleum-related VOCs and CVOCs, including PCE, were detected in the sub-slab vapor samples collected.

Sample locations from the August 2023 Limited Phase II sampling event are shown on Figure 3, and soil, groundwater, and soil vapor analytical results are summarized on Figures 4, 5, and 6, respectively.

2.5.10 SCR dated April 10, 2025, prepared by Haley & Aldrich of New York

Haley & Aldrich of New York completed an SC investigation on behalf of 9002 Commercial Unit LLC to understand the extent of contamination at the Site, evaluate potential on-site sources, and identify potential remedial options. The investigation was performed from May 15, 2024, through June 13, 2024, and included the installation of five soil borings, three 2-inch permanent monitoring wells, and the installation of eight temporary soil vapor probes. A total of ten soil samples (plus QA/QC samples), nine groundwater samples (plus QA/QC samples) from newly installed and relevant existing groundwater monitoring wells, one ambient air sample, and eight sub-slab soil vapor samples with co-located indoor air samples were collected.

Supplemental sampling activities were completed from February 26, 2025, through March 12, 2025, and included the installation of three soil borings, two 2-inch permanent monitoring wells, and ten temporary sub-slab soil vapor probes. A total of six supplemental soil samples (plus QA/QC samples), two groundwater samples from the newly installed monitoring wells (plus QA/QC samples), five groundwater samples from existing monitoring wells (plus QA/QC samples), one ambient air sample, eight sub-slab soil vapor samples with co-located indoor air samples, and two off-site sub-slab soil vapor samples were collected. The off-site sub-slab soil vapor probes were installed to approximately 1 ft bgs within the

sidewalk along Hoffman Drive to the southeast of the Site, within the vicinity of the closed-in-place UST, to evaluate the potential for off-site soil vapor migration. Additionally, a sample of the LNAPL observed in MW-3 was collected for fingerprint analysis.

Soil, groundwater, and soil vapor analytical results from the 2024 and 2025 SC sampling events are summarized on Figures 4, 5, and 6, respectively. A summary of environmental findings of the 2025 SC includes the following:

- The Site was underlain by a layer of fill material consisting of dark brown to black silty clay. Fill extended from the surface to variable depths between 2 and 4 ft bgs. The fill was underlain by a potential native layer consisting of light to dark brown to gray silty clay and fine sand with varying amounts of gravel extending up to the terminus depth of each boring at 12 ft bgs within the basement of the existing building.
- Groundwater was encountered at depths ranging from approximately 3.01 to 3.41 ft below top of casing (btoc) within the basement of the existing building and 8.14 to 9.6 ft btoc in monitoring wells located outside of the existing building during the SC sampling event. Groundwater was encountered at depths ranging from approximately 2.65 to 3.65 ft btoc within the basement of the existing building and 8.37 to 9.84 ft btoc in monitoring wells located outside of the existing building during the associated supplemental sampling event. Groundwater beneath the Site generally flows from the southwest to northeast as shown on Figure 7.
- LNAPL was observed in one permanent monitoring well (MW-3) within the vicinity of the former UST.
- Soil analytical results were compared to NYSDEC 6 NYCRR Part 375 UUSCOs, Protection of Groundwater Soil Cleanup Objectives (PGWSCOs), and Restricted Residential Soil Cleanup Objectives (RRSCOs). Note that no standards for per- and polyfluoroalkyl substances (PFAS) in soil currently exist in New York State; however, NYSDEC published soil Guidance Values (GVs) for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in October 2020 (latest revision April 2023). PFOA and PFOS soil sample results are compared to the unrestricted use, restricted use, and protection of groundwater GVs outlined in the April 2023 PFAS Guidance.

  VOCs

  One VOC, acetone, was detected above the UUSCO and PGWSCO in one soil sample, HA-SB-09_0-2, at a maximum concentration of 0.051 ppm.

  No other VOCs were detected in any soil samples above applicable standards.

  SVOCs

  Six SVOCs, specifically polycyclic aromatic hydrocarbons (PAHs), were detected in soil sample HA-SB-08_0-2 at concentrations exceeding the UUSCOs, RRSCOs, and/or PGWSCOs, including benzo(a)anthracene (maximum concentration of 2.4 ppm), benzo(a)pyrene (maximum concentration of 2.4 ppm), benzo(b)fluoranthene (maximum concentration of 2.9 ppm), benzo(k)fluoranthene (maximum concentration of 1.2 ppm), chrysene (maximum concentration of 2 ppm), and indeno(1,2,3-cd)pyrene (maximum concentration of 1.4 ppm). No other SVOCs were detected above the respective standards in any soil sample.

Metals

Four metals were detected at concentrations exceeding the UUSCOs, RRSCOs, and/or PGWSCOs in multiple shallow soil samples collected, including copper (maximum concentration of 215 ppm in HA-SB-07_2-3), lead (maximum concentration of 4,390 ppm in HA-SB-04_0-2), mercury (maximum 0.79 ppm in HA-SB-11_2-3), and zinc (maximum concentration of 578 ppm in HA-SB-04_0-2). Nickel was detected above the UUSCO in one soil sample, HA-SB-09_2-3, at a maximum concentration of 60 ppm.

Arsenic was detected above the UUSCO, RRSCO, and PGWSCO in one soil sample, HA-SB-04_0-2, at a maximum concentration of 21.8 ppm. Barium was detected above the UUSCO and RRSCO in one soil sample, HA-SB-04_0-2, at a maximum concentration of 474 ppm.

No other metals were detected in any soil samples above applicable standards.

Polychlorinated Biphenyls (PCBs)

No PCBs were detected in any soil samples above applicable standards.

Pesticides

One pesticide, 4,4-DDE, was detected above the UUSCO in two soil samples at a maximum concentration of 0.0059 ppm in HA-SB-07_0-2. One pesticide, 4,4'-DDT, was detected above the UUSCO in one soil sample, HA-SB-11_0-2, at a maximum estimated concentration of 0.0041 milligrams per kilogram (mg/kg).

No other pesticides were detected in any soil samples above applicable standards.

Emerging Contaminants

The compound 1,4-dioxane was not detected above laboratory detection limits in any soil samples collected at the Site.

PFOS was detected above the GV of 0.88 parts per billion (ppb) for unrestricted use in HA-SB-06_2-3 at a concentration of 0.9 ppb and HA-SB-11_0-2, at a concentration of 1.09 ppb, but both were below the protection of groundwater and restricted residential use GVs. PFOA was not detected in any soil samples above applicable standards.

Concentrations of total PFOA/PFOS ranged from non-detect (ND) to a maximum estimated concentration of 1.33 ppb in HA-SB-11_0-2.

- Groundwater analytical results were compared to 6 NYCRR Part 703.5 NYSDEC T.O.G.S. 1.1.1 AWQS and GVs for Class GA Water. Emerging contaminants PFOA and PFOS were compared to the GVs for PFOA and PFOS outlined in the NYSDEC April 2023 PFAS Guidance. The emerging contaminant 1,4-dioxane was compared to the GV as set by NYSDEC in March 2023.

  VOCs

  Five of the 17 groundwater samples collected, including two duplicate samples, reported one or more VOCs detected above the AWQS, including 1,1,1-trichloroethane (maximum concentration 2,700 ppb in the duplicate sample collected from MW-2), 1,1,2-trichloroethane (maximum concentration 3.5 ppb in both MW-2 and the duplicate sample collected from MW-2), 1,1-dichloroethane (maximum concentration 1,700 ppb in the duplicate sample

collected from MW-2), 1,1-dichloroethene (maximum concentration 1,400 ppb in the duplicate sample collected from MW-2), 1,2-dichlorobenzene (maximum concentration 6.8 ppb in MW-17), benzene (maximum concentration 14 ppb in MW-15), chlorobenzene (maximum concentration 14 ppb in the duplicate sample collected from MW-2), chloroethane (maximum concentration 43 ppb in MW-15), chloroform (maximum concentration 47 ppb in the duplicate sample collected from MW-2), PCE (maximum concentration 11 ppb in the duplicate sample collected from MW-2), and vinyl chloride (VC; maximum concentration 47 ppb in the duplicate sample collected from MW-2).

No other VOCs were detected above the respective standards in any groundwater sample.

SVOCs

One SVOC, acenaphthene, was detected above the AWQS in one groundwater sample at a maximum concentration of 86 ppb in MW-15.

No other SVOCs were detected above the AWQS in any groundwater sample.

PCBs

No PCBs were detected above the AWQS in any groundwater sample.

Dissolved Metals

Five dissolved metals were detected in multiple groundwater samples above the AWQS, including antimony (maximum concentration of 5.2 ppb in the duplicate sample collected at MW-19), iron (maximum concentration 664 ppb in MW-15), magnesium (maximum concentration 94,800 ppb in MW-17), manganese (maximum concentration 7830 ppb in MW-17), nickel (maximum concentration 594 ppb in MW-17), and sodium (maximum concentration 409,000 ppb in MW-8). Additionally, cadmium and copper were detected above the AWQS in MW-17 only, at maximum concentrations of 8.7 ppb and 445 ppb, respectively.

No other dissolved metals were detected above the AWQS in any groundwater sample.

Total Metals

Five total metals were detected above the AWQS in multiple groundwater samples, including antimony (maximum concentration 4.1 ppb in MW-19), cadmium (maximum concentration 8.8 ppb in MW-17), iron (maximum concentration 12,500 ppb in MW-12), lead (maximum concentration of 79.1 ppb in MW-16), magnesium (maximum concentration 93,500 ppb in MW-17), manganese (maximum concentration 7820 ppb in MW-17), nickel (maximum concentration 595 ppb in MW-17), and sodium (maximum concentration 427,000 ppb in MW-8). Additionally, copper and mercury were detected above the AWQS in one groundwater sample each, at maximum concentrations of 415 ppb in MW-17 and 0.77 ppb in MW-12, respectively.

No other total metals were detected above the AWQS in any groundwater sample.

Pesticides

No pesticides were detected above the AWQS in any groundwater sample.

Emerging Contaminants

Concentrations of 1,4-dioxane were compared to the GV of 0.35 ppb issued on March 15, 2023, by the NYSDEC. PFOA/PFOS compounds in groundwater are compared to the NYSDEC March 2023 GV of 6.7 parts per trillion (ppt) and 2.7 ppt, respectively.

The compound 1,4-dioxane was detected above the GV of 0.35 ppb in six groundwater samples, including one duplicate, at a maximum concentration of 9 ppb in MW-11.

PFOS was detected above the GV of 2.7 ppt in each of the 13 groundwater samples, including two duplicates, at a maximum concentration of 347 ppt in MW-19. PFOA was detected above the GV of 6.7 ppt in each of the 13 groundwater samples, including two duplicates, at a maximum concentration of 285 ppt in MW-19.

Total PFOA/PFOS concentrations in groundwater samples ranged from 16.8 ppt in MW-18 to a maximum concentration of 632 ppt in MW-19.

Fingerprint Analysis

The LNAPL sample collected for fingerprint analysis at MW-3 most closely resembled a mixture of no. 4 fuel and motor oil.

- No standard currently exists for soil vapor samples in New York State.

  May 2024 Soil Vapor Sampling Results:

  Total sub-slab soil vapor VOC concentrations ranged from 128.76 micrograms per cubic meter (µg/m^3) in HA-SS-11 to a maximum concentration of 4345.9 µg/m^3 in HA-SS-06. Total sub-slab soil vapor CVOC concentrations ranged from 0.74 µg/m^3 in HA-SS-11 to a maximum concentration of 27.95 µg/m^3 in HA-SS-05. Total sub-slab soil vapor benzene, toluene, ethylbenzene, and total xylenes (BTEX) concentrations ranged from 27.9 µg/m^3 in HA-SS-08 to a maximum concentration of 1,278 µg/m^3 in HA-SS-06.

  Total indoor and ambient air sample VOC concentrations ranged from 13.3 µg/m^3 in HA-AA-12 to a maximum concentration of 97.81 µg/m^3 in HA-IA-08. Total CVOC concentrations in indoor and ambient air samples ranged from 1.95 µg/m^3 in HA-IA-11 to a maximum concentration of 8.58 µg/m^3 in HA-IA-10. Total BTEX concentrations in indoor and ambient air samples ranged from 3.61 µg/m^3 in HA-IA-05 to a maximum concentration of 11.77 µg/m^3 in HA-IA-08.

  Acetone was detected in each of the eight sub-slab soil vapor samples and each of the eight indoor air samples above laboratory detection limits, at maximum concentrations of 2,100 µg/m^3 in HA-SS-06 and 33 µg/m^3 detected in both HA-IA-08 and HA-IA-09. Acetone was detected in the ambient air sample, HA-AA-12, above laboratory detection limits at an estimated concentration of 5.2 µg/m^3.

  Sub-slab soil vapor samples and indoor and ambient air concentrations were evaluated using the NYSDOH Decision Matrices A, B, and C (updated May 2017) and Matrices D, E, and F (updated February 2024), as referenced in the 2006 NYSDOH Soil Vapor Intrusion Guidance document. Of the compounds evaluated in the NYSDOH Decision Matrices, eight VOCs were detected in either sub-slab soil vapor samples or indoor air quality samples at concentrations above their lowest respective thresholds. It should be noted that soil vapor, indoor air, and

ambient air samples collected during the May 2024 sampling event were collected outside of the heating season. A summary of the results of the VOCs detected in air quality samples is provided below:

- 1,2,4-trimethylbenzene was detected in indoor air sample HA-IA-07 at a concentration of 2 µg/m^3, which exceeds the lowest threshold noted in the NYSDOH Matrix D of 2 µg/m^3. However, the concentration of 1,2,4-trimethylbenzene at the corresponding sub-slab soil vapor sample, HA-SS-07, was 4.4 µg/m^3, to which NYSDOH recommends "no further action."
- 2,2,4-trimethylpentane was detected in sub-slab soil vapor samples HA-SS-04 and HA-IA-06 at a concentration of 67 µg/m^3 and 130 µg/m^3, respectively, which exceeds the lowest threshold noted in the NYSDOH Matrix D of 60 µg/m^3. However, the concentration of 2,2,4-trimethylpentane in the corresponding indoor air samples, HA-IA-04 and HA-IA-06, was 0.55 µg/m^3 and 0.65 µg/m^3, respectively, to which NYSDOH recommends "no further action" for each location.
- Carbon tetrachloride was detected in all indoor air samples at concentrations exceeding the lowest threshold noted in the NYSDOH Matrix A of 0.2 µg/m^3, at a maximum concentration of 0.37 µg/m^3 at HA-IA-06. However, the concentration of carbon tetrachloride in all corresponding sub-slab soil vapor samples ranged from ND to 0.39 µg/m^3, to which NYSDOH recommends "no further action" for each location.
- Cyclohexane was detected in five indoor air samples HA-IA-06, HA-IA-07, HA-IA-08, HA-IA-09, and HA-IA-10 at concentrations of 2.7 µg/m^3, 2.1 µg/m^3, 4.7 µg/m^3, 3.6 µg/m^3, and 3 µg/m^3, respectively. The detections exceeded the lowest threshold noted in the NYSDOH Matrix D of 2 µg/m^3. However, concentrations of cyclohexane in corresponding sub-slab soil vapor samples did not exceed the minimum threshold of 60 µg/m^3, to which NYSDOH recommends "no further action" for each location.
- Ethylbenzene was detected in sub-slab soil vapor sample HA-SS-06 at a concentration of 190 µg/m^3, which exceeds the lowest threshold noted in the NYSDOH Matrix D of 60 µg/m^3. However, ethylbenzene was detected at the corresponding indoor air sample, HA-IA-06, at a concentration of 0.52 µg/m^3, to which NYSDOH recommends "no further action."
- M,p-xylenes were detected in sub-slab soil vapor sample HA-SS-06 at a concentration of 760 µg/m^3, which exceeds the lowest threshold noted in the NYSDOH Matrix E of 200 µg/m^3. However, m,p-xylenes were detected at the corresponding indoor air sample, HA-IA-06, at a concentration of 2 µg/m^3, to which NYSDOH recommends "no further action."
- Methylene chloride was detected in four indoor air samples HA-IA-06, HA-IA-07, HA-IA-08 and HA-IA-10 at concentrations of 3.3 µg/m^3, 3.4 µg/m^3, 6.9 µg/m^3, and 8.1 µg/m^3, respectively. The detections exceeded the lowest threshold noted in the NYSDOH Matrix B of 3 µg/m^3. However, concentrations of methylene chloride in corresponding sub-slab soil vapor samples did not exceed the minimum threshold of 100 µg/m^3, to which NYSDOH recommends "no further action" for each location.

  O-xylene was detected in sub-slab soil vapor samples HA-SS-04 and HA-SS-06 at a concentration of 66 µg/m3 and 310 µg/m3, respectively, which exceeds the lowest threshold noted in the NYSDOH Matrix D of 60 µg/m3. However, o-xylene was detected

at the corresponding indoor air sample locations, HA-IA-04 and HA-IA-06, at concentrations of 0.77 µg/m3 and 0.8 µg/m3, respectively, to which NYSDOH recommends "no further action."

Supplemental Soil Vapor Sampling Results

Total sub-slab soil vapor VOC concentrations ranged from 7.81 µg/m^3 in HA SS-14 to a maximum concentration of 1,830.81 µg/m^3 in HA SS-12. Total sub-slab soil vapor CVOC concentrations ranged from 0.43 µg/m^3 in HA SS-14 to a maximum concentration of 29.79 µg/m^3 in HA SS-13. Total sub-slab soil vapor BTEX concentrations ranged from 0.31 µg/m^3 in HA SS-14 to a maximum concentration of 35.5 µg/m^3 in HA SS-13.

Total indoor and ambient air sample VOC concentrations ranged from 18.86 µg/m^3 in HA AA-01 to a maximum concentration of 126.44 µg/m^3 in HA IA-17. Total CVOC concentrations in indoor and ambient air samples ranged from 0.35 µg/m^3 in HA IA-16 to a maximum concentration of 1.76 µg/m^3 in HA IA-17. Total BTEX concentrations in indoor and ambient air samples ranged from 3.01 µg/m^3 in HA AA-01 to a maximum concentration of 71.05 µg/m^3 in HA IA-17.

Acetone was detected in seven of the eight sub-slab soil vapor samples and in each of the eight indoor air samples above laboratory detection limits, at maximum concentrations of 1,500 µg/m^3 in HA SS-12 and 46 µg/m^3 in HA IA-13, respectively. Acetone was detected in the ambient air sample, HA AA-01, above laboratory detection limits at an estimated concentration of 4.9 µg/m^3.

Sub-slab soil vapor samples and indoor and ambient air concentrations were collected during the heating season and evaluated using the NYSDOH Decision Matrices A, B, and C (updated May 2017) and Matrices D, E, and F (updated February 2024), as referenced in the 2006 NYSDOH Soil Vapor Intrusion Guidance document. Of the compounds evaluated in the NYSDOH Decision Matrices, two VOCs were detected in either sub-slab soil vapor samples or indoor air quality samples at concentrations above their lowest respective thresholds.

A summary of the results of the VOCs detected in air quality samples is provided below:

- Carbon tetrachloride was detected in all indoor air samples at concentrations exceeding the lowest threshold noted in the NYSDOH Matrix A of 0.2 µg/m^3, at a maximum concentration of 0.43 µg/m^3 in HA-IA-12. However, the concentration of carbon tetrachloride at all corresponding sub-slab soil vapor samples ranged from ND to 0.43 µg/m^3, to which NYSDOH recommends "no further action" for each location.
- Toluene was detected in indoor air sample HA IA-17 at a concentration of 65 µg/m^3, which exceeds the highest threshold noted in the NYSDOH Matrix F of 50 µg/m^3. Toluene was detected in the corresponding sub-slab soil vapor sample, HA SS-17, at a concentration of 4.8 µg/m^3, to which NYSDOH recommends "identify source(s) or resample or mitigate."

Off-Site Supplemental Soil Vapor Sampling Results

Total sub-slab soil vapor VOC concentrations ranged from 414.97 µg/m^3 in HA SS-20 to a maximum concentration of 615 µg/m^3 in HA SS-21. Total sub-slab soil vapor CVOC concentrations ranged from 0.37 µg/m^3 in HA SS-20 to a maximum concentration of 1.78

µg/m^3 in HA SS-21. Total sub-slab soil vapor BTEX concentrations ranged from 11.9 µg/m^3 in HA SS-20 to a maximum concentration of 13.16 µg/m^3 in HA SS-21.

Acetone was detected above laboratory detection limits in both off-site soil vapor samples, at a maximum concentration of 560 µg/m^3 in HA SS-21.

2.6 PREVIOUS REMEDIAL ACTIONS

Interim Remedial Measures (IRMs) completed at the Site include a 7,500-gallon No. 2 fuel oil UST closed-in-place by TCJ Construction in May 2017 and various LNAPL recovery events conducted by HydroTech between May 2017 and March 2020, removing a total of 1,618 gallons of oil/water mixture.

3. Interim Remedial Measures Work Plan

3.1 IRM OBJECTIVES AND RATIONALE

The objective of the IRM is to remove, to the extent practicable, LNAPL from on-site groundwater monitoring well (MW-3) and implement ZVI injections in the northeast portion of the Site to address CVOC contamination in groundwater.

The remedial portion of the Site will be secured by locked entrances and inaccessible to the public during IRM implementation and will remain locked and inaccessible to the public until the IRMWP implementation is complete.

3.2 GENERAL PROJECT INFORMATION

3.2.1 Remediation Engineer

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

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

Under the direction of the RE, the work of other contractors and subcontractors involved in aspects of the IRM will be documented, including air monitoring, injections, LNAPL product recovery from MW-3, and management of waste transportation and disposal.

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

3.3 SUMMARY OF PROPOSED INTERIM REMEDIAL MEASURES

1. Implementation of a Site-specific Health and Safety Plan (HASP) for the protection of on-site workers, the community, residents, and the environment during IRM activities.
2. The existing concrete building slab present across the lot will be kept in place throughout the IRMs to serve as a cover system to subsurface soils.
3. During ground intrusive work, community air monitoring will be implemented to protect downwind receptors. When the proposed intrusive work is to take place indoors or within 20 ft

of potentially exposed individuals or structures, a special requirements Community Air Monitoring Plan (CAMP) will be implemented, as needed, and is attached in Appendix F.

4. LNAPL product recovery from groundwater monitoring well MW-3.
5. Application of ZVI to address the CVOC contamination in groundwater in the northeastern portion of the Site. This treatment will target CVOCs (PCE, 1,1,1-TCA, and VC). Injections will be from 5 ft bgs to 15 ft bgs.
6. Completion of baseline and post-injection groundwater sampling for CVOC analysis at MW-1, MW-2, MW-10, MW-11, MW-15, MW-16, and MW-17.
7. Completion of an SVI Evaluation, in accordance with DER-10 and the NYSDOH Final Guidance on Soil Vapor Intrusion, approximately one month after the completion of ZVI injections and during the heating season at three co-located sub-slab and indoor air locations (HA-SS/IA-04/14, HA-SS/IA-05/13, and HA-SS/IA-06/12).
8. Submission of daily reports to the NYSDEC during the IRM Site activities to document the progress of the IRM.
9. Submission of a CCR at the completion of the IRM.
10. Submission of quarterly and annual Operation, Maintenance & Monitoring (OM&M) reports following the CCR, documenting the OM&M of the LNAPL recovery and groundwater treatment programs.

An IRM location plan outlining the Site features and the proposed IRM locations is included as Figure 8.

3.4 INTERIM REMEDIAL MEASURE ACTIVITY

The proposed IRM is based on data presented in the SCR and the proposed renovation plans. The requirements for each of the IRM tasks are described below.

3.4.1 Site Preparation

3.4.1.1 Mobilization

The remediation contractor will mobilize to the Site and prepare for IRM activities prior to commencement. 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; and,
- Constructing an equipment decontamination pad for equipment and personnel that come into contact with impacted materials during remediation.

3.4.1.2 Utility Marker and Easements Layout

9002 Commercial Unit LLC and its contractors are solely responsible for the identification of utilities and/or easements that might be affected by work under this IRMWP and implementation of the required,

appropriate, or necessary health and safety measures during performance of the work under this IRMWP. 9002 Commercial Unit LLC and its contractors are solely responsible for the safe execution of the work performed under this IRMWP. 9002 Commercial Unit LLC and its contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this IRMWP. Approval of this IRMWP by the NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site has been investigated by the RE. It has been determined that no risk or impediment to the planned work under this IRMWP is posed by utilities or easements on the Site.

3.4.1.3 Excavation Support

Although excavation work is not planned for renovation or IRM purposes, appropriate management of the structural stability of on-site or off-site structures during Site activities is the sole responsibility of 9002 Commercial Unit LLC and its contractors. 9002 Commercial Unit LLC and its contractors are solely responsible for the safe execution of the work performed under this IRMWP. 9002 Commercial Unit LLC and its contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this IRMWP. Additionally, 9002 Commercial Unit LLC and its contractors are solely responsible for the implementation of the required, appropriate, or necessary health and safety measures during the performance of work conducted under this IRMWP.

3.4.2 Product Recovery

LNAPL will be extracted from groundwater monitoring well MW-3 utilizing a pump and sipper system. Gauging of all monitoring wells will be conducted daily during normal workdays (Monday through Friday) when there are active on-site IRM activities, i.e., in-situ chemical reduction (ISCR) injections and groundwater sampling activities. Measurable LNAPL (defined as 0.1 ft or more) will be removed from monitoring well MW-3. LNAPL recovery from MW-3 with thickness at or below the minimum measurable thickness may transition to passive LNAPL recovery via absorbent socks. During each recovery event, the total volume of fluids and LNAPL recovered will be recorded.

A spill containment berm with oil-absorbent booms will be utilized within the LNAPL recovery area. The containment area will be inspected periodically during the LNAPL gauging/recovery activities.

LNAPL removed from the recovery wells will be initially stored in a 55-gallon drum or equivalent. The 55-gallon drum will be placed within or near the LNAPL recovery operations, and the drum will have secondary containment. As the drum reaches capacity, the drum will be replaced, or the fluids stored in the drum will be transferred to a tanker truck for off-site disposal. The recovered fluids will be handled as discussed in Section 4.5, Waste Management. The recovered product will be disposed of off-site in a manner suitable to the receiving facility and in conformance with applicable permits. Data available for product to be disposed of at a given facility will be submitted to the disposal facility with a suitable explanation prior to shipment and receipt.

System specifications for the pump and sipper system can be found in Appendix A.

3.4.3 CVOC Treatment

ISCR injections, utilizing ZVI, will be conducted to remediate the dissolved phase CVOC concentrations centered around monitoring wells MW-2, MW-17, MW-11, and MW-15. This treatment is designed to target CVOCs, specifically PCE, 1,1,1-TCA, and VC, in anaerobic conditions through reductive dechlorination into non-chlorinated products, such as ethene and acetylene. ZVI will be applied through injection into the saturated soils (e.g., with direct-push points) for the on-site soils. Using an approximately 15-ft radius of influence (ROI), 12 injection points will be needed for the treatment area. Studies of various ZVI particle sizes and contaminants have been conducted over the last several decades to estimate rate constants and can be used to approximate reductant demand. Based on the present contaminants, the groundwater flow, and the particle size of ZVI, a dosing of approximately 20 grams per liter (g/L) should be used within the source area treatment zone. The ZVI proposed for this project is a small particle size, micron-ranged ZVI in the range of 25 to 50 microns in diameter.

The remedy will address contamination from the water table to a depth of 15 ft bgs through the addition of ZVI to the groundwater plume. The redox stoichiometry with PCE, 1,1,1-TCA, and VC are shown in the equation below:

PCE

$$4Fe^0 + C_2Cl_4 + 4H^+ \rightarrow 4Fe^{2+} + 8e^- + C_2H_4 + 4Cl^-$$

1,1,1-TCA

$$3Fe^0 + CH_3CCl_3 + 3H^+ \rightarrow 3Fe^{2+} + 6e^- + C_2H_6 + 3Cl^-$$

VC

$$Fe^0 + C_2H_3Cl + H^+ \rightarrow Fe^{2+} + 2e^- + C_2H_4 + Cl^-$$

Figure 8 shows the proposed injection points. Transects are proposed for the injection locations to allow for permeable reactive zones that create reductive zones perpendicular to the flow of groundwater. This allows for both abiotic and biotic reductive dechlorination. Product information for ZVI is in Appendix B. Due to the shallow groundwater conditions, injections will target a 10-ft treatment depth starting at 5 ft bgs (i.e., 2 ft below the water table) to a depth of 15 ft bgs.

3.4.4 Groundwater Sampling

Baseline groundwater samples will be collected from all relevant on-site interior permanent groundwater monitoring wells prior to ISCR injection activities in accordance with NYSDEC Division of Environmental Remediation (DER)-10. Monitoring wells sampled during the baseline sampling event will be sampled again post-injection for CVOC analysis to assess CVOC concentrations and documented in the CCR. Future quarterly sampling will be documented in the OM&M reports. A minimum of seven groundwater samples, plus QA/QC samples, will be collected from the CVOC plume. Proposed baseline and post-injection groundwater monitoring well sample locations are shown on Figure 8.

Baseline and post-injection groundwater samples will be collected from four on-site interior wells with elevated CVOC concentrations (MW-02, MW-11, MW-15, and MW-17), two on-site interior upgradient and downgradient wells (MW-1, and MW-16, respectively), and one on-site exterior cross gradient well

(MW-10) located between the injection zone and the adjacent lot that will be conducting large-scale dewatering in accordance with NYSDEC DER-10 to document remedial performance and to characterize the potential movement of any contaminants of concern outside of the proposed injection area; samples will be analyzed for CVOCs. Samples will be collected into laboratory-provided bottle ware. Samples will be transported under standard chain-of-custody protocol to an Environmental Laboratory Approval Program (ELAP)-certified laboratory.

Cleanup objectives for the Site will be the AWQS concentrations listed in Table 1. QC procedures for baseline and post-injection groundwater sampling are included in the Quality Assurance Project Plan (QAPP; refer to Appendix C). Baseline and post-injection groundwater 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. Groundwater monitoring well locations and sample results that exceeded the AWQS during the SC are shown on Figure 5.

3.4.5 Soil Vapor Intrusion Monitoring

SVI monitoring will be conducted approximately one month after the completion of ZVI injections and during the heating season. Three sub-slab soil vapor samples will be collected with co-located indoor air samples at the following locations from the 2024 and 2025 Site Characterization: HA-SS/IA-04/14, HA-SS/IA-05/13, and HA-SS/IA-06/12. Samples will be collected in accordance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, October 2006, Revised 2017 and 2024).

Sub-slab soil vapor probes will be installed to approximately 1 ft below the slab. The vapor implants will be installed with a direct-push drilling rig (e.g., Geoprobe®) or like equipment to advance a stainless-steel probe to the desired sample depth. All interior sub-slab vapor samples will be co-located with indoor air samples to better assess the potential for exposures associated with SVI. Indoor air samples will be collected at a height between approximately 3 and 5 ft above the floor to represent a height where occupants are normally seated. Sampling will occur for the duration of eight hours. Additionally, one outdoor ambient air sample will be collected.

Samples will be collected in appropriately sized Summa® canisters that have been certified clean by the laboratory, and samples will be analyzed by using United States Environmental Protection Agency (USEPA) Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 liters per minute (L/min). Sampling methods are described in the Field Sampling Plan (FSP) provided as Appendix B of the SCWP.

A building questionnaire and chemical inventory will be completed during the sampling event to identify preferential pathways, building features, conditions, and substances that may affect the interpretation of the sampling results.

3.4.6 Waste Management

Several potential waste streams have been identified that may be generated during IRM:

1. Recovered LNAPL – will be containerized on the Site through the installed sipper system containment. Full containers will be recovered by a licensed contractor and disposed of at an

approved facility, to be determined at a later date. LNAPL will be disposed of in accordance with local, city, and state regulations.

2. Incidental project wastes such as personal protective equipment (PPE) – will be disposed of as general waste unless visually impacted with contaminants, in which case the waste will be disposed of at an approved facility. Proposed facilities will be forwarded to the NYSDEC prior to off-site disposal.

3.4.6.1 On-Site Waste Management

Remediation equipment will require decontamination at certain points in the project. Decontamination will take place using brushes, steam cleaners, and/or pressure washers. Residues from decontamination operations will be collected and managed with other remedial-derived waste. Decontamination water will be collected for off-site disposal or treatment. All waste management activities will be performed within the interior footprint of the building and in such a manner that odors and vapors are controlled.

3.4.6.2 Off-Site Treatment/Disposal of Recovered LNAPL

All accumulated LNAPL will be sent off-site to be treated/disposed of at an approved facility, in accordance with local, city, and state regulations.

3.4.6.3 Demobilization

After IRM activities are 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:

- Disposal of materials in accordance with applicable rules and regulations;
- Equipment decontamination;
- Refuse disposal; and,
- Removal of remaining contaminated material or waste.

3.5 SITE-SPECIFIC HASP

A Site-specific HASP has been prepared (Appendix D). The HASP will apply to IRM-related on-site work. The HASP provides a mechanism for establishing on-site safe working conditions, safety organization, procedures, and PPE requirements during the IRM. The HASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65, respectively). The Haley & Aldrich of New York Safety Coordinator will be Brian Ferguson, and his resume is included in Appendix E.

Contractors or other personnel who perform work at the Site are required to develop their own HASP with comparable or stricter procedures for their respective personnel in accordance with relevant Occupational Safety and Health Administration (OSHA) regulatory requirements for work at hazardous waste sites, as well as general industry requirements, as applicable, based on the nature of the work being performed.

3.6 COMMUNITY AIR MONITORING PLAN

A generic CAMP will be implemented during all ground intrusive work. When the proposed intrusive work is to take place indoors or within 20 ft of potentially exposed individuals or structures, a special requirements CAMP will be implemented and is attached in Appendix F. The CAMP will require real-time monitoring for particulates (i.e., dust) and VOCs at the upwind and downwind perimeters when ground intrusive activities are in progress outdoors at the Site during IRM activities, as applicable. 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 invasive IRM 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 photoionization detectors (PIDs), and particulates will be monitored using DustTrak equipment. Readings will be recorded every 15 minutes at the Site by field personnel.

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

- If the downwind level of particulate matter less than 10 micrometers in diameter (PM-10) 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 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 ft downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less, but in no case less than 20 ft, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down.

The NYSDOH CAMP Guidance will be utilized in the field during community air monitoring activities, and is included as reference in Appendix F. Exceedances observed during the implementation of the CAMP will be reported to NYSDEC and NYSDOH Project Managers within 24 hours of the exceedance and will include the reason(s) for the exceedance, the steps taken to address the exceedance, and the effectiveness of each response. CAMP exceedances will be included in the daily report.

3.7 GREEN AND SUSTAINABLE REMEDIATION

Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing the use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes that balance ecological, economic, and social goals;
- Integrating the remedy with the end use where possible and encouraging green and sustainable renovation and/or redevelopment; and,
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future renovation and/or redevelopment at this Site, any future on-site buildings shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis was completed and is included in Appendix G. The environmental footprint analysis was completed using the USEPA's Spreadsheets for Environmental Footprint Analysis (SEFA), which is an NYSDEC-accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction, and material use were estimated for the remedy. Goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, are incorporated into the remedial program, as appropriate. Progress with respect to green and sustainable remediation metrics will be tracked during the implementation of the interim remedial measures and reported in the CCR, including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program includes a climate change vulnerability assessment to evaluate the impact of climate change on the project Site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress, and drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities. Climate change is not expected to have a significant impact on the remedial system.

Progress with respect to green and sustainable remediation metrics will be tracked during the implementation of the interim remedial measures and reported in the CCR, including a comparison with the analyses provided in this IRMWP. The climate screening process and results will be documented in the form of a completed checklist and brief letter report. A completed climate screening checklist for the remediation phase is provided in Appendix H. An updated checklist will be included in the CCR to document the post-remediation status of the Site.

4. Reporting

Reporting will be conducted throughout the execution of the IRM as described below.

4.1 CONSTRUCTION COMPLETION REPORT

A CCR will be prepared in accordance with DER-10 guidelines to document all aspects of the IRM activities and will include:

- A summary of the LNAPL recovery activities, including monitoring well gauging readings and the volume of LNAPL removed;
- A summary of ZVI injection activities;
- A summary of groundwater sampling activities;
- A summary of SVI Evaluation sampling activities;
- All manifests documenting any off-site transport of waste material;
- A scaled Site plan showing the location of IRM activities;
- Photographic documentation; and
- Certification of the CCR by a New York State-certified P.E.

4.2 QUARTERLY OM&M REPORTS

Quarterly OM&M reports will include a summary of OM&M activities conducted over the previous quarter, including:

- Quarterly groundwater sampling to monitor VOC concentrations Site-wide; and
- Field measurements collected related to groundwater monitoring and maintenance of the LNAPL recovery system.

4.3 ANNUAL OM&M REPORTS

Annual OM&M reports will include a summary of OM&M activities conducted over the past year, including:

- Site Inspection of the Site cover system;
- Quarterly groundwater sampling to monitor VOC concentrations Site-wide;
- Field measurements collected related to the monitoring of groundwater and LNAPL recovery system; and
- Recommendations for future system operation or modification to the scheduled data collection.

4.3.1 LNAPL Recovery Program

Exposure to residual LNAPL will be prevented by an engineering recovery system installed within groundwater monitoring well MW-3 to extract LNAPL. The recovery system will consist of a Geotech AC Sipper (Single-Phase, 110-220V AC, remedial system) extracting LNAPL through a down well pump incorporating a floating oleophilic/hydrophobic intake filter. Extracted product will be containerized within the filter via a vacuum system, then pumped to the surface for storage for accessible off-site disposal. The intake filter will be replaced periodically as indicated by manufacturer's specifications.

Measurable LNAPL (defined as 0.1 ft) will be removed from monitoring well MW-3. LNAPL recovery from MW-3 with thickness at or below the minimum measurable thickness may transition to passive LNAPL recovery via absorbent socks. Fluids management is discussed in Section 3.4.5, Waste Management, which outlines the handling and disposal of recovered and extracted fluids generated during IRM activities.

The components of the product recovery system will be documented in the CCR. Operation and maintenance of this product recovery system will be documented in the quarterly OM&M reports and annual OM&M reports.

The system will remain in place until well gauging measurements of LNAPL thickness are at or below the defined minimum measurable thickness (defined as 0.1 ft). LNAPL recovery from MW-3 with thickness at or below the minimum measurable thickness may transition to passive LNAPL recovery via absorbent socks. The recovery system will not be discontinued without written approval by NYSDEC. A proposal to discontinue the system may be submitted based on confirmatory data that justifies such a request. The system will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC.

4.3.2 Groundwater Monitoring Program

ISCR, utilizing ZVI injections, will be conducted to remediate the CVOC groundwater plume centered around monitoring wells MW-2, MW-11, MW-15, and MW-17. This treatment is designed to target CVOCs through reductive dechlorination into non-chlorinated products such as ethene and acetylene. ZVI will be applied through injection into the saturated soils (e.g., with direct-push points) for the on-site soils. Injection points will be strategically placed, targeting a depth of approximately 13 ft bgs. Proposed injection locations are shown on Figure 8.

Groundwater samples will be collected from the seven designated wells post-injection to establish a baseline level of CVOCs for monitoring purposes. Results from baseline and quarterly post-injection groundwater sampling will be documented in quarterly OM&M reports and summarized in the annual OM&M reports.

If the groundwater monitoring program is discontinued based on the results of sampling, it will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the groundwater monitoring program may be submitted based on confirmatory data that justifies such a request. The monitoring program will remain in place and be performed until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

5. Schedule

The Respondent plans to implement the IRM promptly after the approval of this IRMWP.

Anticipated IRM Schedule	
SCR and IRMWP Drafting	May 2025
NYSDEC IRMWP Review	June 2025 to October 2025
Final IRMWP Submission	October 2025 to November 2025
Implementation of IRMWP	November 2025 to January 2026*
Preparation of CCR	January 2026 to February 2026
NYSDEC & NYSDOH Review and Approval of CCR	March 2026
Quarterly OM&M Reports (First Year)	April, July, and October 2026
First OM&M Report	January 2027

** Pending Site operations.*

References

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

2. 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.

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

4. ASTM Phase I Environmental Site Assessment Report, 90-02 Queens Boulevard, Queens, New York. Prepared by Hydro Tech Environmental, Corp., December 27, 2013.

5. Phase II Environmental Site Assessment, 90-02 Queens Boulevard, Queens, New York, Prepared by Hydro Tech Environmental, Corp., January 14, 2014.

6. Focused Subsurface Investigation, 90-02 Queens Boulevard, Queens, New York, Prepared by Hydro Tech Environmental, Corp., August 5, 2015.

7. Subsurface Investigation Report, 90-02 Queens Boulevard, Queens, New York, Prepared by Hydro Tech Environmental, Corp., September 15, 2015.

8. Focused Subsurface Investigation, 90-02 Queens Boulevard, Queens, New York, Prepared by Hydro Tech Environmental, Corp., March 27, 2017.

9. 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.

10. Documentation of Tank Abandonment and Groundwater Quality, 90-02 Queens Boulevard, Queens, New York, Prepared by Hydro Tech Environmental, Corp., February 17, 2020.

11. Enhanced Fluid Recovery (EFR) Results – February and March 2020, 90-02 Queens Boulevard, Queens, New York, Prepared by Hydro Tech Environmental, Corp., May 7, 2020.

12. ASTM Phase I Environmental Site Assessment, 90-02 Queens Boulevard, Queens, New York, Prepared by Nelson, Pope & Voorhis, LLC, January 26, 2023.

13. Limited Phase II Environmental Site Investigation Report, 90-02 Queens Boulevard, Queens, New York, Prepared by Haley & Aldrich of New York, August 21, 2023.

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

15. Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 (Revised 2017 and 2024).

16. Site Characterization Report, 90-02 Queens Boulevard, Queens, New York, Prepared by Haley & Aldrich of New York, April 2025.

TABLE

TABLE 1
GROUNDWATER CLEANUP OBJECTIVES
90-02 QUEENS BOULEVARD, QUEENS, NEW YORK
NYSDEC SITE NO. 241249

Chlorinated Volatile Organic Compounds (µg/L)	
1,1,1-Trichloroethane	5
1,1,2,2-Tetrachloroethane	5
1,1,2-Trichloroethane	1
1,1-Dichloroethane	5
1,1-Dichloroethene	5
1,2,3-Trichlorobenzene	5
1,2,4-Trichlorobenzene	5
1,2-Dibromo-3-chloropropane (DBCP)	0.04
1,2-Dichlorobenzene	3
1,2-Dichloroethane	0.6
1,2-Dichloropropane	1
1,3-Dichlorobenzene	3
1,4-Dichlorobenzene	3
Bromodichloromethane	50
Carbon tetrachloride	5
Chlorobenzene	5
Chlorobromomethane	5
Chloroethane	5
Chloroform (Trichloromethane)	7
Chloromethane (Methyl Chloride)	5
cis-1,2-Dichloroethene	5
cis-1,3-Dichloropropene	0.4
Dibromochloromethane	50
Dichlorodifluoromethane (CFC-12)	5
Methylene chloride (Dichloromethane)	5
Tetrachloroethene	5
trans-1,2-Dichloroethene	5
trans-1,3-Dichloropropene	0.4
Trichloroethene	5
Trichlorofluoromethane (CFC-11)	5
Trifluorotrichloroethane (Freon 113)	5
Vinyl chloride	2

ABBREVIATIONS AND NOTES:

µg/L: micrograms per liter
NA: Not Applicable
NYSDEC Division of Water TOGS 1.1.1 Class GA Ambient Water Quality Standards.

TABLE 1

GROUNDWATER CLEANUP OBJECTIVES
90-02 QUEENS BOULEVARD, QUEENS, NEW YORK
NYSDEC SITE NO. 241249

Volatile Organic Compounds (µg/L)	
1,1,1-Trichloroethane	5
1,1,2,2-Tetrachloroethane	5
1,1,2-Trichloroethane	1
1,1-Dichloroethane	5
1,1-Dichloroethene	5
1,2,3-Trichlorobenzene	5
1,2,4-Trichlorobenzene	5
1,2,4-Trimethylbenzene	5
1,2-Dibromo-3-chloropropane (DBCP)	0.04
1,2-Dibromoethane (Ethylene Dibromide)	0.0006
1,2-Dichlorobenzene	3
1,2-Dichloroethane	0.6
1,2-Dichloropropane	1
1,3,5-Trimethylbenzene	5
1,3-Dichlorobenzene	3
1,4-Dichlorobenzene	3
2-Butanone (Methyl Ethyl Ketone)	50
2-Hexanone (Methyl Butyl Ketone)	50
2-Phenylbutane (sec-Butylbenzene)	5
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	NA
Acetone	50
Benzene	1
Bromodichloromethane	50
Bromoform	50
Bromomethane (Methyl Bromide)	5
Carbon disulfide	60
Carbon tetrachloride	5
Chlorobenzene	5
Chlorobromomethane	5
Chloroethane	5
Chloroform (Trichloromethane)	7
Chloromethane (Methyl Chloride)	5
cis-1,2-Dichloroethene	5
cis-1,3-Dichloropropene	0.4
Cyclohexane	NA
Dibromochloromethane	50
Dichlorodifluoromethane (CFC-12)	5
Ethylbenzene	5
Isopropylbenzene (Cumene)	5
m,p-Xylenes	5

TABLE 1
GROUNDWATER CLEANUP OBJECTIVES
90-02 QUEENS BOULEVARD, QUEENS, NEW YORK
NYSDEC SITE NO. 241249

Volatile Organic Compounds (µg/L)	
Methyl acetate	NA
Methyl Tert Butyl Ether (MTBE)	10
Methylcyclohexane	NA
Methylene chloride (Dichloromethane)	5
n-Butylbenzene	5
n-Propylbenzene	5
o-Xylene	5
Styrene	5
tert-Butylbenzene	5
Tetrachloroethene	5
Toluene	5
trans-1,2-Dichloroethene	5
trans-1,3-Dichloropropene	0.4
Trichloroethene	5
Trichlorofluoromethane (CFC-11)	5
Trifluorotrichloroethane (Freon 113)	5
Vinyl chloride	2
Xylene (Total)	5

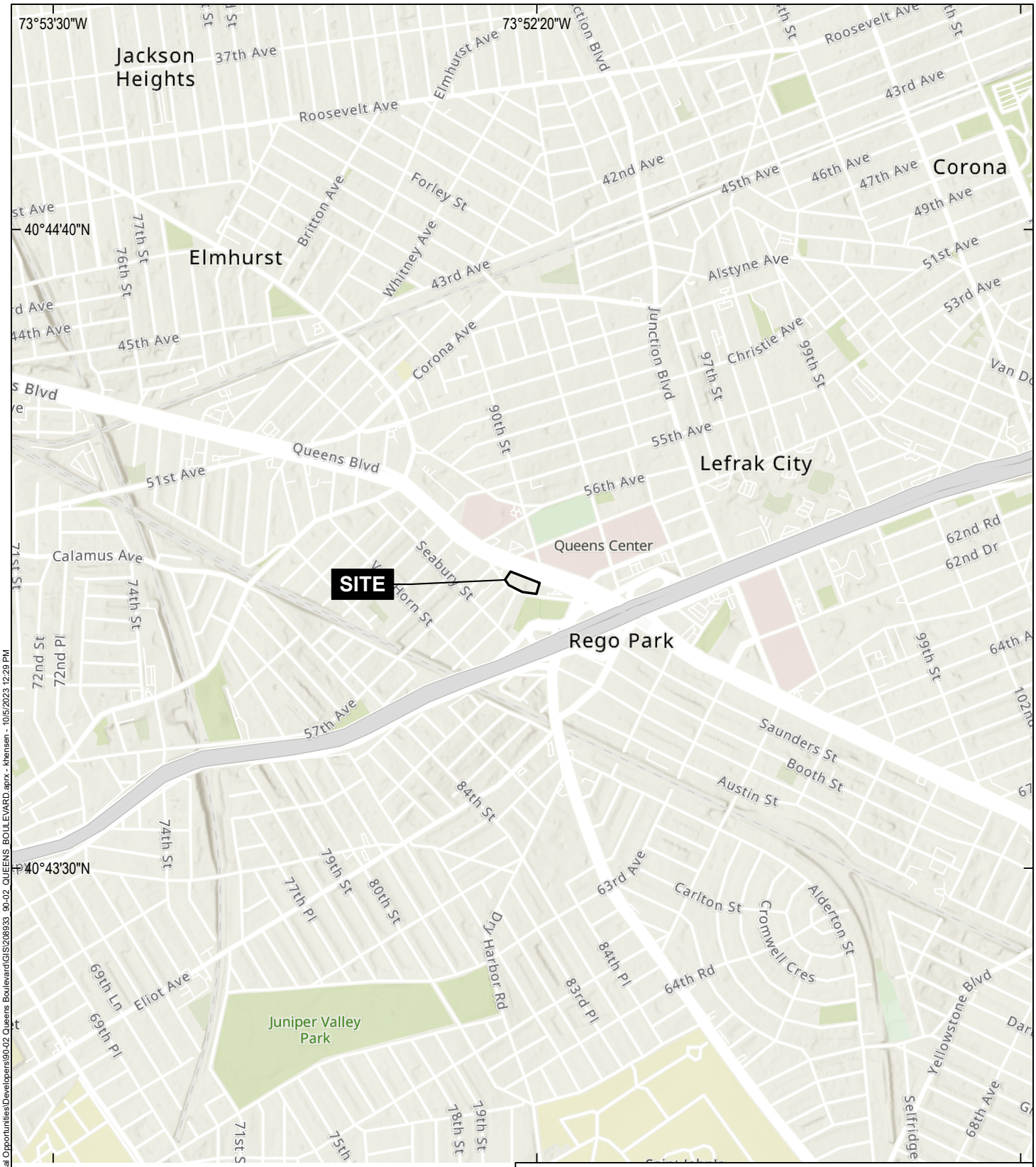
ABBREVIATIONS AND NOTES:

µg/L: micrograms per liter

NA: Not Applicable

NYSDEC Division of Water TOGS 1.1.1 Class GA Ambient Water Quality Standards.

FIGURES



GIS: \\haleyaldrich.com\share\CF\Groups\nyc\Proposal Opportunities\Developers\90-02 Queens Boulevard\GIS\208933_90-02_QUEENS_BOULEVARD.aprx - khensen - 10/5/2023 12:29 PM

MAP SOURCE: ESRI
SITE COORDINATES: 40°44'01"N, 73°52'22"W

HALEY ALDRICH

90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

PROJECT LOCUS

APPROXIMATE SCALE: 1 IN = 2000 FT
MAY 2025

FIGURE 1



LEGEND

- FILL PORT
- ABANDONED UNDERGROUND STORAGE TANK (UST)
- PARTIAL BASEMENT OUTLINE
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. PARTIAL BASEMENT OUTLINE SOURCE: 'FIGURE 1: MONITORING WELL LOCATIONS', HYDRO TECH ENVIRONMENTAL CORP., 18 SEPTEMBER 2015

3. ASSESSOR PARCEL DATA SOURCE: NEW YORK CITY PLANNING

4. AERIAL IMAGERY SOURCE: NEARMAP, 16 JUNE 2024

N

0 40 80

SCALE IN FEET

HALEY ALDRICH

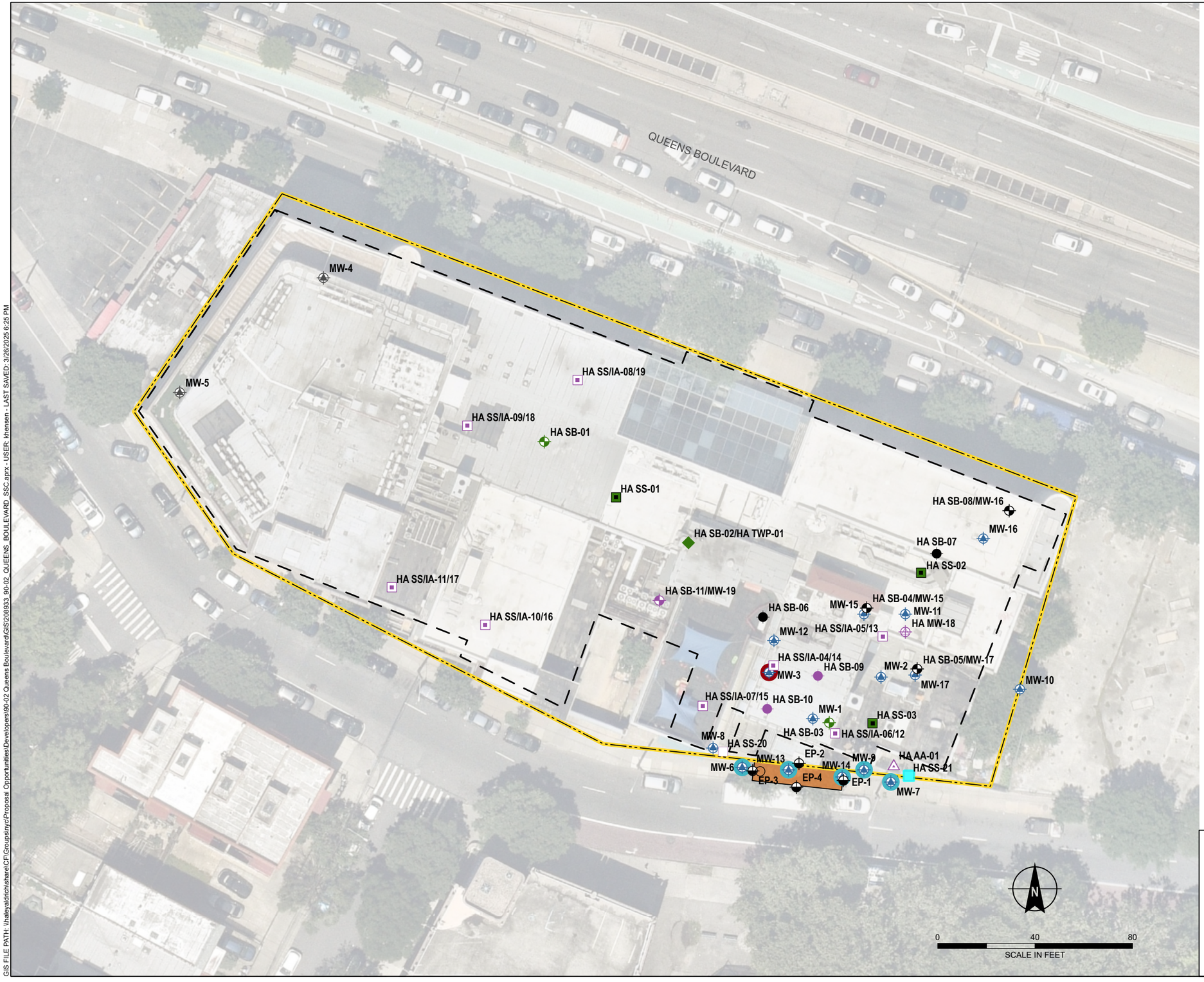
90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

SITE PLAN

MAY 2025

FIGURE 2

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LEGEND

- FILL PORT
- EXISTING MONITORING WELL (NOT SAMPLED)
- EXISTING MONITORING WELL (SAMPLED)
- JUNE 2017 UST ABANDONMENT ENDPOINT SAMPLE

SUPPLEMENTAL SITE CHARACTERIZATION INVESTIGATION

- SOIL BORING
- SOIL BORING/MONITORING WELL
- DEEP MONITORING WELL
- AMBIENT AIR SAMPLE
- SOIL VAPOR/INDOOR AIR SAMPLE
- OFF-SITE SOIL VAPOR
- FINGERPRINT ANALYSIS
- VOC ANALYSIS

SITE CHARACTERIZATION (SC) INVESTIGATION

- SOIL BORING
- SOIL BORING/MONITORING WELL

AUGUST 2023 LIMITED PHASE II INVESTIGATION

- SOIL BORING
- SOIL BORING/TEMPORARY MONITORING WELL
- SOIL VAPOR SAMPLE
- ABANDONED UST
- PARTIAL BASEMENT OUTLINE
- SITE BOUNDARY

NOTES
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. POST-EXCAVATION ENDPOINT SAMPLES WERE COLLECTED FROM THE FOUR SIDEWALLS OF THE UST DURING TANK ABANDONMENT ACTIVITIES COMPLETED IN MAY AND JUNE 2017.
3. SOIL VAPOR, INDOOR AIR, AND AMBIENT AIR SAMPLES COLLECTED DURING THE INITIAL SC INVESTIGATION WERE RESAMPLED DURING HEATING SEASON DURING THE SUPPLEMENTAL SC INVESTIGATION.
4. DEFINITIONS:
UST = UNDERGROUND STORAGE TANK
VOC = VOLATILE ORGANIC COMPOUNDS
5. ASSESSOR PARCEL DATA SOURCE: NEW YORK CITY PLANNING
6. AERIAL IMAGERY SOURCE: NEARMAP, 16 JUNE 2024

HALEY ALDRICH

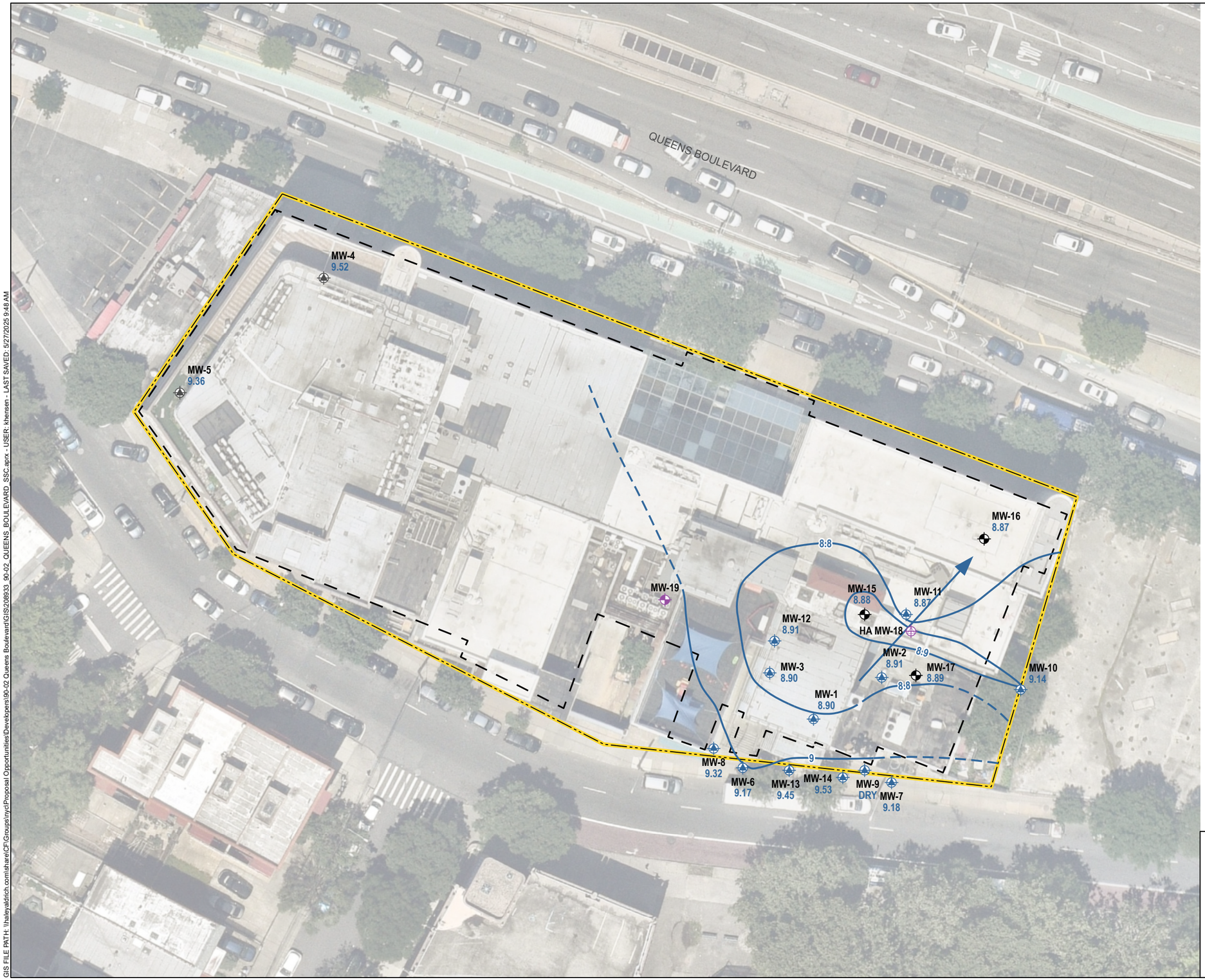
90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

SAMPLE LOCATION MAP

MAY 2025

FIGURE 3

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LEGEND

- EXISTING MONITORING WELL (NOT SAMPLED)
- EXISTING MONITORING WELL (SAMPLED)

SUPPLEMENTAL SITE CHARACTERIZATION INVESTIGATION

- SOIL BORING/MONITORING WELL
- DEEP MONITORING WELL

SITE CHARACTERIZATION (SC) INVESTIGATION

- SOIL BORING/MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR, IN FEET, DASHED WHERE INFERRED
- GROUNDWATER FLOW DIRECTION
- PARTIAL BASEMENT OUTLINE
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. NAVD88 = NORTH AMERICAN VERTICAL DATUM OF 1988
3. GROUNDWATER ELEVATIONS ARE IN **BOLD BLUE TEXT** IN FEET (NAVD88).
4. GROUNDWATER ELEVATIONS WERE MEASURED ON 13 JUNE 2024.
5. PARTIAL BASEMENT OUTLINE SOURCE: 'FIGURE 1: MONITORING WELL LOCATIONS', HYDRO TECH ENVIRONMENTAL CORP., 18 SEPTEMBER 2015
6. AERIAL IMAGERY SOURCE: NEARMAP, 16 JUNE 2024

N

0 40 80

SCALE IN FEET

HALEY ALDRICH

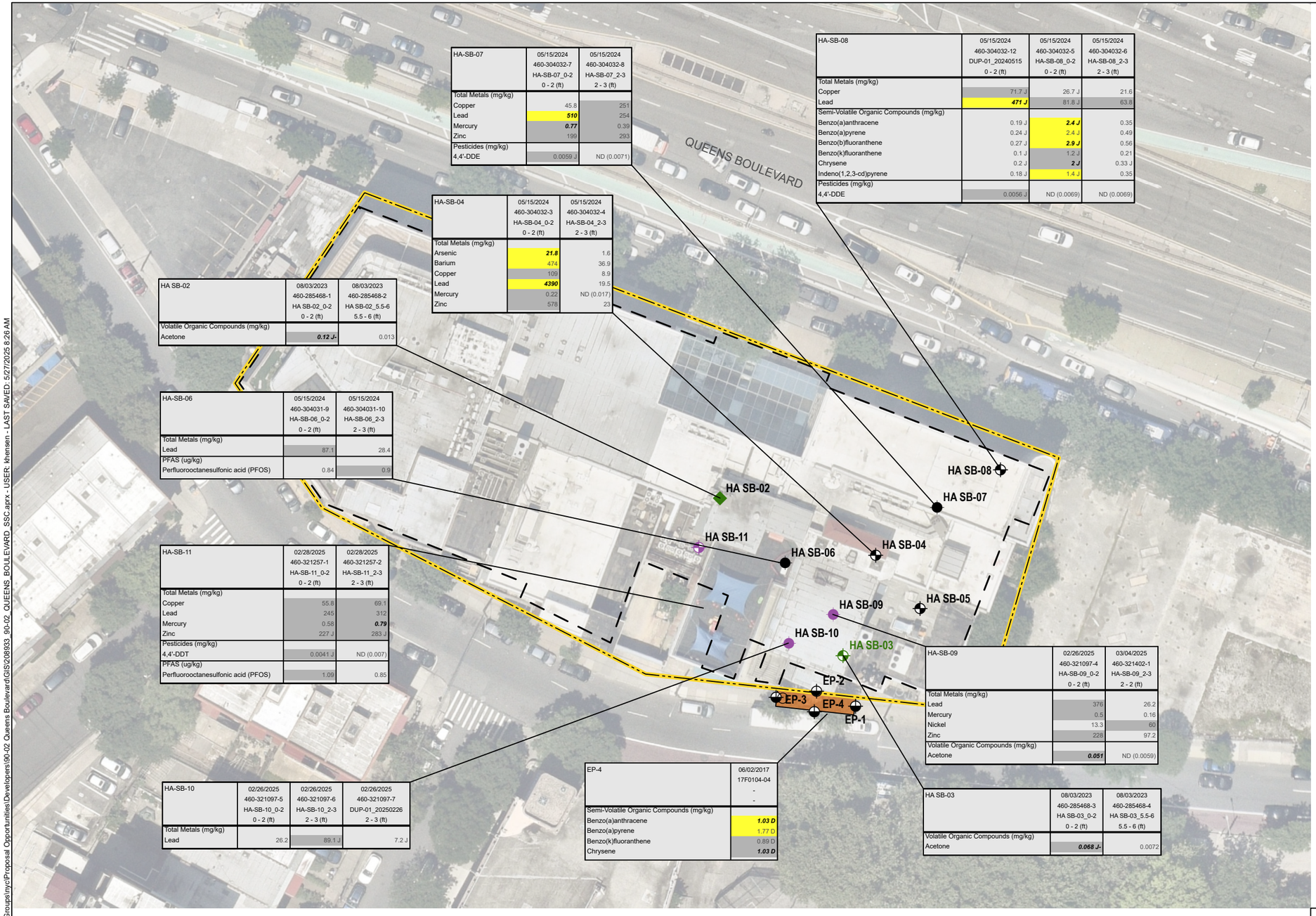
90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

GROUNDWATER CONTOUR MAP

MAY 2025

FIGURE 4

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HA-SB-07	05/15/2024 460-304032-7 HA-SB-07_0-2 0 - 2 (ft)	05/15/2024 460-304032-8 HA-SB-07_2-3 2 - 3 (ft)
Total Metals (mg/kg)		
Copper	45.8	251
Lead	***510***	254
Mercury	***0.77***	0.39
Zinc	199	293
Pesticides (mg/kg)		
4,4'-DDE	0.0059 J	ND (0.0071)

HA-SB-04	05/15/2024 460-304032-3 HA-SB-04_0-2 0 - 2 (ft)	05/15/2024 460-304032-4 HA-SB-04_2-3 2 - 3 (ft)
Total Metals (mg/kg)		
Arsenic	***21.8***	1.6
Barium	474	36.9
Copper	109	8.9
Lead	***4390***	19.5
Mercury	0.22	ND (0.017)
Zinc	578	23

HA SB-02	08/03/2023 460-285468-1 HA SB-02_0-2 0 - 2 (ft)	08/03/2023 460-285468-2 HA SB-02_5.5-6 5.5 - 6 (ft)
Volatile Organic Compounds (mg/kg)		
Acetone	***0.12 J-***	0.013

HA-SB-06	05/15/2024 460-304031-9 HA-SB-06_0-2 0 - 2 (ft)	05/15/2024 460-304031-10 HA-SB-06_2-3 2 - 3 (ft)
Total Metals (mg/kg)		
Lead	87.1	28.4
PFAS (ug/kg)		
Perfluorooctanesulfonic acid (PFOS)	0.84	0.9

HA-SB-11	02/28/2025 460-321257-1 HA-SB-11_0-2 0 - 2 (ft)	02/28/2025 460-321257-2 HA-SB-11_2-3 2 - 3 (ft)
Total Metals (mg/kg)		
Copper	55.8	69.1
Lead	245	312
Mercury	0.58	***0.79***
Zinc	227 J	283 J
Pesticides (mg/kg)		
4,4'-DDT	0.0041 J	ND (0.007)
PFAS (ug/kg)		
Perfluorooctanesulfonic acid (PFOS)	1.09	0.85

HA-SB-10	02/26/2025 460-321097-5 HA-SB-10_0-2 0 - 2 (ft)	02/26/2025 460-321097-6 HA-SB-10_2-3 2 - 3 (ft)	02/26/2025 460-321097-7 DUP-01_20250226 2 - 3 (ft)
Total Metals (mg/kg)			
Lead	26.2	89.1 J	7.2 J

EP-4	06/02/2017 17F0104-04 - -
Semi-Volatile Organic Compounds (mg/kg)	
Benzo(a)anthracene	***1.03 D***
Benzo(a)pyrene	1.77 D
Benzo(b)fluoranthene	0.89 D
Chrysene	***1.03 D***

HA-SB-08	05/15/2024 460-304032-12 DUP-01_20240515 0 - 2 (ft)	05/15/2024 460-304032-5 HA-SB-08_0-2 0 - 2 (ft)	05/15/2024 460-304032-6 HA-SB-08_2-3 2 - 3 (ft)
Total Metals (mg/kg)			
Copper	71.7 J	26.7 J	21.6
Lead	***471 J***	81.8 J	63.8
Semi-Volatile Organic Compounds (mg/kg)			
Benzo(a)anthracene	0.19 J	***2.4 J***	0.35
Benzo(a)pyrene	0.24 J	2.4 J	0.49
Benzo(b)fluoranthene	0.27 J	***2.9 J***	0.56
Benzo(k)fluoranthene	0.1 J	1.2 J	0.21
Chrysene	0.2 J	***2 J***	0.33 J
Indeno(1,2,3-cd)pyrene	0.18 J	1.4 J	0.35
Pesticides (mg/kg)			
4,4'-DDE	0.0056 J	ND (0.0069)	ND (0.0069)

HA-SB-09	02/26/2025 460-321097-4 HA-SB-09_0-2 0 - 2 (ft)	03/04/2025 460-321402-1 HA-SB-09_2-3 2 - 3 (ft)
Total Metals (mg/kg)		
Lead	376	26.2
Mercury	0.5	0.16
Nickel	13.3	60
Zinc	228	97.2
Volatile Organic Compounds (mg/kg)		
Acetone	***0.051***	ND (0.0059)

HA SB-03	08/03/2023 460-285468-3 HA SB-03_0-2 0 - 2 (ft)	08/03/2023 460-285468-4 HA SB-03_5.5-6 5.5 - 6 (ft)
Volatile Organic Compounds (mg/kg)		
Acetone	***0.068 J-***	0.0072

	NY-PGW	NY-RESR	NY-UNRES
Total Metals (mg/kg)			
Arsenic	16	16	13
Barium	820	400	350
Copper	1720	270	50
Lead	450	400	63
Mercury	0.73	0.81	0.18
Nickel	130	310	30
Zinc	2480	10000	109
Semi-Volatile Organic Compounds (mg/kg)			
Benzo(a)anthracene	1	1	1
Benzo(a)pyrene	22	1	1
Benzo(b)fluoranthene	1.7	1	1
Benzo(k)fluoranthene	1.7	3.9	0.8
Chrysene	1	3.9	1
Indeno(1,2,3-cd)pyrene	8.2	0.5	0.5
Volatile Organic Compounds (mg/kg)			
Acetone	0.05	100	0.05
Pesticides (mg/kg)			
4,4'-DDE	17	8.9	0.0033
4,4-DDT	136	7.9	0.0033
PFAS (ug/kg)			
PFOS	-	44	0.88

NOTES
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DEFINITIONS:
UST = UNDERGROUND STORAGE TANK
ND = NON-DETECT
D = DILUTED
J = ESTIMATED VALUE
J- = ESTIMATED VALUE, BIASED LOW
- = NO INFORMATION AVAILABLE
PGW = PROTECTION OF GROUNDWATER
RR = RESTRICTED RESIDENTIAL
UU = UNRESTRICTED USE
SCOS = SOIL CLEANUP OBJECTIVES
3. POST-EXCAVATION ENDPOINT SAMPLES WERE COLLECTED FROM THE FOUR SIDEWALLS OF THE UST DURING TANK ABANDONMENT ACTIVITIES COMPLETED IN MAY AND JUNE 2017.
4. SOIL SAMPLE ANALYTICAL RESULTS, WITH THE EXCEPTION OF EMERGING CONTAMINANTS, 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 (SCOS), RESTRICTED-RESIDENTIAL SCOS, AND 40 CFR 261 SUBPART C AND TABLE 1 OF 40 CFR 261.24.
5. EMERGING CONTAMINANTS ANALYTICAL RESULTS ARE COMPARED TO THE NYSDEC APRIL 2023 UNRESTRICTED, RESTRICTED RESIDENTIAL, AND PROTECTION OF GROUNDWATER GUIDANCE VALUES (NYSDEC GVs) FOR PFOA AND PFOS.
6. EXCEEDANCES OF THE NY-UNRES SCOS ARE SHADED GRAY.
7. EXCEEDANCES OF THE NY-RESRR ARE SHADED YELLOW.
8. EXCEEDANCES OF THE NY-PGW ARE SHOWN IN BLACK TEXT AND IN ITALICS.
9. NON-EMERGING CONTAMINANTS RESULTS ARE DISPLAYED IN MILLIGRAMS PER KILOGRAM (mg/kg).
10. EMERGING CONTAMINANTS RESULTS ARE DESPLAYED IN MICROGRAMS PER KILOGRAM (µg/kg).
11. PARTIAL BASEMENT OUTLINE SOURCE: 'FIGURE 1: MONITORING WELL LOCATIONS', HYDRO TECH ENVIRONMENTAL CORP.,18 SEPTEMBER 2015.
12. ASSESSOR PARCEL DATA SOURCE: NEW YORK CITY PLANNING
13. AERIAL IMAGERY SOURCE: NEARMAP, 16 JUNE 2024

N

0 50 100
SCALE IN FEET

LEGEND

- FILL PORT
- JUNE 2017 UST ABANDONMENT ENDPOINT SAMPLE

SUPPLEMENTAL SITE CHARACTERIZATION INVESTIGATION
- SOIL BORING
- SOIL BORING/MONITORING WELL

SITE CHARACTERIZATION (SC) INVESTIGATION
- SOIL BORING
- SOIL BORING/MONITORING WELL

AUGUST 2023 LIMITED PHASE II INVESTIGATION
- SOIL BORING

- SOIL BORING/TEMPORARY MONITORING WELL
- ABANDONED UST
- PARTIAL BASEMENT OUTLINE
- SITE BOUNDARY

HALEY ALDRICH

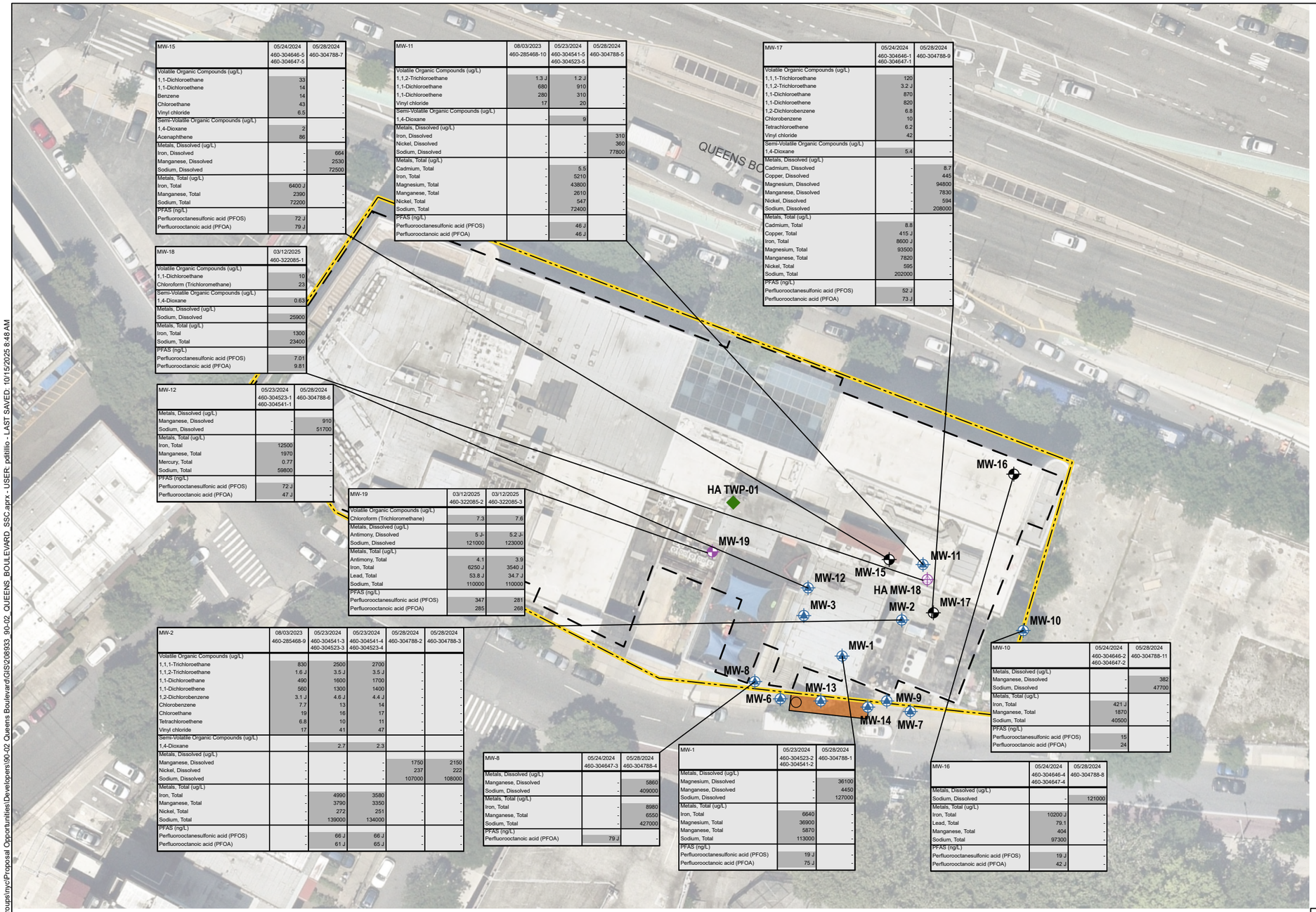
90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

SOIL RESULTS EXCEEDANCE MAP

MAY 2025

FIGURE 5

GIS FILE PATH: \\haleyaldrich.com\share\CF\Groups\nyc\Proposal Opportunities\Developers\90-02 Queens Boulevard\GIS\208933_90-02_QUEENS_BOULEVARD_SSC.aprx - USER: khensen - LAST SAVED: 5/27/2025 8:26 AM



MW-15	05/24/2024 460-304646-5 460-304647-5	05/28/2024 460-304788-7
Volatile Organic Compounds (ug/L)		
1,1-Dichloroethane	33	-
1,1-Dichloroethene	14	-
Benzene	14	-
Chloroethane	43	-
Vinyl chloride	6.5	-
Semi-Volatile Organic Compounds (ug/L)		
1,4-Dioxane	2	-
Acenaphthene	86	-
Metals, Dissolved (ug/L)		
Iron, Dissolved	-	664
Manganese, Dissolved	-	2530
Sodium, Dissolved	-	72500
Metals, Total (ug/L)		
Iron, Total	6400 J	-
Manganese, Total	2390	-
Sodium, Total	72200	-
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	72 J	-
Perfluorooctanoic acid (PFOA)	79 J	-

MW-11	08/03/2023 460-285468-10	05/23/2024 460-304541-5 460-304523-5	05/28/2024 460-304788-5
Volatile Organic Compounds (ug/L)			
1,1,2-Trichloroethane	1.3 J	1.2 J	-
1,1-Dichloroethane	680	910	-
1,1-Dichloroethene	280	310	-
Vinyl chloride	17	20	-
Semi-Volatile Organic Compounds (ug/L)			
1,4-Dioxane	-	9	-
Metals, Dissolved (ug/L)			
Iron, Dissolved	-	-	310
Nickel, Dissolved	-	-	360
Sodium, Dissolved	-	-	77800
Metals, Total (ug/L)			
Cadmium, Total	-	5.5	-
Iron, Total	-	5210	-
Magnesium, Total	-	43800	-
Manganese, Total	-	2610	-
Nickel, Total	-	547	-
Sodium, Total	-	72400	-
PFAS (ng/L)			
Perfluorooctanesulfonic acid (PFOS)	-	46 J	-
Perfluorooctanoic acid (PFOA)	-	46 J	-

MW-17	05/24/2024 460-304646-1 460-304647-1	05/28/2024 460-304788-9
Volatile Organic Compounds (ug/L)		
1,1,1-Trichloroethane	120	-
1,1,2-Trichloroethane	3.2 J	-
1,1-Dichloroethane	870	-
1,1-Dichloroethene	820	-
1,2-Dichlorobenzene	6.8	-
Chlorobenzene	10	-
Tetrachloroethene	6.2	-
Vinyl chloride	42	-
Semi-Volatile Organic Compounds (ug/L)		
1,4-Dioxane	5.4	-
Metals, Dissolved (ug/L)		
Cadmium, Dissolved	-	8.7
Copper, Dissolved	-	445
Magnesium, Dissolved	-	94800
Manganese, Dissolved	-	7830
Nickel, Dissolved	-	594
Sodium, Dissolved	-	208000
Metals, Total (ug/L)		
Cadmium, Total	8.8	-
Copper, Total	415 J	-
Iron, Total	8600 J	-
Magnesium, Total	93500	-
Manganese, Total	7820	-
Nickel, Total	595	-
Sodium, Total	202000	-
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	52 J	-
Perfluorooctanoic acid (PFOA)	73 J	-

MW-18	03/12/2025 460-322085-1
Volatile Organic Compounds (ug/L)	
1,1-Dichloroethane	10
Chloroform (Trichloromethane)	23
Semi-Volatile Organic Compounds (ug/L)	
1,4-Dioxane	0.63
Metals, Dissolved (ug/L)	
Sodium, Dissolved	25900
Metals, Total (ug/L)	
Iron, Total	1300
Sodium, Total	23400
PFAS (ng/L)	
Perfluorooctanesulfonic acid (PFOS)	7.01
Perfluorooctanoic acid (PFOA)	9.81

MW-12	05/23/2024 460-304523-1 460-304541-1	05/28/2024 460-304788-6
Metals, Dissolved (ug/L)		
Manganese, Dissolved	-	910
Sodium, Dissolved	-	51700
Metals, Total (ug/L)		
Iron, Total	12500	-
Manganese, Total	1970	-
Mercury, Total	0.77	-
Sodium, Total	59800	-
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	72 J	-
Perfluorooctanoic acid (PFOA)	47 J	-

MW-19	03/12/2025 460-322085-2	03/12/2025 460-322085-3
Volatile Organic Compounds (ug/L)		
Chloroform (Trichloromethane)	7.3	7.6
Metals, Dissolved (ug/L)		
Antimony, Dissolved	5 J-	5.2 J-
Sodium, Dissolved	121000	123000
Metals, Total (ug/L)		
Antimony, Total	4.1	3.9
Iron, Total	6250 J	3540 J
Lead, Total	53.8 J	34.7 J
Sodium, Total	110000	110000
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	347	281
Perfluorooctanoic acid (PFOA)	285	268

MW-2	08/03/2023 460-285468-9	05/23/2024 460-304541-3 460-304523-3	05/23/2024 460-304541-4 460-304523-4	05/28/2024 460-304788-2	05/28/2024 460-304788-3
Volatile Organic Compounds (ug/L)					
1,1,1-Trichloroethane	830	2500	2700	-	-
1,1,2-Trichloroethane	1.6 J	3.5 J	3.5 J	-	-
1,1-Dichloroethane	490	1600	1700	-	-
1,1-Dichloroethene	560	1300	1400	-	-
1,2-Dichlorobenzene	3.1 J	4.6 J	4.4 J	-	-
Chlorobenzene	7.7	13	14	-	-
Chloroethane	19	16	17	-	-
Tetrachloroethene	6.8	10	11	-	-
Vinyl chloride	17	41	47	-	-
Semi-Volatile Organic Compounds (ug/L)					
1,4-Dioxane	-	2.7	2.3	-	-
Metals, Dissolved (ug/L)					
Manganese, Dissolved	-	-	-	1750	2150
Nickel, Dissolved	-	-	-	237	222
Sodium, Dissolved	-	-	-	107000	108000
Metals, Total (ug/L)					
Iron, Total	-	4990	3580	-	-
Manganese, Total	-	3790	3350	-	-
Nickel, Total	-	272	251	-	-
Sodium, Total	-	139000	134000	-	-
PFAS (ng/L)					
Perfluorooctanesulfonic acid (PFOS)	-	66 J	66 J	-	-
Perfluorooctanoic acid (PFOA)	-	61 J	65 J	-	-

MW-8	05/24/2024 460-304647-3	05/28/2024 460-304788-4
Metals, Dissolved (ug/L)		
Manganese, Dissolved	-	5860
Sodium, Dissolved	-	409000
Metals, Total (ug/L)		
Iron, Total	-	8980
Manganese, Total	-	6550
Sodium, Total	-	427000
PFAS (ng/L)		
Perfluorooctanoic acid (PFOA)	79 J	-

MW-1	05/23/2024 460-304523-2 460-304541-2	05/28/2024 460-304788-1
Metals, Dissolved (ug/L)		
Magnesium, Dissolved	-	36100
Manganese, Dissolved	-	4450
Sodium, Dissolved	-	127000
Metals, Total (ug/L)		
Iron, Total	6640	-
Magnesium, Total	36900	-
Manganese, Total	5870	-
Sodium, Total	113000	-
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	19 J	-
Perfluorooctanoic acid (PFOA)	75 J	-

MW-10	05/24/2024 460-304646-2 460-304647-2	05/28/2024 460-304788-11
Metals, Dissolved (ug/L)		
Manganese, Dissolved	-	382
Sodium, Dissolved	-	47700
Metals, Total (ug/L)		
Iron, Total	421 J	-
Manganese, Total	1870	-
Sodium, Total	40500	-
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	15	-
Perfluorooctanoic acid (PFOA)	24	-

MW-16	05/24/2024 460-304646-4 460-304647-4	05/28/2024 460-304788-8
Metals, Dissolved (ug/L)		
Sodium, Dissolved	-	121000
Metals, Total (ug/L)		
Iron, Total	10200 J	-
Lead, Total	79.1	-
Manganese, Total	404	-
Sodium, Total	97300	-
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	19 J	-
Perfluorooctanoic acid (PFOA)	42 J	-

	NYSDEC AWQS	2023 Guidance Values
Volatile Organic Compounds (ug/L)		
1,1,1-Trichloroethane	5	-
1,1,2-Trichloroethane	1	-
1,1-Dichloroethane	5	-
1,1-Dichloroethene	5	-
1,2-Dichlorobenzene	3	-
Benzene	1	-
Chlorobenzene	5	-
Chloroethane	5	-
Chloroform	7	-
Tetrachloroethene	5	-
Vinyl chloride	2	-
Semi-Volatile Organic Compounds (ug/L)		
Acenaphthene	20	
1,4-Dioxane	-	0.35
Metals (ug/L)		
Antimony, Dissolved/Total	3	-
Cadmium, Dissolved/Total	5	-
Copper, Dissolved/Total	200	-
Iron, Dissolved/Total	300	-
Lead, Total	25	-
Magnesium, Dissolved/Total	35000	-
Manganese, Dissolved/Total	300	-
Mercury, Total	0.7	-
Nickel, Dissolved/Total	100	-
Sodium, Dissolved/Total	20000	-
PFAS (ng/L)		
Perfluorooctanesulfonic acid (PFOS)	-	2.7
Perfluorooctanoic acid (PFOA)	-	6.7

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

2. DEFINITIONS:
UST = UNDERGROUND STORAGE TANK
ND = NON-DETECT
J = ESTIMATED VALUE
J- = ESTIMATED VALUE, BIASED LOW
- = NO INFORMATION AVAILABLE

3. 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).

4. EMERGING CONTAMINANTS ANALYTICAL RESULTS COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) APRIL 2023 GUIDANCE VALUES (GVs) FOR PFOA AND PFOS.

5. RESULTS SHADED GRAY EXCEED THE NYSDEC AWQS.

6. RESULTS ARE DISPLAYED IN MICROGRAMS PER LITER (µg/L).
PFAS RESULTS ARE SHOWN IN NANOGRAMS PER LITER (ng/L).
1,4-DIOXANE RESULTS SHOWN IN MICROGRAM PER LITER (µg/L).

7. PARTIAL BASEMENT OUTLINE SOURCE: 'FIGURE 1: MONITORING WELL LOCATIONS', HYDRO TECH ENVIRONMENTAL CORP., 18 SEPTEMBER 2015.

8. ASSESSOR PARCEL DATA SOURCE: NEW YORK CITY PLANNING

9. AERIAL IMAGERY SOURCE: NEARMAP, 16 JUNE 2024

LEGEND

- FILL PORT
- EXISTING MONITORING WELL (SAMPLED)

SUPPLEMENTAL SITE CHARACTERIZATION INVESTIGATION
- SOIL BORING/MONITORING WELL
- DEEP MONITORING WELL

SITE CHARACTERIZATION (SC) INVESTIGATION
- SOIL BORING/MONITORING WELL

AUGUST 2023 LIMITED PHASE II INVESTIGATION
- SOIL BORING/TEMPORARY MONITORING WELL
- SITE BOUNDARY

N

0 50 100
SCALE IN FEET

HALEY ALDRICH

90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

GROUNDWATER RESULTS EXCEEDANCE MAP

OCTOBER 2025

FIGURE 6

GIS FILE PATH: \\haleyaldrich.com\share\CFGroups\nyc\Proposal Opportunities\Developers\90-02 Queens Boulevard\GIS\208933_90-02_QUEENS_BOULEVARD_SSC.aprx - USER: pdifillio - LAST SAVED: 10/15/2025 8:48 AM

HA SS/A-17	HA IA-17 03/04/2025 200-77193-8	HA SS-17 03/04/2025 200-77193-7
VOCs		
1,2,4-Trimethylbenzene	0.6 J	4.3
1,3,5-Trimethylbenzene	ND (0.98)	0.96 J
2,2,4-Trimethylpentane	0.65 J	ND (0.93)
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	ND (0.98)	1.2 J
Acetone	22	9.7 J
Benzene	0.93	0.54 J
Butane	6.2	2
Carbon disulfide	ND (1.6)	0.6 J
Carbon tetrachloride	0.36	0.38
Chlorodifluoromethane	1.1 J	0.99 J
Chloroform (Trichloromethane)	ND (0.98)	0.35 J
Chloromethane (Methyl Chloride)	1.6	ND (1)
Cyclohexane	0.33 J	ND (0.69)
Dichlorodifluoromethane (CFC-12)	1.5	0.92 J
Dichlorodifluoromethane (CFC-12)	3	2.2 J
Ethylbenzene	0.82 J	1.4
Hexane	1.1 J	0.63 J
Isopropyl Alcohol (2-Propanol)	13	5.8 J
m,p-Xylenes	3.3	6.7
N-Heptane	0.77 J	1.2
n-Propylbenzene	ND (0.98)	0.63 J
o-Xylene	1	2.5
Tetrachloroethene	1.4	0.26 J
Toluene	65	4.8
Trichlorofluoromethane (CFC-11)	1.3	1.2
Trifluorotrichloroethane (Freon 113)	0.48 J	0.47 J
Calculated Totals		
Total BTEXs	71.05	15.94
Total CVOCs	1.76	0.64
Total VOCs	126.44	49.52

HA SS/A-11	HA-IA-11 05/23/2024 200-73686-2	HA-SS-11 05/23/2024 200-73686-1
VOCs		
1,2,4-Trimethylbenzene	1.3	7.7
1,3,5-Trimethylbenzene	0.26 J	2.4
1,4-Dioxane	0.34 J	1.8 J
2,2,4-Trimethylpentane	0.64 J	0.48 J
2-Butanone (Methyl Ethyl Ketone)	3	4.4
2-Phenylbutane (sec-Butylbenzene)	ND (1.1)	0.37 J
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	0.26 J	1.9
Acetone	15	31
Benzene	0.95	3.4
Butane	3.2	4
Carbon disulfide	2.3	2.8
Carbon tetrachloride	0.33	0.32
Chlorodifluoromethane	0.94 J	0.71 J
Chloroform (Trichloromethane)	0.48 J	ND (0.98)
Chloromethane (Methyl Chloride)	0.89 J	ND (1)
Cyclohexane	0.34 J	1.2
Cymene (p-Isopropyltoluene)	ND (1.1)	1.1
Dichlorodifluoromethane (CFC-12)	1.9 J	1.8 J
Ethylbenzene	0.48 J	2.6
Hexane	0.63 J	0.77 J
Isopropyl Alcohol (2-Propanol)	7.7 J	ND (12)
Isopropylbenzene (Cumene)	0.2 J	ND (0.98)
m,p-Xylenes	1.5 J	11
Methylene chloride (Dichloromethane)	0.72 J	ND (1.7)
N-Heptane	0.49 J	1.5
n-Propylbenzene	ND (0.98)	1.3
o-Xylene	0.55 J	5.8
Styrene	0.32 J	0.63 J
Tert-Butyl Alcohol (tert-Butanol)	ND (15)	16
tert-Butylbenzene	ND (1.1)	0.56 J
Tetrachloroethene	0.9 J	0.42 J
Toluene	4.2	22
Trichlorofluoromethane (CFC-11)	1 J	1.2
Calculated Totals		
Total BTEXs	7.66	44.8
Total CVOCs	1.95	0.74
Total VOCs	50.72	128.76

HA SS/A-10	HA-IA-10 05/16/2024 200-73580-10	HA-SS-10 05/16/2024 200-73580-9
VOCs		
1,1-Dichloroethene	ND (0.2)	0.17 J
1,2,4-Trimethylbenzene	1	1
1,3,5-Trimethylbenzene	0.28 J	0.5 J
1,3-Butadiene	0.13 J	0.24 J
1,3-Dichlorobenzene	ND (1.2)	0.55 J
1,4-Dioxane	ND (18)	0.62 J
2,2,4-Trimethylpentane	0.62 J	0.81 J
2-Butanone (Methyl Ethyl Ketone)	2	11
2-Hexanone (Methyl Butyl Ketone)	ND (2)	2.5
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	0.25 J	0.48 J
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	3	4.8
Acetone	22	220
Benzene	0.72	1.6
Butane	2.5	20
Carbon disulfide	0.49 J	1.4 J
Carbon tetrachloride	0.28	0.3
Chlorobenzene	ND (0.92)	0.34 J
Chlorodifluoromethane	1.3 J	1.2 J
Chloroform (Trichloromethane)	0.4 J	2.4
Chloromethane (Methyl Chloride)	1.1	0.65 J
Cyclohexane	3	2.6
Cymene (p-Isopropyltoluene)	ND (1.1)	0.53 J
Dichlorodifluoromethane (CFC-12)	2.3 J	2.4 J
Ethylbenzene	0.51 J	7.4
Hexane	1.5 J	2
Isopropyl Alcohol (2-Propanol)	7.2 J	14
Isopropylbenzene (Cumene)	0.28 J	0.94 J
m,p-Xylenes	1.9 J	25
Methylene chloride (Dichloromethane)	6.1	4.2
N-Heptane	0.69 J	2.4
n-Propylbenzene	ND (0.98)	0.39 J
o-Xylene	0.77 J	8.2
Styrene	0.35 J	ND (0.85)
Tert-Butyl Alcohol (tert-Butanol)	ND (15)	6.5 J
Tetrachloroethene	0.2 J	0.93 J
Toluene	4.1	6.6
Trichloroethene	ND (0.2)	0.65
Trichlorofluoromethane (CFC-11)	1.2	1.2
Trifluorotrichloroethane (Freon 113)	ND (1.5)	0.44 J
Calculated Totals		
Total BTEXs	8	48.8
Total CVOCs	8.58	6.23
Total VOCs	68.15	357.92

HA SS/A-04	HA-IA-04 05/16/2024 200-73580-6	HA-SS-04 05/16/2024 200-73580-5
VOCs		
1,1,1-Trichloroethane	ND (1.1)	0.59 J
1,1,2-Trichloroethane	ND (1.1)	0.4 J
1,1-Dichloroethane	ND (0.81)	0.32 J
1,1-Dichloroethene	ND (0.2)	0.12 J
1,2,4-Trimethylbenzene	1.5	5.2 J
1,3,5-Trimethylbenzene	0.44 J	1.2 J
1,3-Butadiene	ND (0.44)	0.42 J
1,3-Dichlorobenzene	ND (1.2)	1.9 J
1,4-Dioxane	ND (18)	12 J
2,2,4-Trimethylpentane	0.55 J	67 J
2-Butanone (Methyl Ethyl Ketone)	1.6	53 J
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	0.38 J	1.2 J
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ND (2)	2.5 J
Acetone	14	470 J
Benzene	0.58 J	9.5 J
Butane	2	34 J
Carbon disulfide	2.5	8.85 J
Carbon tetrachloride	0.36	0.39 J
Chlorodifluoromethane	0.81 J	0.51 J
Chloroform (Trichloromethane)	0.76 J	21 J
Chloromethane (Methyl Chloride)	0.89 J	0.37 J
cis-1,2-Dichloroethene	ND (0.2)	0.2 J
Cyclohexane	1.7	25 J
Cymene (p-Isopropyltoluene)	ND (1.1)	1.2 J
Dichlorodifluoromethane (CFC-12)	2 J	2.3 J
Ethylbenzene	0.46 J	36 J
Hexane	1.1 J	25 J
Isopropyl Alcohol (2-Propanol)	4.7 J	32 J
Isopropylbenzene (Cumene)	ND (0.98)	2.6 J
m,p-Xylenes	1.9 J	140 J
Methyl Tert Butyl Ether (MTBE)	ND (0.72)	0.51 J
Methylene chloride (Dichloromethane)	1.8	0.9 J
N-Heptane	0.52 J	18 J
n-Propylbenzene	0.25 J	0.99 J
o-Xylene	0.77 J	66 J
Styrene	0.31 J	ND (0.85) J
Tert-Butyl Alcohol (tert-Butanol)	ND (15)	9.2 J
Tetrachloroethene	0.46 J	10 J
Toluene	3.4	39 J
Trichloroethene	ND (0.2)	0.48 J
Trichlorofluoromethane (CFC-11)	1.3	1.1 J
Trifluorotrichloroethane (Freon 113)	ND (1.5)	0.48 J
Calculated Totals		
Total BTEXs	7.11	290.5
Total CVOCs	2.82	15
Total VOCs	47.14	1079.95

HA SS/A-09	HA-IA-09 05/16/2024 200-73580-12	HA-SS-09 05/16/2024 200-73580-11
VOCs		
1,2,4-Trimethylbenzene	0.86 J	3.2
1,3,5-Trimethylbenzene	0.26 J	0.77 J
1,3-Butadiene	ND (0.44)	0.13 J
1,3-Dichlorobenzene	ND (1.2)	0.28 J
2,2,4-Trimethylpentane	0.57 J	1.8
2-Butanone (Methyl Ethyl Ketone)	1.8	2.2
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	ND (0.98)	0.7 J
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.86 J	0.71 J
Acetone	33	15
Allyl chloride	0.9 J	ND (1.6)
Benzene	0.54 J	1.6
Bromodichloromethane	ND (1.3)	0.65 J
Butane	2.5	2.1
Carbon disulfide	ND (1.6)	0.68 J
Carbon tetrachloride	0.3	0.31
Chlorodifluoromethane	0.82 J	0.96 J
Chloroform (Trichloromethane)	0.74 J	9.8
Chloromethane (Methyl Chloride)	1.1	0.59 J
Cyclohexane	3.6	6.5
Cymene (p-Isopropyltoluene)	ND (1.1)	0.7 J
Dichlorodifluoromethane (CFC-12)	1.9 J	2.2 J
Ethylbenzene	0.56 J	4.2
Hexane	1.1 J	1.9
Isopropyl Alcohol (2-Propanol)	11 J	13
m,p-Xylenes	2.2	14
Methyl Tert Butyl Ether (MTBE)	ND (0.72)	0.39 J
Methylene chloride (Dichloromethane)	2.9	5.2
N-Heptane	0.85 J	1
n-Propylbenzene	ND (0.98)	0.52 J
o-Xylene	0.95	5.5
Styrene	0.33 J	0.64 J
Tert-Butyl Alcohol (tert-Butanol)	ND (15)	7.1 J
Tetrachloroethene	0.37 J	4.3
Toluene	3.7	18
Trichloroethene	ND (0.2)	0.3
Trichlorofluoromethane (CFC-11)	1.1	1.2
Trifluorotrichloroethane (Freon 113)	ND (1.5)	0.41 J
Calculated Totals		
Total BTEXs	8	43.5
Total CVOCs	3.57	10.81
Total VOCs	74.46	129.96

HA SS/A-16	HA IA-16 03/04/2025 200-77193-6	HA SS-16 03/04/2025 200-77193-5
VOCs		
1,2,4-Trimethylbenzene	ND (0.98)	3.1
1,3,5-Trimethylbenzene	ND (0.98)	0.68 J
1,3-Butadiene	0.13 J	0.36 J
1,4-Dioxane	ND (18)	0.43 J
2,2,4-Trimethylpentane	0.46 J	0.3 J
2-Butanone (Methyl Ethyl Ketone)	ND (1.5)	14
2-Hexanone (Methyl Butyl Ketone)	ND (2)	1.8 J
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	ND (0.98)	0.88 J
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ND (2)	3.6
Acetone	7.4 J	250
Benzene	0.86	1.7
Butane	6.6	12
Carbon disulfide	ND (1.6)	35
Carbon tetrachloride	0.35	0.38
Chlorobenzene	ND (0.92)	0.2 J
Chlorodifluoromethane	1.1 J	1 J
Chloroform (Trichloromethane)	ND (0.98)	1.4
Chloromethane (Methyl Chloride)	1.2	0.73 J
Cyclohexane	ND (0.69)	0.5 J
Cymene (p-Isopropyltoluene)	ND (1.1)	0.68 J
Dichlorodifluoromethane (CFC-12)	3	2.4 J
Ethylbenzene	0.41 J	1.3
Hexane	0.87 J	2.2
Isopropyl Alcohol (2-Propanol)	9.4 J	8.3 J
m,p-Xylenes	1.4 J	5.5
N-Heptane	0.46 J	4.4
n-Propylbenzene	ND (0.98)	0.48 J
o-Xylene	0.46 J	2
Tetrachloroethene	ND (1.4)	0.72 J
Toluene	1.8	5.4
Trichloroethene	ND (0.2)	0.23
Trichlorofluoromethane (CFC-11)	1.2	1.2
Trifluorotrichloroethane (Freon 113)	0.47 J	0.47 J
Calculated Totals		
Total BTEXs	4.93	15.9
Total CVOCs	0.35	1.33
Total VOCs	37.37	363.34

HA SS/A-14	HA IA-14 03/04/2025 200-77193-4	HA SS-14 03/04/2025 200-77193-3
VOCs		
1,2,4-Trimethylbenzene	0.74 J	ND (0.98)
1,3-Butadiene	0.16 J	ND (0.44)
2,2,4-Trimethylpentane	0.51 J	ND (0.93)
Acetone	21	ND (12)
Benzene	0.93	0.31 J
Butane	6.7	0.7 J
Carbon tetrachloride	0.42	0.49
Chlorodifluoromethane	0.98 J	1.4 J
Chloroform (Trichloromethane)	0.52 J	ND (0.98)
Chloromethane (Methyl Chloride)	0.97 J	0.6 J
Cyclohexane	0.24 J	ND (0.69)
Dichlorodifluoromethane (CFC-12)	2.2 J	2.4 J
Ethylbenzene	0.38 J	ND (0.87)
Hexane	0.85 J	ND (1.8)
Isopropyl Alcohol (2-Propanol)	23	ND (12)
m,p-Xylenes	1.4 J	ND (2.2)
N-Heptane	0.51 J	ND (0.82)
o-Xylene	0.49 J	ND (0.87)
Tetrachloroethene	0.16 J	ND (1.4)
Toluene	2	ND (0.75)
Trichlorofluoromethane (CFC-11)	1.2	1.2
Trifluorotrichloroethane (Freon 113)	0.46 J	0.47 J
Calculated Totals		
Total BTEXs	5.2	0.31
Total CVOCs	0.58	0.43
Total VOCs	65.82	7.81

HA SS/A-07	HA-IA-07 05/16/2024 200-73580-8	HA-SS-07 05/16/2024 200-73580-7
VOCs		
1,2,4-Trimethylbenzene	2	4.4
1,3,5-Trimethylbenzene	0.46 J	0.7 J
1,3-Butadiene	ND (0.44)	0.48
1,3-Dichlorobenzene	ND (1.2)	1.3
1,4-Dioxane	0.84 J	0.87 J
2,2,4-Trimethylpentane	0.66 J	0.79 J
2-Butanone (Methyl Ethyl Ketone)	2.1	23
2-Hexanone (Methyl Butyl Ketone)	ND (2)	1.6 J
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	0.41 J	0.75 J
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ND (2)	2.3
Acetone	16	350
Benzene	0.73	1.3
Butane	2.3	9.9
Carbon disulfide	1.2 J	5.9
Carbon tetrachloride	0.36	0.31
Chlorodifluoromethane	0.81 J	0.6 J
Chloroform (Trichloromethane)	0.58 J	5.8
Chloromethane (Methyl Chloride)	0.92 J	0.69 J
Cyclohexane	2.1	2.3
Cymene (p-Isopropyltoluene)	ND (1.1)	0.79 J
Dichlorodifluoromethane (CFC-12)	2.3 J	170
Ethylbenzene	0.58 J	3.2
Hexane	1.3 J	1.2 J
Isopropyl Alcohol (2-Propanol)	5.7 J	21
Isopropylbenzene (Cumene)	ND (0.98)	0.87 J
m,p-Xylenes	2.2	13
Methyl Tert Butyl Ether (MTBE)	ND (0.72)	0.31 J
Methylene chloride (Dichloromethane)	3.4	1.6 J
N-Heptane	0.6 J	2.5
n-Propylbenzene	0.27 J	0.54 J
o-Xylene	0.84 J	5.9
Styrene	0.38 J	1.3
Tert-Butyl Alcohol (tert-Butanol)	ND (15)	8.7 J
Tetrachloroethene	0.35 J	2.9
Toluene	4.7	6.3
Trichloroethene	ND (0.2)	0.48
Trichlorofluoromethane (CFC-11)	1.3	1.2
Trifluorotrichloroethane (Freon 113)	ND (1.5)	1.5
Calculated Totals		
Total BTEXs	9.05	29.7
Total CVOCs	4.11	5.29
Total VOCs	50.41	656.23

HA SS/A-15	HA IA-15 03/04/2025 200-77193-14	HA SS-15 03/04/2025 200-77193-13
VOCs		
1,2,4-Trimethylbenzene	ND (0.98)	3
1,3,5-Trimethylbenzene	ND (0.98)	0.89 J
1,3-Butadiene	0.14 J	ND (0.44)
1,4-Dioxane	ND (18)	1.4 J
2,2,4-Trimethylpentane	0.47 J	ND (0.93)
2-Butanone (Methyl Ethyl Ketone)	ND (1.5)	2.1
2-Hexanone (Methyl Butyl Ketone)	ND (2)	0.82 J
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	ND (0.98)	0.83 J
Acetone	9.2 J	23
Benzene	0.84	0.35 J
Bromodichloromethane	ND (1.3)	1.5
Butane	6.7	2.1
Carbon disulfide	0.41 J	ND (1.6)
Carbon tetrachloride	0.39	0.4
Chlorodifluoromethane	1.2	0.94 J
Chloroform (Trichloromethane)	0.28 J	16
Chloromethane (Methyl Chloride)	1.2	ND (1)
Cyclohexane	0.22 J	ND (0.69)
Cymene (p-Isopropyltoluene)	ND (1.1)	1.1
Dichlorodifluoromethane (CFC-12)	3.1	2.3 J
Ethylbenzene	0.66 J	0.4 J
Hexane	0.7 J	ND (1.8)
Isopropyl Alcohol (2-Propanol)	16	5.5 J
m,p-Xylenes	2.4	4.5
N-Heptane	0.44 J	0.76 J
n-Propylbenzene	ND (0.98)	0.45 J
o-Xylene	0.67 J	1.7
Tetrachloroethene	ND (1.4)	0.54 J
Toluene	1.8	3.9
Trichlorofluoromethane (CFC-11)	1.3	1.1
Trifluorotrichloroethane (Freon 113)	0.46 J	0.47 J
Calculated Totals		
Total BTEXs	6.37	11.45
Total CVOCs	0.39	0.94
Total VOCs	48.38	75.25

HA SS/A-08	HA-IA-08 05/16/2024 200-73580-14	HA-SS-08 05/16/2024 200-73580-13
VOCs		
1,2,4-Trimethylbenzene	0.51 J	4
1,3,5-Trimethylbenzene	ND (0.98)	0.5 J
1,3-Butadiene	0.12 J	0.64
1,3-Dichlorobenzene	ND (1.2)	0.68 J
1,4-Dioxane	0.75 J	0.99 J
2,2,4-Trimethylpentane	1.2	1.9
2-Butanone (Methyl Ethyl Ketone)	3.5	29
2-Hexanone (Methyl Butyl Ketone)	ND (2)	1.5 J
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	ND (0.98)	0.47 J
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	1.3 J	1.5 J
Acetone	33	180
Benzene	1.3	1.6
Butane	4.4	37
Carbon disulfide	9	0.59 J
Carbon tetrachloride	0.31	0.22
Chlorodifluoromethane	1.1	0.77 J
Chloroform (Trichloromethane)	0.45 J	0.42 J
Chloromethane (Methyl Chloride)	1.1	1.4
Cyclohexane	4.7	2.5
Cymene (p-Isopropyltoluene)	ND (1.1)	0.57 J
Dichlorodifluoromethane (CFC-12)	2.2 J	2.1 J
Ethylbenzene	0.69 J	4.1
Hexane	3.9	3.4
Isopropyl Alcohol (2-Propanol)	8.7 J	39
m,p-Xylenes	2.3	12
Methylene chloride (Dichloromethane)	6.9	1.7
N-Heptane	1.3	4.7
n-Propylbenzene	ND (0.98)	0.53 J
o-Xylene	0.78 J	3.8
Styrene	0.26 J	0.58 J
Tert-Butyl Alcohol (tert-Butanol)	ND (15)	8.3 J
Tetrachloroethene	0.54 J	0.32 J
Toluene	6.7	6.4
Trichlorofluoromethane (CFC-11)	1.1	1.1
Calculated Totals		
Total BTEXs	11.77	27.9
Total CVOCs	7.75	2.24
Total VOCs	97.81	354.08

HA SS/A-19	HA IA-19 03/04/2025 200-77193-12	HA SS-19 03/04/2025 200-77193-11
VOCs		
1,1,1-Trichloroethane	ND (1.1)	0.52 J
1,2,4-Trimethylbenzene	0.51 J	4.7
1,3,5-Trimethylbenzene	ND (0.98)	0.96 J
1,3-Butadiene	ND (0.2)	0.45 J
1,4-Dioxane	ND (18)	0.63 J
2,2,4-Trimethylpentane	1.2	0.3 J
2-Butanone (Methyl Ethyl Ketone)	ND (1.5)	18
2-Hexanone (Methyl Butyl Ketone)	ND (2)	1.2
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	ND (0.98)	1.2
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ND (2)	1.3 J
Acetone	24	58
Benzene	1.5	0.87
Butane	9.5	5
Carbon disulfide	0.65 J	1.1 J
Carbon tetrachloride	0.42	0.18 J
Chlorodifluoromethane	1.2 J	0.48 J
Chloroform (Trichloromethane)	1	1.1
Chloromethane (Methyl Chloride)	1.4	0.35 J
Cyclohexane	2.8	0.47 J
Dichlorodifluoromethane (CFC-12)	2.1	2.4 J
Ethylbenzene	0.87	1.9
Hexane	2.6	2.2 J
Isopropyl Alcohol (2-Propanol)	24	14
m,p-Xylenes	1.9 J	7.9
N-Heptane	1.2	2.8
n-Propylbenzene	ND (0.98)	0.71 J
o-Xylene	0.6 J	2.8
Styrene	0.27 J	3.7
Tetrachloroethene	3.5	6.5
Trichlorofluoromethane (CFC-11)	1.3	1.4
Trifluorotrichloroethane (Freon 113)	0.47 J	0.53 J
Calculated Totals		
Total BTEXs	8.37	19.97
Total CVOCs	3.77	0.69
Total VOCs	81.32	130.62

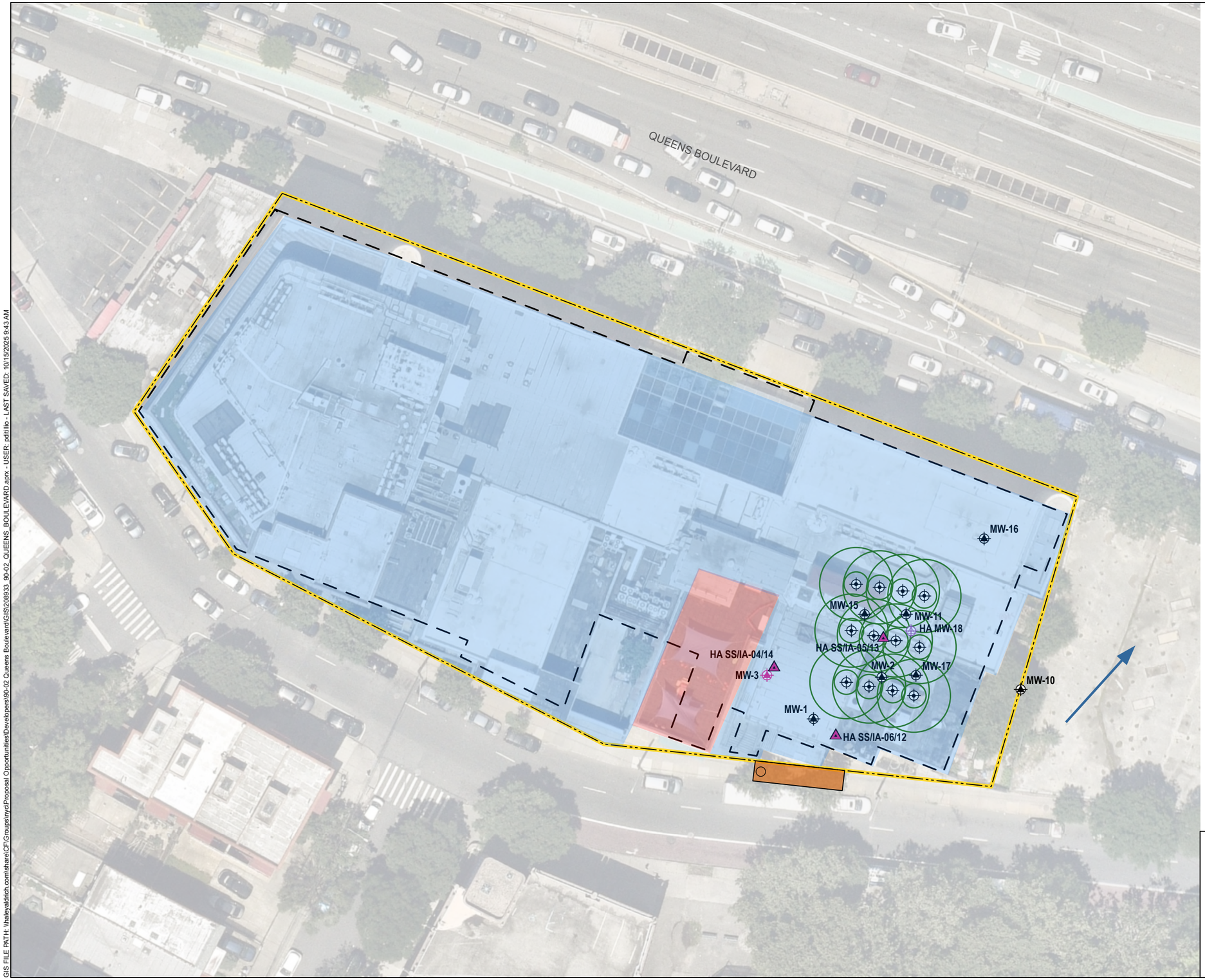
HA SS-01	HA SS-01 08/03/2023 200-69388-1
VOCs	
1,1,1-Trichloroethane	6.1
1,1-Dichloroethane	0.11 J
1,2,4-Trimethylbenzene	6.2
1,3,5-Trimethylbenzene	1.5
2,2,4-Trimethylpentane	0.9 J
2-Butanone (Methyl Ethyl Ketone)	3.2
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	2.1
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	1.8 J
Acetone	12
Benzene	2.6
Bromodichloromethane	0.52 J
Butane	4.8
Carbon disulfide	1.4 J
Carbon tetrachloride	0.18 J
Chlorodifluoromethane	0.93 J
Chloroform (Trichloromethane)	9.5
Chloromethane (Methyl Chloride)	0.32 J
Cyclohexane	0.71
Cymene (p-Isopropyltoluene)	0.69 J
Dichlorodifluoromethane (CFC-12)	2.9
Ethylbenzene	24
Hexane	3.8
Isopropylbenzene (Cumene)	0.78 J
m,p-Xylenes	110
N-Heptane	3.8
n-Propylbenzene	1.3
o-Xylene	42
Styrene	1.4
Tetrachloroethene	7.9
Toluene	27
Trichlorofluoromethane (CFC-11)	29
Trifluorotrichloroethane (Freon 113)	1.8
Calculated Totals	
Total BTEXs	205.6
Total CVOCs	14.18
Total VOCs	311.24

HA SS/A-20	HA SS-20 03/04/2025 200-77193-17
VOCs	
1,2,4-Trimethylbenzene	1.6 J
1,3-Butadiene	0.18 J
2,2,4-Trimethylpentane	0.47 J
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	0.52 J
Acetone	380 D
Benzene	1.1 J
Butane	5
Carbon tetrachloride	0.37 J
Chlorodifluoromethane	1.2 J
Chloroform (Trichloromethane)	0.91 J
Chloromethane (Methyl Chloride)	1.3 J
Dichlorodifluoromethane (CFC-12)	2.3 J
Ethylbenzene	0.8 J
Hexane	0.83 J
m,p-Xylenes	3.3 J
N-Heptane	0.99 J
o-Xylene	1.2 J
Toluene	5.6
Trichlorofluoromethane (CFC-11)	1.2 J
Calculated Totals	
Total BTEXs	11.9
Total CVOCs	0.37
Total VOCs	414.97

HA SS/A-06	HA-IA-06 05/16/2024 200-73580-4	HA-SS-06 05/16/2024 200-73580-3
VOCs		
1,1,1-Trichloroethane	ND (1.1)	1.9 J
1,2,4-Trimethylbenzene	1.3	3.8 J
1,3,5-Trimethylbenzene	0.35 J	ND (7.9)
1,3-Butadiene	ND (0.44)	1.1 J
1,4-Dioxane	ND (18)	5.3 J
2,2,4-Trimethylpentane	0.65 J	130
2-Butanone (Methyl Ethyl Ketone)	2.1	300
2-Hexanone (Methyl Butyl Ketone)	ND (2)	140
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	0.33 J	ND (7.9)
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	ND (2)	20
Acetone	16	2100
Benzene	0.7 J	24
Butane	2.3	63
Carbon disulfide	0.37 J	ND (1.6)
Carbon tetrachloride	0.86 J	ND (14)
Chlorodifluoromethane	0.58 J	5.5 J
Chloromethane (Methyl Chloride)	1	ND (8.3)
Cyclohexane	2.7	30
Dichlorodifluoromethane (CFC-12)	2.1 J	ND (20)
Ethylbenzene	0.52 J	190
Hexane	1.2 J	51
Isopropyl Alcohol (2-Propanol)	5.2	64 J
m,p-Xylenes	2.2	760
Methylene chloride (Dichloromethane)	3.3	ND (14)
N-Heptane	0.61 J	140
n-Propylbenzene	ND (0.98)	1.8 J
o-Xylene	0.8 J	310
Styrene	0.36 J	ND (8.5)
Tetrachloroethene	0.37 J	8.8 J
Toluene	3.9	12
Trichloroethene	ND (0.2)	17
Trichlorofluoromethane (CFC-11)	1.7	ND (9)
Calculated Totals		
Total BTEXs	7.92	1278
Total CVOCs	4.04	12.4
Total VOCs	51.1	4345.9

HA SS/A-05	HA-IA-05 05/16/2024 200-73580-2	HA-SS-05 05/16/2024 200-73580-1
VOCs		
1,1,1-Trichloroethane	ND (1.1)	6.7
1,1,2-Trichloroethane	ND (1.1)	1.6
1,1-Dichloroethene	ND (0.81)	1.6
1,1-Dichloroethene	ND (0.2)	0.43
1,2,4-Trimethylbenzene	0.57 J	5.2
1,3,5-Trimethylbenzene	ND (0.98)	1
1,3-Butadiene	ND (0.44)	0.87
1,3-Dichlorobenzene	ND (1.2)	0.64 J
1,4-Dioxane	ND (18)	5 J
2,2,4-Trimethylpentane	0.37 J	6.5
2-Butanone (Methyl Ethyl Ketone)	ND (1.5)	46
2-Hexanone (Methyl Butyl Ketone)	ND (2)	9.3
4-Ethyltoluene (1-Ethyl-4-Methylbenzene)	ND (0.98)	1
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.75 J	4.6
Acetone	12	260
Benzene	0.43 J	3.4
Butane	1.7	27
Carbon disulfide	0.4 J	1.5 J
Carbon tetrachloride	0.28	0.32
Chlorodifluoromethane	0.93 J	ND (1.8)
Chloroform (Trichloromethane)	0.58 J	0.74 J
Chloromethane (Methyl Chloride)	1	0.94 J
Cyclohexane	1.1	7.9
Cymene (p-Isopropyltoluene)	ND (1.1)	0.95 J
Dichlorodifluoromethane (CFC-12)	1.8 J	2.1 J
Ethylbenzene	ND (0.87)	15
Hexane	0.82 J	6.6
Isopropyl Alcohol (2-Propanol)	ND (1.8)	57
Isopropylbenzene (Cumene)	ND (0.98)	2
m,p-Xylenes	0.91 J	57
Methyl Tert Butyl Ether (MTBE)	ND (0.72)	0.13 J
Methylene chloride (Dichloromethane)	1.6 J	1.6 J
N-Heptane	0.29 J	19
n-Propylbenzene	ND (0.98)	0.86 J
o-Xylene	0.37 J	24
Styrene	ND (0.85)	2.3
Tert-Butyl Alcohol (tert-Butanol)	ND (15)	13 J
Tetrachloroethene	0.23 J	17
Toluene	1.9	11
Trichloroethene	ND (0.2)	1.5
Trichlorofluoromethane (CFC-11)	1.1	8.1
Calculated Totals		
Total BTEXs	3.61	110.4
Total CVOCs	2.11	27.95
Total VOCs	29.13	580.78

HA SS/A-12	HA IA-12 03/04/2025 200-77193-2	HA SS-12 03/04/2025 200-77193-1
VOCs		
1,1,1-Trichloroethane	ND (1.1)	3.5 J
1,2,4-Trimethylbenzene	0.75 J	7.3
1,3,5-Trimethylbenzene	ND (0.98)	1.4 J
1,3-Butadiene	ND (0.44)	0.41 J
1,4-Dioxane	ND (18)	8.9 J
2,2,4-Trimethylpentane	0.8 J	ND (3.7)
2-Butanone (Methyl Ethyl Ketone)	ND (1.5)	140
2-Hexanone (Methyl Butyl Ketone)	ND (2)	61
4-Ethylto



LEGEND

- FILL PORT
- PROPOSED BASELINE AND POST-INJECTION SAMPLING MONITORING WELL
- PROPOSED ZVI INJECTION POINT
- PROPOSED LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL) EXTRACTION MONITORING WELL
- PROPOSED POST-INJECTION SUB-SLAB/INDOOR AIR SAMPLE LOCATION

SUPPLEMENTAL SITE CHARACTERIZATION INVESTIGATION

- DEEP MONITORING WELL
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- 15 FT RADIUS OF INFLUENCE
- ABANDONED UST
- PARTIAL BASEMENT OUTLINE
- SITE BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. UST = UNDERGROUND STORAGE TANK
3. PARTIAL BASEMENT OUTLINE SOURCE: 'FIGURE 1: MONITORING WELL LOCATIONS', HYDRO TECH ENVIRONMENTAL CORP., 18 SEPTEMBER 2015
4. THE CELLAR IS CURRENTLY UNOCCUPIED.
5. AERIAL IMAGERY SOURCE: NEARMAP, 16 JUNE 2024

N

0 40 80
SCALE IN FEET

HALEY ALDRICH

90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

PROPOSED INTERIM REMEDIAL MEASURES PLAN

OCTOBER 2025

FIGURE 8

GIS FILE PATH: \\haleyaldrich.com\share\CFGroup\nyc\Proposal Opportunities\Developers\90-02 Queens Boulevard\GIS\208933_90-02_QUEENS_BOULEVARD.aprx - USER: pdilillo - LAST SAVED: 10/15/2025 9:43 AM

APPENDIX A
Sipper System Specifications

geotech

Hydrocarbon Recovery System

Geotech Single & Multi-Well AC Sipper

The Geotech AC Sipper is a Single-Phase, 110-220V AC, powered remediation system, designed for recovery applications where electrical power is available. This uniquely flexible system can be configured for up to seven wells. The compact, easy-to-install features make this unit an industry favorite!

The AC Sipper uses a unique downwell pump to recover hydrocarbons through a floating oleophilic/hydrophobic intake filter. Once the pump canister is filled via the vacuum cycle, the pump reverses, pressurizes the system and pumps the re-covered fluid to the surface and into a storage vessel.

The Geotech AC Sipper can effectively extract fluids from depths to 180 feet below ground surface and recover viscous hydrocarbons such as 90 weight oil when our heavy oil skimmer is utilized.

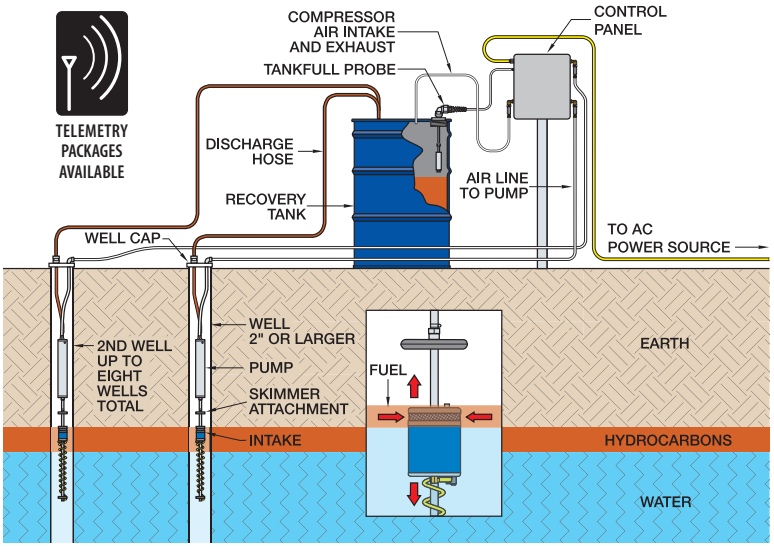
FEATURES

- Available in single or multi-well configurations
- Solar powered versions are also available

OPERATION

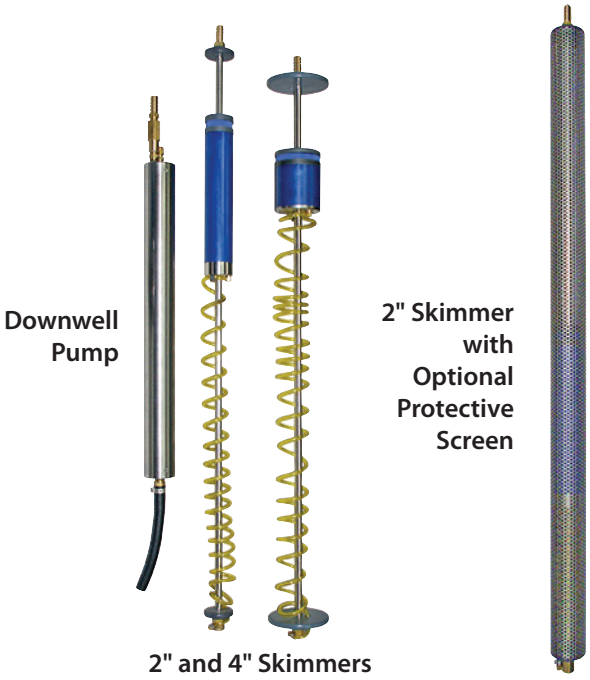
The Geotech AC Sipper recovers floating hydrocarbons (LNAPL) from wells using an AC powered pressure/vacuum pump. The standard Skimmer features a unique product intake assembly that incorporates both a density float and an oleophilic/hydrophobic filter that differentiates between floating hydrocarbons and water. The skimmer floats just above the oil/water interface to collect and remove hydrocarbons from the well into an optional above ground storage tank.

The Geotech AC Sipper is also available for recovery of sinking product (DNAPL) from wells when using a fixed intake.





Control Panel and Pressure/Vacuum Pump
(eight-well controller shown)



Downwell Pump

2" Skimmer with Optional Protective Screen

2" and 4" Skimmers

CALL GEOTECH TODAY (800) 833-7958

Geotech Environmental Equipment, Inc.
2650 East 40th Avenue • Denver, Colorado 80205
(303) 320-4764 • FAX (303) 322-7242
email: sales@geotechenv.com • website: www.geotechenv.com

geotech

Hydrocarbon Recovery System

Geotech Single & Multi-Well AC Sipper

DESIGN YOUR RECOVERY SYSTEM

Step 1: Control Panel

✔ Choose from 1 to 7 wells
- NEMA 3R Enclosure
- Tankfull Shut-Off Switch (¾" or 2" NPT bung-fitting)
- Microprocessor Controlled 2-Line LCD Display with four scroll buttons
- On/Off Switch
- Pressure/Vacuum Pump
- Pressure/Vacuum Gauge

Solar powered versions are available

Step 2: Downwell Equipment

✔ Downwell Pump(s)
- Standard
- With Conductivity Sensor

✔ Skimmer(s)
- 2" or 4" Skimmer with 100 or 60 Mesh Intake
- 2" or 4" Protective Screen
- 4" Skimmer with Extended Travel
- 4" Heavy Oil Skimmer
- 4" High Temperature/Heavy Oil Skimmer
- 2" DNAPL Intake

Other Options:

✔ 2" or 4" Slip Fit Well Cap(s)

✔ Choose Length: Air and Discharge Tubing

✔ 55 Gallon Steel Product Drum(s)

✔ Tank Manifold: 2 to 7 Wells

✔ Dual-Wall Containment Product Recovery Tank(s)

✔ Lockable Weatherproof Enclosure

✔ Trailer for Mounting Mobile System

✔ SitePro with SiteView Telemetry

SPECIFICATIONS

Applications:	2" (50 mm) or larger recovery wells	
Recovery Rate:	.2 gallons (.76 liters) per cycle	
Maximum Operating Depth:	180 feet (55 meters)	
Power Requirements:	87 to 240 Volts AC 2.7 to 1 Amp(s)	
Maximum Pressure:	100 PSIG (7 bar)	
Maximum Vacuum:	20" Hg @ MSL (50 mm Hg)	
Oil/Water Separation:	Oleophilic/hydrophobic mesh screen	
Controller:		
Operating Temperature	32° to 104°F (0° to 40°C)	
Storage Temperature Range	-20° to 150°F (-29° to 66°C)	
Humidity	90% non-condensing (max)	
Size	10" D x 18" T x 16" W (25.4 cm D x 45.7 cm T x 40.6 cm W)	
Approximate Weight	35 lbs. (15.9 kg) single channel 51 lbs. (23.1 kg) eight channel	
Rating	NEMA 3R	
Optional Downwell Pump:		
Size	23.5" L x 1.75" OD (59.7 cm L x 4.4 cm OD)	
Weight	4.5 lbs. (2.04 kg)	
Materials	303 and 304 Stainless Steel, Flexible Rubber Tubing, PVC, Brass	

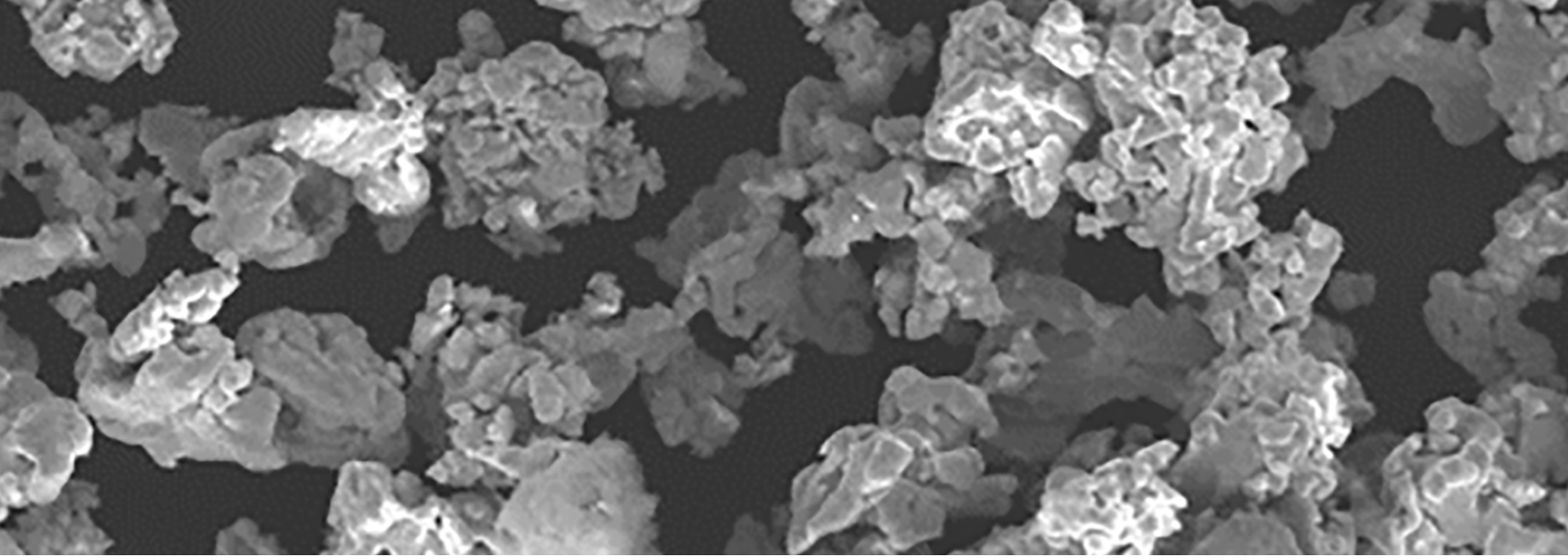
Optional Skimmer Assemblies:	**2" Model**	**4" Model**
Effective Travel Range	12" (30.5 cm)	24" (61 cm)
Size	35.5" L x 1.75" OD (90.2cm L x 4.4cm OD)	35.5" L x 3.75" OD (90.2cm L x 9.5cm OD)
Weight	1.75 lbs. (.79 kg)	2.25 lbs. (1.02 kg)
Operating Temperature	32° to 104°F (0° to 40°C)	
Storage Temperature	-20° to 150°F (-29° to 66°C)	
Materials	304 Stainless Steel, Polyethylene, PVC, Polypropylene, Brass	

Optional Tubing:	
Air	.17" ID x .25" OD (4.3 mm ID x 6 mm OD)
Discharge	.375" ID x .5" OD (9.5 mm ID x 12.7 mm OD)

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APPENDIX B
Zero Valent Iron Product Information



CleanER™ – 25

CleanER zero valent iron (ZVI) powders are manufactured specifically for the environmental market. This innovative product line of ZVI is manufactured using cutting-edge powder metallurgical technologies.

CleanER-25 is a highly reactive H-Sponge ZVI that has been developed explicitly with an optimal particle size to surface area ratio for injection applications. CleanER-25 is an excellent choice for blended products and combined remedial strategies.

H-Sponge iron vs conventional iron

- No on-site acid wash required
- Up to 8x more reactivity
- 400% greater surface area
- >98% Iron purity
- No oil or grease contamination

For more information on CleanER and other Höganäs products, please contact your local sales representative.

Höganäs Environment Solutions
3000 Weston Parkway, Cary, NC
+1 984 333 0300 | hesinfo@hoganas.com
www.hoganasenvironmentsolutions.com

Höganäs



Lower treatment costs with CleanER™

- Customized reactivity and longevity
- Highest quality product on the market
- Specialized packaging
- Full delivery logistics and flexibility
- Largest product portfolio: 5 – 2000 µm

Target contaminants

- Chlorinated solvents
- Heavy metals:
  - Selenium, chromium, lead, arsenic, etc.
- Radionuclides

Remedial applications

- Low or high pressure soil injection
- Catalyst for ISCO injection or blending
- Synergistic enhanced biotic degradation

Standard packaging

- 1 US ton (907 Kg)
- 50kg pail
- 25kg pail

CleanER-25 general information

Particle size	Typical value
D10	7-9 µm
D50	20-30 µm
D90	30-45 µm

Superior purity

Parameter	Typical Value
Acid Insolubility	<0.5%
Surface Area	0.4-0.46 m^2/g
Iron Content	>98%
Apparent Density	1.8-1.9 g/cc

Specifications subject to change without notice

Höganäs

www.hoganas.com

Established in 1797, Höganäs is the world's leading iron powder manufacturer, supplying 500,000 tons annually to 2,500 customers in 65 countries. Höganäs Environment Solutions specializes in CleanER engineered zero valent iron (ZVI) for environmental applications.

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APPENDIX C
Quality Assurance Project Plan

HALEY ALDRICH

www.haleyaldrich.com

QUALITY ASSURANCE PROJECT PLAN
90-02 QUEENS BOULEVARD SITE
90-02 QUEENS BOULEVARD
QUEENS, NEW YORK

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

for
9002 Commercial Unit LLC
New York, New York

File No. 0208933
October 2025



Executive Summary

This Quality Assurance Project Plan (QAPP) outlines the scope of the quality assurance and quality control (QA/QC) activities associated with the remedial and monitoring activities associated with the Interim Remedial Measures Work Plan (IRMWP) for 90-02 Queens Boulevard in Queens, New York (Site).

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

Table of Contents

Page

Executive Summary i
List of Tables v
List of Appendices v

1. Project Description 1

1.1 PROJECT OBJECTIVES 1
1.2 SITE DESCRIPTION AND HISTORY 1
1.3 LABORATORY PARAMETERS 1
1.4 SAMPLING LOCATIONS 1

2. Project Organization and Responsibilities 2

2.1 MANAGEMENT RESPONSIBILITIES 2
2.2 QUALITY ASSURANCE RESPONSIBILITIES 2
2.2.1 Quality Assurance Officer 3
2.2.2 Data Validation Staff 3
2.3 LABORATORY RESPONSIBILITIES 3
2.3.1 Laboratory Project Manager 3
2.3.2 Laboratory Operations Manager 3
2.3.3 Laboratory QA Officer 3
2.3.4 Laboratory Sample Custodian 4
2.3.5 Laboratory Technical Personnel 4
2.4 FIELD RESPONSIBILITIES 4
2.4.1 Field Coordinator 4
2.4.2 Field Team Personnel 5

3. Sampling Procedures 6

3.1 SAMPLE CONTAINERS 6
3.2 SAMPLE LABELING 6
3.3 FIELD QC SAMPLE COLLECTION 6
3.3.1 Field Duplicate Sample Collection 6

4. Custody Procedures 7

4.1 FIELD CUSTODY PROCEDURES 7
4.1.1 Field Procedures 8
4.1.2 Transfer of Custody and Shipment Procedures 8
4.2 LABORATORY CHAIN OF CUSTODY PROCEDURES 9
4.3 STORAGE OF SAMPLES 9
4.4 FINAL PROJECT FILES CUSTODY PROCEDURES 9

5. Calibration Procedures and Frequency 11

Table of Contents

Page

5.1 FIELD INSTRUMENT CALIBRATION PROCEDURES 11
5.2 LABORATORY INSTRUMENT CALIBRATION PROCEDURES 11

6. Analytical Procedures 12

6.1 FIELD ANALYTICAL PROCEDURES 12
6.2 LABORATORY ANALYTICAL PROCEDURES 12
6.2.1 List of Project Target Compounds and Laboratory Detection Limits 12
6.2.2 List of Method-Specific Quality Control Criteria 12

7. Internal Quality Control Checks 13

7.1 FIELD QUALITY CONTROL 13
7.1.1 Field Blanks 13
7.1.2 Trip Blanks 13
7.2 LABORATORY PROCEDURES 13
7.2.1 Field Duplicate Samples 13
7.2.2 Matrix Spike Samples 14
7.2.3 Laboratory Control Sample Analyses 14
7.2.4 Surrogate Compound/Internal Standard Recoveries 14
7.2.5 Calibration Verification Standards 15
7.2.6 Laboratory Method Blank Analyses 15

8. Data Quality Objectives 16

8.1 PRECISION 16
8.1.1 Definition 16
8.1.2 Field Precision Sample Objectives 16
8.1.3 Laboratory Precision Sample Objectives 16
8.2 ACCURACY 17
8.2.1 Definition 17
8.2.2 Field Accuracy Objectives 17
8.3 LABORATORY ACCURACY OBJECTIVES 17
8.4 REPRESENTATIVENESS 17
8.4.1 Definition 17
8.4.2 Measures to Ensure Representativeness of Field Data 18
8.5 COMPLETENESS 18
8.5.1 Definition 18
8.5.2 Field Completeness Objectives 18
8.5.3 Laboratory Completeness Objectives 18
8.6 COMPARABILITY 18
8.6.1 Definition 18
8.6.2 Measures to Ensure Comparability of Laboratory Data 18
8.7 LEVEL OF QUALITY CONTROL EFFORT 19

Table of Contents

Page

9. Data Reduction, Validation, and Reporting 20

9.1 DATA REDUCTION 20
9.1.1 Field Data Reduction Procedures 20
9.1.2 Laboratory Data Reduction Procedures 20
9.1.3 Quality Control Data 20
9.2 DATA VALIDATION 20
9.3 DATA REPORTING 21

10. Performance and System Audits 22

10.1 FIELD PERFORMANCE AND SYSTEM AUDITS 22
10.1.1 Internal Field Audit Responsibilities 22
10.1.2 External Field Audit Responsibilities 22
10.2 LABORATORY PERFORMANCE AND SYSTEM AUDITS 22
10.2.1 Internal Laboratory Audit Responsibilities 22
10.2.2 External Laboratory Audit Responsibilities 23

11. Preventive Maintenance 24

11.1 FIELD INSTRUMENT PREVENTIVE MAINTENANCE 24
11.2 LABORATORY INSTRUMENT PREVENTIVE MAINTENANCE 24

12. Specific Routine Procedures Used to Assess Data Precision, Accuracy, and Completeness 25

12.1 FIELD MEASUREMENTS 25
12.2 LABORATORY DATA 25

13. Quality Assurance Reports 26

References 27

List of Tables

Table No.	Title
I	Summary of Analysis Method, Preservation Method, Holding Time, Sample Size Requirements, and Sample Containers

List of Appendices

Appendix No.	Title
A	Data Validation Team Resumes
B	Project Team Resumes

1. Project Description

This Quality Assurance Project Plan (QAPP) has been prepared as a component of the Interim Remedial Measures Work Plan (IRMWP) for the 90-02 Queens Boulevard Site located at 90-02 Queens Boulevard in Queens, New York.

1.1 PROJECT OBJECTIVES

The primary objective for data collection activities is to collect sufficient data necessary to confirm the results of remedial activities, evaluate mitigation measures, and determine a course of action for Site closure. 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 are provided in the Site Description and History Summary that accompanies the IRMWP for the Site and is incorporated herein by reference.

1.3 LABORATORY PARAMETERS

The laboratory parameters for groundwater include:

- Chlorinated volatile organic compounds (CVOCs) using United States Environmental Protection Agency (USEPA) Method 8260B.

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

The laboratory parameters for soil vapor, indoor air, and ambient air include:

- Volatile organic compounds (VOCs) using USEPA 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 IRMWP provides the locations of indoor air/ambient air locations and groundwater monitoring wells that will be sampled.

2. Project Organization and Responsibilities

This section defines the roles and responsibilities of the individuals who will perform the IRMWP monitoring activities. A New York State Department of Health (NYSDOH)-certified analytical laboratory will perform the analyses of environmental samples collected at the Site. See Appendix A for data validation team resumes and Appendix B for project team resumes.

2.1 MANAGEMENT RESPONSIBILITIES

James Bellew will be the Principal-in-Charge and serve as the Qualified Environmental Professional (QEP) for this work. In this role, Mr. Bellew will be responsible for the overall completion of each task per the requirements outlined in this QAPP and in accordance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER)-10 guidance.

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

The Project Manager will be responsible for managing the implementation of the IRMWP and monitoring and coordinating the collection of data. The Project Manager will be responsible for technical quality control and project oversight. The Project Manager's responsibilities include the following:

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

Hailey Russell will be the field engineer responsible for implementing the field efforts for this work. Her responsibilities will include implementing the work plan activities and directing the subcontractors to ensure successful completion of all field activities.

2.2 QUALITY ASSURANCE RESPONSIBILITIES

The Quality Assurance team will consist of a Quality Assurance (QA) Officer and the data validation staff. Quality Assurance responsibilities are described in the following subsections.

2.2.1 Quality Assurance Officer

The QA Officer will be Nicole Mooney and she will report 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 for the evaluation and validation of field and laboratory-generated data.

2.2.2 Data Validation Staff

The data validation staff will consist of Eric Hitchens and Kristina Ilina, who 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; the results of the validation will be presented in a Data Usability Summary Report (DUSR) for submittal to the QA Officer.

2.3 LABORATORY RESPONSIBILITIES

Laboratory services provided by Eurofins Scientific (an Environmental Laboratory Accreditation Program [ELAP]-approved laboratory) to support the IRMWP 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 (COC) reports, scheduling sample analyses, overseeing data review, and overseeing the preparation of analytical reports.

2.3.3 Laboratory QA Officer

The Laboratory QA Officer will have the sole responsibility for the review and validation of the analytical laboratory data. The Laboratory QA Officer will provide case narrative descriptions of any data quality issues encountered during the analyses conducted by the laboratory. The QA Officer will also define appropriate QA procedures, overseeing quality assurance/quality control (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 the COC 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 of performing the sample analysis and executing the QA procedures developed to determine the data quality. These activities will include the proper preparation and analysis of the project samples in accordance with the laboratory's Quality Assurance Manual (QAM) and associated Standard Operating Procedures (SOPs).

2.4 FIELD RESPONSIBILITIES

2.4.1 Field Coordinator

The Field Coordinator is responsible for the overall operations of the field team and reports directly to the Project Manager. The Field Coordinator works with the project Health and Safety Officer (HSO) to conduct operations in compliance with the project HASP. The Field Coordinator will facilitate communication and coordinate efforts among 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 QA Officer and Project Manager; implement and document corrective action procedures; and
- Participate in the preparation of the final laboratory data reports.

2.4.2 Field Team Personnel

Field Team Personnel will be responsible for the following:

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

3. Sampling Procedures

The FSP provides the SOPs for sampling required by the IRMWP. Sampling will be conducted in general accordance with the NYSDEC Technical Guidance for Site Investigation and Remediation (DER-10).

3.1 SAMPLE CONTAINERS

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

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

3.2 SAMPLE LABELING

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

Refer to the FSP for the sample labeling procedures.

3.3 FIELD QC SAMPLE COLLECTION

3.3.1 Field Duplicate Sample Collection

3.3.1.1 Water Samples

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

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

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

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

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

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

- Detailed description of sample location;
- Equipment used to collect sample or make measurements and the date equipment was calibrated;
- Time sample was collected;
- Description of the sample conditions;
- Depth at which the 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 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 analytical methodology can be met.
- Samples will be transported in containers (coolers) that 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 COC 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 they are 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 for receiving 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 COC forms, has been completed. The custodian will sign the COC 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 COC form, analyses by the laboratory's analysts will begin in accordance with the appropriate methodologies. Samples will be removed from secure storage, with internal COC sign-out procedures followed.

4.3 STORAGE OF SAMPLES

Empty sample bottles will be returned to secure and limited-access storage after the available volume has been consumed by the analysis. Upon completion of the entire analytical work effort, samples will be disposed of by the sample custodian. The length of time that samples are held will be at least 30 days after final analytical 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 the custody of the Project Director or 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 COC documentation;
- Correspondence;
- References and literature;
- Laboratory data deliverables;
- Data validation and assessment reports;
- Progress reports and QA reports; and
- Final report.

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

5. Calibration Procedures and Frequency

5.1 FIELD INSTRUMENT CALIBRATION PROCEDURES

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

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

5.2 LABORATORY INSTRUMENT CALIBRATION PROCEDURES

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

All solid chemicals and acids/bases used by the laboratory will be rated as "reagent-grade" or better. All gases will be "high" purity or better. All Standard Reference Materials (SRMs) or Performance Evaluation (PE) materials will be obtained from approved vendors of the National Institute of Standards and Technology (NIST; formerly the National Bureau of Standards), the USEPA Environmental Monitoring Support Laboratories (EMSLs), 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 the 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 VOCs during the collection of soil samples.

6.2 LABORATORY ANALYTICAL PROCEDURES

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

> "Test Methods for Evaluating Solid Waste," SW-846 USEPA, 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 code of Federal Regulations (CFR) Part 136, Appendix B.

Laboratory parameters for groundwater samples are listed in the IRMWP.

6.2.2 List of Method-Specific Quality Control Criteria

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

7. Internal Quality Control Checks

This section presents the internal 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 the analysis of VOCs.

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

7.2 LABORATORY PROCEDURES

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

7.2.1 Field Duplicate Samples

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

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

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

Acceptance criteria for duplicate analyses performed on solid matrices will be 100 percent and aqueous matrices will be 35 percent. 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 reanalysis 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 (%R). The %R of an analyte is an indication of the accuracy of an analysis within the Site-specific sample matrix. Percent recovery will be calculated for matrix spike/matrix spike duplicate (MS/MSD) samples using the following equation:

$$\%\ Recovery = \frac{Spiked\ Sample - Background}{Known\ Value\ of\ Spike} x100\%$$

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

7.2.3 Laboratory Control Sample Analyses

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

The laboratory will evaluate LCS analyses in terms of %R 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 reanalysis of project samples will be performed, if possible.

The analytical anomaly will be noted in the SDG case narrative and reviewed by the data validator. The data validator will confirm that appropriate corrective actions were implemented and recommend the applicable use of the affected data.

7.2.4 Surrogate Compound/Internal Standard Recoveries

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

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

For 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 standards immediately before analysis for quantitation via internal standardization techniques.

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

To ascertain the effect that 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 the 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 reanalysis of each affected project sample, a detailed description of the problem, the corrective action undertaken, the person who performed the action, and the resolution to 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 its SOPs. The data validator will provide recommendations for corrective actions, including but not limited to additional data qualification.

8. Data Quality Objectives

Sampling that will be performed as described in the IRMWP is designed to produce data of the quality necessary to achieve the minimum standard requirements of the field and laboratory analytical objectives described below. These data are being obtained with the primary objective of assessing 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, laboratory analysis, and reporting that achieve the project objectives. The following section is a general discussion of the criteria that will be used to measure the achievement of the project DQO.

8.1 PRECISION

8.1.1 Definition

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

8.1.2 Field Precision Sample Objectives

Field precision will be assessed through the collection and measurement of field duplicate samples at a rate of one duplicate per 20 investigative samples. The RPD criteria for the project field duplicate samples will be +/- 100 percent for soil and +/- 35 percent for groundwater for parameters of analysis detected at concentrations greater than 5 times (5X) the laboratory RL.

8.1.3 Laboratory Precision Sample Objectives

Laboratory precision will be assessed through the analysis of LCS and laboratory control sample duplicate (LCSD) and MS/MSD samples for groundwater and soil samples and the analysis of laboratory duplicate samples for air and soil vapor samples. Air and soil vapor laboratory duplicate sample analyses will be performed by analyzing the same SUMMA canister twice. The RPD criteria for the air/soil vapor laboratory duplicate samples will be +/- 35 percent for parameters of analysis detected at concentrations greater than 5X the laboratory RL.

8.2 ACCURACY

8.2.1 Definition

Accuracy relates to the bias in a measurement system. Bias is the difference between the observed and the "true" value. Sources of error are the sampling process, field contamination, preservation techniques, sample handling, sample matrix, sample preparation, and/or 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 VOCs. Trip blank samples will be analyzed for each VOC for which groundwater samples have been collected for analysis.

8.3 LABORATORY ACCURACY OBJECTIVES

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

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

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

8.4 REPRESENTATIVENESS

8.4.1 Definition

Representativeness expresses the degree to which sample data represent a characteristic of a population, a parameter variation at a sampling point, or an environmental condition. Representativeness is a qualitative parameter that is dependent upon the design of the sampling program. The

representativeness criterion is satisfied through the proper selection of sampling locations, the quantity of samples, and the use of appropriate procedures to collect and analyze the samples.

8.4.2 Measures to Ensure Representativeness of Field Data

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

8.5 COMPLETENESS

8.5.1 Definition

Completeness is a measure of the amount of valid (usable) data obtained from a measuring system compared to the total amount anticipated to be obtained. The completeness goal for all data uses is that a sufficient amount of valid data be generated so that determinations can be made related to the intended data use with a sufficient degree of confidence.

8.5.2 Field Completeness Objectives

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

8.5.3 Laboratory Completeness Objectives

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

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

8.6 COMPARABILITY

8.6.1 Definition

Comparability is a qualitative parameter expressing the confidence with which one dataset 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 SRMs obtained from either USEPA CRADA suppliers or the NIST. The reported analytical data will also be presented in standard units of mass of contaminant within a known volume of environmental media. The standard units for various sample matrices are as follows:

- Solid Matrices – milligrams per kilogram (mg/kg) of media (dry weight).

- Aqueous Matrices – micrograms per liter (µg/L) of media for organic analyses, and milligrams per liter (mg/L) for inorganic analyses.

8.7 LEVEL OF QUALITY CONTROL EFFORT

If non-dedicated sampling equipment is used, equipment rinse blanks will be prepared by field personnel and submitted for the analysis of target parameters. Equipment rinse blank samples will be analyzed to check for potential cross-contamination between sampling locations that may be introduced during the investigation. One equipment rinse blank will be collected per sampling event to the extent that non-dedicated sampling equipment is used. (Note: If dedicated or disposable sampling equipment is used, equipment rinse samples will not be collected as part of that field effort.)

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

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

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

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

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

9. Data Reduction, Validation, and Reporting

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

9.1 DATA REDUCTION

9.1.1 Field Data Reduction Procedures

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

9.1.2 Laboratory Data Reduction Procedures

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

9.1.3 Quality Control Data

QC data (e.g., laboratory duplicates, surrogates, MSs, and MSDs) 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 that will include information concerning data that fell outside acceptance limits and any other anomalous conditions encountered during the 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:

- "USEPA National Functional Guidelines for Organic Data Review," and the "USEPA 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 USEPA National Functional Guidelines. Validation will be performed by qualified personnel at the direction of the Haley & Aldrich QA Officer.
- 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 data validator will determine whether the required items are present and request copies of missing deliverables (if necessary) from the laboratory.

9.3 DATA REPORTING

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

- Field Data Reporting: Field data reporting will be conducted principally through the transmission of report sheets containing tabulated results of measurements made in the field and documentation of field calibration activities.
- Laboratory Data Reporting: The laboratory data reporting package will enable data validation based on the protocols described above. The final laboratory data report format will include the QA/QC sample analysis deliverables to enable the development of a DUSR based on 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, and instrument operating records;
- Sample collection;
- Handling and packaging in compliance with procedures;
- Maintenance of QA procedures; and
- COC reports.

10.1.2 External Field Audit Responsibilities

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

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

10.2 LABORATORY PERFORMANCE AND SYSTEM AUDITS

10.2.1 Internal Laboratory Audit Responsibilities

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

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

10.2.2 External Laboratory Audit Responsibilities

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

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

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

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

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

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

11. Preventive Maintenance

11.1 FIELD INSTRUMENT PREVENTIVE MAINTENANCE

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

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

The maintenance responsibilities for field equipment will be assigned to the task leaders in charge of specific field operations. Field personnel will be responsible for daily field checks and calibrations and for reporting any problems with the equipment. The maintenance schedule will follow the manufacturer's recommendations. In addition, 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 detect 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 includes evaluation of bound logbooks/forms, data entry, and calculation checks. Field data will be assessed by the Project Coordinator, who will review the field results for compliance with the established QC criteria that are specified in Section 7.0 of this QAPP. The accuracy of pH and specific conductance will be assessed using daily instrument calibration, calibration checks, and blank data. Accuracy will be measured by determining the %R of calibration check standards. Precision of the pH and specific conductance measurements will be assessed on the basis of the reproducibility of duplicate readings of a field sample and will be measured by determining the RPD. Accuracy and precision of the soil VOC screening will be determined using duplicate readings of calibration checks. Field data completeness will be calculated using the following equation:

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

12.2 LABORATORY DATA

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

- Precision, in terms of RPD, will be determined by relative sample analysis at a frequency of one duplicate analysis for each batch of 10 project samples or a frequency of 10 percent. RPD is defined as the absolute difference of duplicate measurements divided by the mean of these analyses, normalized to a percentage.
- Accuracy, in terms of %R (recovery of known constituent additions or surrogate recoveries), will be determined by the analysis of spiked and unspiked samples. MS/MSDs will be used to determine analytical accuracy. The frequency of MS/MSD analyses will be one project sample MS/MSD per set of 20 project samples.
- One method blank will be prepared and analyzed with each batch of project samples. The total number of method blank sample analyses will be determined by the laboratory analytical batch size.
- SRMs will be used for each analysis. Sources of SRMs include the USEPA CRADA-certified and/or NIST 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 dataset completeness will be performed by the following equation.

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

13. Quality Assurance Reports

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

QA reports to management can include:

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

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

References

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

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

3. United States Environmental Protection Agency, 1986. Test Methods for Evaluating Solid Waste, Office of Solid Waste, USEPA SW-846, November 1986, with updates.

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

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

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

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

8. United States Environmental Protection Agency, 2017a. National Functional Guidelines for Inorganic Data Review. USEPA 540/R-2017-001.

9. United States Environmental Protection Agency, 2017b. National Functional Guidelines for Organic Data Review. USEPA 540/R-2017-002.

TABLE

TABLE I

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

90-02 QUEENS BOULEVARD

QUEENS, NEW YORK

Analysis/Method	Sample Type	Preservation	Holding Time	Volume/Weight	Container
Chlorinated Volatile Organic Compounds/8260B	Groundwater	HCl, Cool, 4 ± 2 ^{o}C	14 days	120 mL	3 - 40ml glass vials
Volatile Organic Compounds/TO-15	Soil Vapor	N/A	30 days	2.7 - 6 L	1 2.7 or 6 L Summa Canister

Notes:

1. Refer to text for additional information.

QAQC samples include:

MS/MSD - 1 for every 20 samples

Field Duplicate - 1 for every 20 samples

Trip Blanks - 1 per cooler of samples to be analyzed for VOCs

Field Blanks - 1 for every 20 samples

APPENDIX A
Data Validation Team Resumes

KIRKLAND BROADWELL, G.I.T.

Project Geologist

EDUCATION

Ph.D., Philosophy, Geosciences, Virginia Polytechnic Institute and State University (Virginia Tech)
B.S., Geology, The College of William & Mary-Williamsburg

PROFESSIONAL REGISTRATIONS

2022/ VA: Certified Geologist in Training (G.I.T.) (Reg. No.: 2801002362)

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
24-Hour MSHA/New Miner Training (Part 48)
24-Hour MSHA/New Miner Training Surface Mine Operations
American Red Cross First Aid Training and CPR Course

Kirkland is a project geologist with field and laboratory experience and is currently working in the Energy & Mining sector at Haley & Aldrich. He has experience in geologic data collection, analysis, and interpretation, as well as technical communication. He holds a doctorate in philosophy in geosciences from Virginia Tech, where he studied metamorphic processes and specialized in igneous and metamorphic geochemistry and petrology. He has extensive experience with petrography, electron microscopy, and thermodynamic modeling of geologic systems. He also has experience with compliance and corrective action groundwater monitoring programs, including field activities (slug testing and groundwater, surface water, and stormwater sampling), and data analysis (data verification, validation, and regulatory reporting).

RELEVANT PROJECT EXPERIENCE

Waste Management, Inc., Environmental Services, Virginia. Kirkland served as a field geologist for environmental services, which included compliance and corrective action groundwater, surface water, and stormwater monitoring activities, landfill gas monitoring and data management, and data verification, analysis, and reporting.

Iluka Resources, Inc., Environmental Services, Stony Creek, Virginia. Kirkland served as a geologist for environmental services which included aquifer testing and compliance groundwater monitoring activities.

ExTerra Field Institute and Research Endeavor, Western Alps, Europe. Kirkland worked as a graduate researcher and used geochemistry and petrology to trace fluid and element cycling within subduction zone systems and quantify the timing and conditions of metamorphic processes that occur in subduction zones.

PUBLICATIONS

“From the Appalachians to the Alps: Constraints on the timing, duration, and conditions of metamorphism at convergent margins,” dissertation for Doctor of Philosophy, Virginia Polytechnic Institute and State University (Virginia Tech), Blackburg, Virginia, 2020.

“Deciphering poly-metamorphism and fluid alteration in the central Appalachians with monazite and allanite petrochronology,” with M.J. Caddick, J.S. Beard, W. Henika, and A. Kylander-Clark, A., in review with *American Journal of Science.*

"Meta-rodingite dikes as recorders of subduction zone metamorphism and serpentinite dehydration: Voltri Ophiolite, Italy," with A.A. Haws, P.G. Starr, B. Dragovic, M. Scambelluri, D. Delmonte, M.J. Caddick, J.J Ague, and E.F. Baxter, *Chemical Geology*, 2021. https://doi.org/10.1016/j.chemgeo.2021.120077

"The subduction and exhumation history of the Voltri Ophiolite, Italy: Evaluating exhumation mechanisms for high-pressure metamorphic massifs," P.G. Starr, B. Dragovic, M. Scambelluri, A.A. Haws, M.J. Caddick, A.J. Smye, and E.F. Baxter, In press at *Lithos,* 2020. https://doi.org/10.1016/j.lithos.2020.105767

"Polymetamorphism in high-T metamorphic rocks: An example from the central Appalachians," with M.J. Caddick, and J.S. Beard, *Journal of Metamorphic Geology*, 2019. https://doi.org/10.1111/jmg.12509

"Transient and periodic brittle deformation of eclogites during intermediate-depth subduction," with M. Locatelli, A. Verlaguet, P. Agard, and M.J. Caddick, Earth and Planetary Science Letters, Pages 91-102, September 2019. https://doi.org/10.1016/j.epsl.2019.06.008

"A Comparative Climate Analysis of Virginia During the 20th and 21st centuries," thesis for Bachelor of Science, The College of William & Mary, Williamsburg, Virginia, 2013.

OSCAR CERVANTES

Staff Professional

EDUCATION

B.S., Environmental Engineering, Arizona State University

PROFESSIONAL REGISTRATIONS

2021/ AZ: Environmental Engineering F.E. Exam (NCEES ID 22-408-39)

SPECIAL STUDIES AND COURSES (DELETE IF NOT APPLICABLE)

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)]
24-Hour MSHA/New Miner Training (Part 48)
EPA Region 9: TRI Basic Concepts Training
EPA Region 9: TRI Advanced Concepts Training

Oscar is a recently graduated staff professional with experience in environmental remediation programs and data quality assurance/quality control and will focus his time at Haley & Aldrich serving the Energy and Mining markets. He is skilled in groundwater, air, and soil sampling methods. He participates in the operation and maintenance of high-volume air samplers. He is also skilled in data quality assurance and quality control, regularly validating field and laboratory data. Oscar will also become familiar with overseeing operations and maintenance for water treatment systems.

RELEVANT PROJECT EXPERIENCE

Airports

Goodyear, Phoenix Goodyear Airport Groundwater Monitoring, Goodyear, Arizona. Oscar served as an engineer for environmental services, which included measuring the water levels at all wells, collecting suitable samples at the treatment compounds and wells, completing field tests such as pH and turbidity, and performing maintenance on wells.

Mining Sites

Asarco, Air Monitoring Activities, Hayden, Arizona. Oscar has worked as a field technician at the Hayden site. His main responsibility in this role is operating and maintaining high-volume air sampling machines. This includes collecting suitable air samples and performing monthly audits and verifications. Oscar also validates field and lab data for the project.

Colleges and Universities

Arizona State University, Design Project, Tempe, Arizona. Oscar participated in a design project during his capstone course at Arizona State University. The group designed an entire drinking water treatment plant/system, including coagulation/flocculation, sedimentation, granular media filtration, granular activated carbon filtration, disinfection, advanced treatment, and storage/distribution. Oscar was specifically responsible for the storage/distribution of the treated water. This involved considerations/calculations such as location, piping size/material, water demands, length of pipes, residence time, total storage required, and of course, costs (capital and operational). Sustainability was an emphasis on the design of the treatment plant: each student had to provide ways in which their design choices implemented sustainability concepts.

APPENDIX B
Project Team Resumes

ERIC HITCHENS

Staff Scientist

EDUCATION

B.A., Physics, University of California-Santa Barbara

SPECIAL STUDIES AND COURSES

OSHA 40 Hour HAZWOPER Safety Certification
OSHA 10 Hour Construction Safety Certification
APNG 8 Hour Nuclear Gauge Safety Certification
Cetco Liquid Boot® Inspector Certification
Land Science Geo-Seal® Inspector Certification

Eric is a field technician with one year of experience in field work and will focus his time at Haley & Aldrich serving multiple markets. He has experience inspecting vapor intrusion mitigation systems (VIMS) and operating nuclear gauges to measure soil density and moisture content in the field. He is skilled in physics, data acquisition and analysis, field documentation, instrumentation, and experimental methods. He received the Haley & Aldrich Award for Outstanding Safety Performance in 2018.

RELEVANT PROJECT EXPERIENCE

New Industrial Developments

San Leandro Business Center (SLBC), San Leandro, California. As lead field staff, Eric is currently responsible for geotechnical oversight of general site grading, underground utility installation, ground improvement, and pavement construction with minimal supervision from senior engineers. He coordinates directly with the general contractor and its subcontractors, performs nuclear gauge compaction testing on native and imported soils, collects soil samples and oversees trench backfill. Additionally, Eric oversaw compaction grouting and lime treatment for ground improvement.

New Commercial Developments

3181 Porter Drive Development, Palo Alto, California. Eric oversaw trench dam installation for the vapor intrusion mitigation system and performed air monitoring during trench excavation using a photoionization detector (PID).

New Residential Developments

America Center - Residence and Fairfield Inns, San Jose, California. As lead field staff, Eric is responsible for geotechnical oversight of general site grading, underground utility installation, and pavement construction with minimal supervision from senior engineers. Performs nuclear gauge testing on native and imported soils. Collects soil samples. Coordinates with contractors and installers. Oversaw installation of the sub-slab venting pipes for the vapor intrusion mitigation system (VIMS). Oversaw repairs and testing of the VIMS after initial installation.

Flats at Metro, Mountain View, California. Eric is currently performing third-party oversight and testing of the installation of the Geo-Seal vapor intrusion mitigation systems for several flats and townhouses. He coordinates with contractors and installers, collects field data and records field sketches and helps senior staff prepare installation completion reports.

University Terrace, Palo Alto, California. Eric oversaw installation and testing of the Liquid Boot vapor intrusion mitigation systems for several single-family homes. He coordinated with contractors and installers, collected field data and records field sketches and prepared deliverable field reports to the client under supervision from senior staff.

Radius at Whisman Station, Mountain View, California. Eric oversaw installation and testing of the Liquid Boot vapor intrusion mitigation systems for several single-family homes, flats, and townhouses. He coordinated with contractors

and installers, collected field data and records field sketches and helped senior staff prepare installation completion reports.

Confidential Energy Client Manufactured Gas Plant (MGP) Remediation

Remediation, San Francisco, California. Eric is the go-to person for nuclear gauge testing and the geotechnical field staff for backfill oversight. He collected bulk soil samples for laboratory testing, tested native material and imported fill and oversaw and gave recommendation for backfill procedures around utilities in coordination with senior staff. Additionally, he installed and troubleshot vibration monitoring equipment and oversaw testing of the vapor mitigation system.

Industrial Remediation

United Technologies Corporation Remediation, Chula Vista, California. As the go-to person for truck scales operation and soil sampling, wrote a seven-page field manual to guide future staff onsite.

EPA's Middlefield – East Middlefield Road – Whisman Road Superfund Sites

Waverly Development, 277 Fairchild Drive, Mountain View, California. Eric is the lead field staff responsible for oversight and testing of the installation of the Liquid Boot vapor intrusion mitigation system and sub-slab depressurization systems for several single-family and multi-family homes. He coordinates with contractors and installers, collects field data and records field sketches and prepares installation completion letters and reviews engineering bulletins under direction from senior staff.

350 Ellis Street, Mountain View, California. Eric currently performs drainage of the sub-slab depressurization (SSD) system. Performs inspections and air sampling of the SSD system.

340 East Middlefield Road, Mountain View, California. Eric currently performs inspections of the SSD system.

440 East Middlefield Road, Mountain View, California. Eric currently performs inspections of the SSD system.

615 National Avenue, Mountain View, California. Eric currently performs inspections of the SSD system.

Residence 4, Mountain View, California. Eric currently performs inspections of the SSD system.

Public Works

Alviso Storm Pump Station, San Jose, California. Eric performed construction oversight of trench excavations and was the lead field staff for nuclear gauge testing and backfill oversight during levee construction. He sampled drainage and basin water and prepared a memorandum for client delivery.

Mines and Quarries

Pilarcitos Quarry, Half Moon Bay, California. Eric performed water sampling of basin and receiving water, coordinated with site management and identified key site safety issues.

Colleges and Universities

California Academy of the Arts, San Francisco, California. Eric planned and executed environmental soil sampling.

KRISTINA ILINA

Staff Environmental Scientist

EDUCATION

M.S., Organic Chemistry, Georgia State University-Atlanta, Georgia
M. Eng, Chemical Engineering of Natural Energy Products and Carbon-based Materials, Volgograd State Technical University-Russia
B.E., Chemical Engineering and Biotechnology, Volgograd State Technical University-Russia
B.E., World Economics, Volgograd State Technical University-Russia

PROFESSIONAL REGISTRATIONS

2021 Drinking Water Laboratory Analyst, GA (License No WL014708)
2021 Wastewater Laboratory Analyst, GA (License No WWL014904)

PROFESSIONAL SOCIETIES

American Chemical Society

SPECIAL STUDIES AND COURSES

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

Kristina is a staff environmental scientist with experience in an Environmental NELAC accredited laboratory and daily research and development (R&D) of novel compounds in a chemical laboratory and teaching experience.

PUBLICATIONS

"Cyanine Dyes Containing Quinoline Moieties: History, Synthesis, Optical Properties and Applications," with M. Henary, *Chem. Eur. J*. Accepted Author Manuscript, 2020. DOI:10.1002/chem.202003697

"Squaraine Dyes: Molecular Design for Different Applications and Remaining Challenges,"with W.M. MacCuaig, M. Laramie, J. N. Jeouty, L. R. McNally, and M. Henary. *Bioconjugate Chemistry*, 2020, 31 (2), 194-213. DOI: 10.1021/acs.bioconjchem.9b00482

"Alternative of using a bimetallic hydrotreatment reactor for an L-35-8 / 300B type systems," with Y.L. Zotov Y.L., International conference-school on chemical technology ChT'16. Collection of report theses of the satellite conference of the XX Mendeleev Congress on General and Applied Chemistry, Volgograd, May 16-20, 2016: Total of 3 Vol. - Volgograd: VSTU, 216. - Vol. 3 - P. 80.

"Alternative of changing of the heat flows for the catalytic reforming system of type L-35-8 / 300B," with Y.L. Zotov, *Journal of Scientific Publications of Post-Graduates and Doctoral Students,* 2016. No. 5. P. 197-198

"Synthesis, Characterization, Optical Properties and DNA Cleavage Study of Symmetrical Pentamethine Cyanine Dyes Containing Quinoline Moieties," Master's Thesis in Organic Chemistry, Georgia State University-Atlanta, Georgia, 2020."Naphtha hydrotreating process efficiency enhancing," Bachelor's thesis in Chemical Engineering of Natural Energy Products and Carbon-based Materials and Biotechnology, Volgograd State Technical University-Russia, 2016.

"International economic activity of oil and gas companies in modern economic conditions," Bachelor's thesis in World Economics, Volgograd State Technical University-Russia, 2015.

"Theoretical and engineering foundations of vinyl chloride synthesis," Bachelor's thesis in Chemical Engineering and Biotechnology, Volgograd State Technical University-Russia, 2014.



JAMES BELLEW

Principal

EDUCATION

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

PROFESSIONAL SOCIETIES

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

SPECIAL STUDIES AND COURSES

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

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

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

RELEVANT PROJECT EXPERIENCE

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

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

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

Development's, Speedway Portfolio, Multiple Boroughs, New York. Principal responsible for the expedited due diligence during acquisition of 5 former Speedway Sites of Phase I ESA's and Limited Phase II ESI's, preparation of the Brownfield Cleanup Program Applications, Remedial Investigation Work Plans, Interim Remedial Measure Work Plans and Air/Noise Remedial Action Work Plans (NYCOER). Five of the Sites were accepted into the NYSDEC Brownfield Cleanup program. Remedial Investigations for compliance with the Brownfield Cleanup Program have been completed and the remedial design on the Sites include a variety of remedial approaches which include in situ chemical treatment for groundwater, soil vapor extraction, excavation and dewatering removal and treatment.

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

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

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

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

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

Development, Former Techtronics Site (8 Walworth Street), Brooklyn, New York. Principal for the remedial investigation, remedial action design and remedial action implementation for the former Techtronics Site under the New York State Brownfield Cleanup program as a Participant where trichloroethene (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. For this Site we have designed source removal to 20'bgs, Zero Valent Iron (ZVI) Reactive Barrier Wall, in situ ZVI injections sitewide and a vertical vapor mitigation system. The Site is currently in the remedial implementation phase.

Development, 346 Grand Concourse, Bronx, New York. Principal for the proposed 9-story, 60 key commercial building with one-level deep cellar. Design phase environmental services consist of guiding the Site through the New York City Office of Environmental of Remediation Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality and Noise requirements. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise) and the Final Installation Report for the Certificate of Occupancy.

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

590-594 Myrtle Avenue, Brooklyn, New York. Principal for the proposed 6-story, 12-unit residential building with one-level deep cellar. Design phase environmental services consist of guiding the Site through the New York City Office of Environmental of Remediation Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality and Noise requirements. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise) and the Final Installation Report for the Certificate of Occupancy.

Development, 3530 Webster Avenue, Bronx, New York. Principal for the proposed 8-story, 75 key commercial building with one-level deep cellar. Design phase environmental services consist of guiding the Site through the New York City Office of Environmental of Remediation Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality and Noise requirements. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise). The project is currently in the construction phase of the NYCOER program.

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

New York State Brownfield Site, Former Delta Metals Site, Brooklyn, New York. Senior Project manager for the remedial investigation and remedial action design for the former Delta Metal Products Company. Project is under the New York State 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 track down for the immediate area and identify additional Potentially Responsible Parties. The design for an Air Sparge Soil Vapor Extraction system has been accepted and the project is currently under construction.

Manufacturing-Industrial, Hess Amerada, Bogota and Edgewater, New Jersey. Senior Project Manager and technical Lead for the construction management services for the demolition of two waterfront terminals on the Hackensack and Hudson rivers. Services included demolition design, submittal review, site execution and coordination of activities

related to asbestos abatement, demolition of buildings, thirty holding tanks, piping structures, containment structures and storm water structures.

Manufacturing-Industrial, PQ Corporation, Northeastern United States. Senior Project Manager responsible for the design and implementation of a three phased program for handling polychlorinated biphenyl (PCB) containing materials on approximately 100 tank structures at large, active industrial sites, which included coating removal, encapsulation, demolition, and Toxic Substances Control Act (TSCA) remediation. He was responsible for development of the overall program, specifications, drawings, bid packages, construction oversight and project administration until closure. The program also included 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, New York. Senior Project Manager responsible for environmental and construction management services required to successfully navigate a seven-building redevelopment project through the NYSDEC Brownfield Cleanup Program (BCP) and NYCOER E-Designation Program (Air/Noise). Project included site investigation, design, and remediation for development of seven buildings within a 2-acre site in Brooklyn, New York. Remediation included excavation of approximately 40,000 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, New York. James was responsible for environmental site investigation and remediation activities required to successfully navigate the project through the NYCOER's E-Designation and Voluntary Cleanup Programs. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise). The project is currently in the construction phase of the NYCOER program.

Development, New York State Brownfield Site, BJ's Wholesale, Brooklyn, New York. Senior Project Manager for the remedial execution within the NYSDEC BCP and NYCOER E-Designation programs at an 8-acre peninsula in Gravesend Bay being redeveloped by BJ's Wholesale Club (BJ's) into a "big-box" warehouse and parking garage, and a publicly accessible, waterfront open space. He implemented a comprehensive community air monitoring plan (CAMP), managed the design and installation of a passive 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, New York. Senior Project Manager responsible for the environmental design during the rehabilitation and expansion of a 1970s-era mixed-use complex, which covers an area equivalent to three city blocks. He facilitated the BCP applications for two adjacent parcels within the complex impacted by historic dry-cleaning uses. Site investigations performed had documented the presence of PCE in soil gas and 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, New York. Project Manager for environmental remediation for this MSKCC development project. James was solely responsible for subsurface investigation and remediation activities, large, manufactured gas plant (MGP) gas holder removal (from former Con Edison Operations), UST removal, daily status updates to the NYCOER, implementation of the CAMP and the management, handling, characterization, and off-site disposal of MGP impacted soil and dewatering fluids.

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

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

Development, New York State Brownfield, Queens West, Long Island City, New York. Project Manager responsible for oversight of the Environmental Remediation on-site. James implemented the construction plan for remediation of 20,000 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, New York. James aided in the design and implementation of the soil characterization plan for MGP impacted sands. After delineation of the contamination plume, drafted work plans and site layout of the negative pressure tent. He performed and trained the on-site staff on the use of personal air monitoring equipment and aided with design considerations on the installation of a waterloo barrier to be advanced to minus 80 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, New York. Environmental engineer for responsible party for all environmental issues associated with this job, including transportation and disposal of 8,000 tons of MGP contaminated soil from former Con Edison operations. James scheduled weekly work for all civil and environmental tasks on the job. He was responsible for the design and installation of the dewatering treatment system with a daily discharge of 25,000 gallons per day of MGP -impacted water.

New York State Superfund Project, NYSDEC, Hicksville, New York. James performed O&M and reporting on the Site's Potassium Permanganate Injection system, which was on a timed system; 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, New York. Environmental Engineer responsible for the design and installation of groundwater and soil vapor remedial systems at over 30 retail petroleum stations for Hess. Responsible for ensuring that the remedial systems were operating properly and performing repairs as necessary during operation. He performed groundwater and soil vapor monitoring and drafted O&M reports for the NYSDEC. Plume size ranged from within the retail station property with monitoring off-site impacts in local neighborhoods greater than a 3-mile radius.

Retail Petroleum, New York State Spills Program, British Petroleum (BP), Various Locations, New York. Environmental Engineer responsible for the design and installation of groundwater and soil vapor remedial systems at over 10 retail petroleum stations for BP. He was responsible for ensuring that the remedial systems were operating properly and performing repairs necessary during operation. He performed groundwater and soil vapor monitoring

and drafted O&M reports for the NYSDEC. Plume size ranged from within the retail station property with monitoring off-site impacts in local neighborhoods greater than a 2-mile radius.

Development, 524 West 19th Street, New York, NY (Metal Shutter Homes). Project Engineer 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, New York. Environmental Engineer who aided in the design of the pump and treat system installed at Peerless Importers. He also aided in the design and installation of the harbor boom set up. Operated and Maintained groundwater/LNAPL extraction systems on-site and performed monthly site gauging as part of the O&M plan.

MATTHEW J. LEVY

Senior Project Manager | Environmental Scientist

EDUCATION

BS, Biochemistry and Environmental Science, Muhlenberg College

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)
30-Hour OSHA Construction
NYSDEC Erosion and Sediment Control Inspector
American Red Cross First Aid Training and CPR Course

Matthew is a project manager with experience in soil, groundwater and soil vapor investigation, specializing in remedial design and implementation. During his time at Haley & Aldrich, Matthew's focus has been serving the environmental and real estate markets. He is experienced in 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.

Matthew has experience in composing site closure documentation including Remedial Closure Reports reviewed by the Office of Environmental Remediation as well as Final Engineering Reports reviewed by the New York State Department of Environmental Conservation. His background includes the development of and compliance with regulator-approved site management plans, overseeing the operation and maintenance of on-site engineering controls and ensuring the protection of human health and the environment.

Matthew 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 Harlem, Manhattan and Gowanus, Brooklyn as well as Industry City, Brooklyn.

RELEVANT PROJECT EXPERIENCE

Redevelopment and Remediation

The Jay Group, Brownfield Cleanup Program Remediation Site, 101 Fleet Place, Brooklyn, New York. Project manager for environmental consulting services during the redevelopment of a former childcare center into a mixed-use commercial and residential high-rise. The Site has been assigned New York City Office of Environmental Remediation (NYC OER) E-Designation status for hazardous materials, noise and air quality and has received its Certificate of Completion for remedial work completed in the NYS Brownfield Cleanup Program (BCP). OER Services development of an Air Quality/Noise Remedial Action Plan and Installation Report. New York State BCP services included completion of a remedial investigation, composition of a Remedial Investigation Report (RIR), development of a BCP Remedial Action Work Plan (RAWP), Remedial Oversight during the implementation of the RAWP, composition of the Site Management Plan and composition of the Final Engineering Report (FER).

The Jay Group, Brownfield Cleanup Program Remediation Site, 401 West 207th Street, New York, New York. Project manager for environmental consulting services during the redevelopment of a former gas station into a mixed-use commercial and residential high-rise. The Site has been assigned New York City Office of Environmental Remediation

(NYC OER) E-Designation status for hazardous materials, noise and air quality and has received its Certificate of Completion for remedial work completed in the NYS Brownfield Cleanup Program (BCP). OER Services development of an Air Quality/Noise Remedial Action Plan and Installation Report. New York State BCP services included completion of a remedial investigation, composition of a Remedial Investigation Report (RIR), development of a BCP Remedial Action Work Plan (RAWP), Remedial Oversight during the implementation of the RAWP, composition of the Final Engineering Report (FER).

Manhattan Management, Brownfield Cleanup Program Remediation Site, Bedford Beverly Redevelopment, Brooklyn York, New York. Project manager for environmental consulting services during the redevelopment of a former auto service center, landmark commercial building and associated parking lots into a development renovating the landmarked building and redeveloping the surrounding space into four mixed-use commercial and residential high-buildings. The Site is being remediated under the NYS Brownfield Cleanup Program (BCP). BCP services included completion of a remedial investigation, composition of a Remedial Investigation Report (RIR), development of a BCP Remedial Action Work Plan (RAWP), Remedial Oversight during the implementation of the RAWP, composition of the Final Engineering Report (FER) and composition of a Site Management Plan (SMP).

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.

Private Developer, Mixed-Use Redevelopment, Queens, New York. Project manager for a mixed-use residential and commercial redevelopment in Queens. The Site has been assigned New York City Office of Environmental Remediation (NYC OER) E-Designation status for hazardous materials. Services included completion of a remedial investigation, composition of a Remedial Investigation Report and development of Hazardous Material Remedial Action Work Plan as per NYC OER requirements.

HAILEY RUSSELL

Staff Professional

EDUCATION

B.S., Chemical Engineering with a concentration: Sustainable Engineering, Energy, and the Environment, North Carolina State University

PROFESSIONAL SOCIETIES

Tau Beta Pi Engineering Honors Society (NC Alpha), Treasurer, 2017-2018

SPECIAL STUDIES AND COURSES

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

8-Hour DOT Hazmat Employee & RCRA Hazardous Waste Generator Training

Hailey is a motivated, experienced chemical and environmental engineer who is knowledgeable in testing, process scale-up and data analysis. She also has experience in soil, groundwater, and soil vapor investigation, and preparation of technical documents. She has focused her time at Haley & Aldrich serving the Building & Infrastructure markets. In this effort, she has performed site reconnaissance to observe existing conditions and assessing site access for subsurface explorations. She has also monitored subsurface exploration activities, conducted soil and groundwater sampling, and conducted routine data collection, synthesis and analysis.

RELEVANT PROJECT EXPERIENCE

Environmental Experience

Madison Realty Capital, Former NuHart Plastics Site, New York State Superfund Site (NuHart West), Brooklyn, New York. Hailey served as a staff engineer during the demolition phase of Nuhart West. Her responsibilities included demolition oversight, well gauging, and air monitoring. NuHart is a high-profile site that requires coordination with the New York State Department of Environmental Conservation (NYSDEC), the New York City Office of Environmental Remediation (NYCOER), local regulatory agencies, community stakeholders and local elected officials.

The Jay Group, Speedway Portfolio, Brooklyn, New York. As a staff engineer, Hailey was responsible for a waste characterization, a lead delineation sampling event, and a supplemental remedial investigation, where she successfully determined the extent of contamination in one of the former Speedway sites. Additionally, she helped draft an in-situ chemical oxidation (ISCO) scope for the sites to treat the petroleum-based contamination in the groundwater. She also oversaw the installation of monitoring and injection wells for two of the sites in preparation for the ISCO treatment.

Mazel Mit Brucha 104 LLC, 817-819 Bedford Avenue, Brooklyn, New York. Hailey conducted a Limited Phase II Environmental Site Assessment (ESA) sampling event at 817 Bedford Avenue, which included soil characterization and sampling, groundwater and soil vapor sampling and well installation. In addition, she conducted a waste characterization sampling event for 817 Bedford Avenue and prepared a Brownfield Cleanup Program (BCP) application for 817-819 Bedford Avenue, which was submitted to the NYSDEC.

Toldos Yehuda, Former Techtronics Site (8 Walworth Street), Brooklyn, New York. Hailey served as staff engineer for environmental waste characterization services for the former Techtronics Site under the NYSBCP as a participant where trichloroethene (TCE) and tetrachloroethene (PCE) were encountered in soil and groundwater.

Lendlease (US) Construction LMB Inc, Shirley Chisholm Recreation Center, Brooklyn, New York. Hailey served as a staff engineer for a remedial investigation at the site. The investigation included the oversight of ten soil borings,

installation of nine soil vapor points, and installation of six temporary wells. Her responsibilities included classifying soil, developing wells, collecting environmental soil samples, collecting soil vapor samples, and conducting groundwater sampling for various analyses

Madison Realty Capital, River North, Staten Island, New York. As a staff engineer, Hailey performed environmental waste characterization services for the approximately two-acre site, as required by the disposal facility. In addition to characterizing soil and collecting samples, she collected bedrock samples for various analyses and drafted the waste characterization letter for the client.

Riverside Developers USA Inc, 43 Franklin Avenue, Brooklyn, New York. Hailey performed environmental waste characterization services for the site, as required by the disposal facility. In addition to characterizing soil and collecting samples for the waste characterization, she conducted lead delineation sampling, which determined the extent of lead contamination at one location of the site.

Manhattan Management Realty, 91 Bruckner Boulevard, Bronx, New York. Hailey served as a staff engineer for a remedial investigation at the site. The investigation included the oversight of 14 soil borings, installation of 11 soil vapor points, and installation of seven permanent wells. Her responsibilities included classifying soil, developing wells, collecting environmental soil samples, and collecting soil vapor samples.

Upton Metropolitan LLC, 808 Metropolitan Avenue, Bronx, New York. Hailey served as a staff engineer for a remedial investigation at the site. Her responsibilities included low-flow groundwater sampling for emerging contaminants such as PFAS.

BCP Applications for NYSDEC. Hailey has completed writing several BCP Applications for various clients in New York State. In writing the applications, Hailey reviews previous subsurface investigations of the site, and historical information to help get underutilized and abandoned contaminated properties into the BCP to be remediated and redeveloped under NYSDEC.

Multiple Clients, Phase I ESAs and Due Diligence, Multiple Locations in New York. Hailey conducted Phase I ESAs, for buyers on a variety of properties including commercial and residential sites in New York. She has experience conducting site reconnaissance and reviewing historical site documentation to identify recognized environmental conditions at the sites.

APPENDIX D
Site-Specific Health and Safety Plan

HALEY & ALDRICH, INC.
SITE-SPECIFIC SAFETY PLAN

FOR

90-02 Queens Boulevard

90-02 Queens Boulevard, Queens, NY, 11373

Project/File No. 0208933

Gensuite EZ Scan®

BI - Developers

Prepared By: Rachel Freeman	**Date: 10/2/2024**
Approvals: The following signatures constitute approval of this Health & Safety Plan.	
Field Safety Manager: Brian Ferguson	**Date: 10/2/2024**
Project Manager: Matthew Levy	**Date: 10/9/2024**
HASP Valid Through: 12/31/2025	

Table of Contents

Page

STOP WORK AUTHORITY **I**

ISSUANCE AND COMPLIANCE **II**

EMERGENCY EVENT PROCEDURES **III**

PROJECT INFORMATION AND CONTACTS **IV**

DIRECTIONS TO THE NEAREST HOSPITAL **V**

DIRECTIONS TO THE NEAREST URGENT CARE **VI**

1. WORK SCOPE **7**

Project Task Breakdown 7
Subcontractor(s) Tasks 7

2. SITE OVERVIEW / DESCRIPTION **8**

Site Classification 8
Site Description 8
Background and Historic Site Usage 8
Site Status 8
Site Plan 8
Work Areas 8

3. HAZARD ASSESSMENT **10**

Site Chemical Hazards 10
Site Hazards Checklist 15
Weather 15
Biological 16
Location/Terrain 18
Miscellaneous 19
Task Hazard Summary 20
Task Physical Hazards Checklist 22
Summary of Physical Hazards & Controls 23

4. PROTECTIVE MEASURES **31**

Required Safety & Personal Protective Equipment 31

5. TRAINING REQUIREMENTS **32**

Site Specific Training Requirements 32
Task Specific Training Requirements 32

6. AIR MONITORING PLAN AND EQUIPMENT **33**

Air Monitoring/Screening Equipment Requirements 33
Monitoring Plans 33

7. DECONTAMINATION & DISPOSAL METHODS **34**

Personal Hygiene Safeguards 34
Decontamination Supplies 34

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

Location of Decontamination Station 34
Standard Personal Decontamination Procedures 35
Disposal Methods 36
Disposal of Single Use Personal Protective Equipment 36

8. SITE CONTROL 37

Communication 37
Visitors 37
Zoning 37

9. SITE SPECIFIC EMERGENCY RESPONSE PLAN 38

Pre-Emergency Planning 38
Onsite Emergency Response Equipment 38
EVACUATION ALARM 39
EVACUATION ROUTES 39
EVACUATION MUSTER POINT(S)/ SHELTER AREA(S) 39
EVACUTION RESPONSE DRILLS 39
Emergency Type 40
Notification 40
Response Action 40
Evacuation Plan/Route 40

10. HASP ACKNOWLEDGEMENT FORM 41

Attachments

Attachment A	HASP Amendment Form
Attachment B	Training Requirements
Attachment C	Roles and Responsibilities
Attachment D	Job Safety Analyses
Attachment E	Project Site Forms
Attachment F	Site-Specific Operating Procedures

Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

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.
- A 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.

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

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.

Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

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.

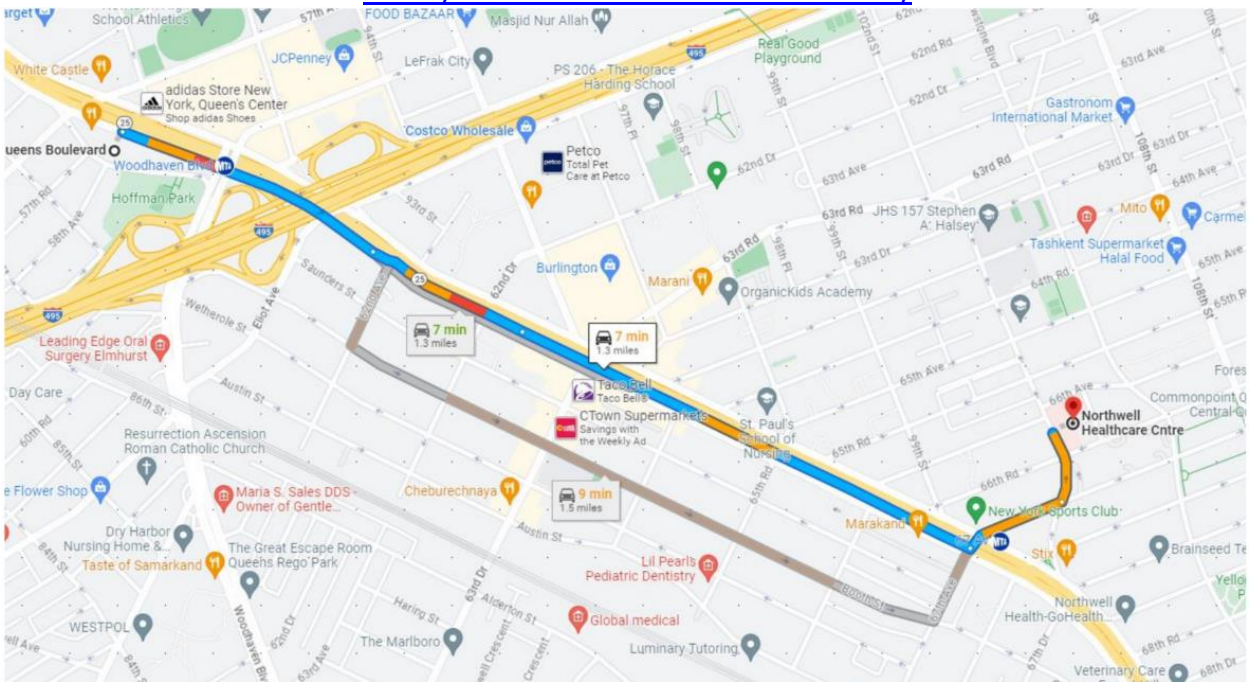
Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

PROJECT INFORMATION AND CONTACTS	
Project Name: 90-02 Queens Boulevard	**Haley & Aldrich File No.:** 0208933
Location: 90-02 Queens Boulevard, Queens, New York	
Client/Site Contact: Phone Number:	Selim Sabbagh Enter Phone Number
Haley & Aldrich Field Representative: Phone Number: Emergency Phone Number:	Hailey Russel 646-569-9465 332-999-7683
Haley & Aldrich Project Manager: Phone Number: Emergency Phone Number:	Matthew Levy 646-893-5382 516-893-4733
Field Safety Manager: Phone Number: Emergency Phone Number:	Brian Ferguson 617-886-7439 617-908-2761
Subcontractor Project Manager: Phone Number:	Enter Name Enter Phone Number
Nearest Hospital: Address: (see map on next page) Phone Number:	Northwell Healthcare Center 102-01 66th Road Flushing, Queens, NY Enter Phone Number
Nearest Occ. Health Clinic: http://www.talispoint.com/liberty/ext/ Address: (see map on next page) Phone Number:	NYC Health + Hospitals/Gotham Health, Lefrak 59-17 Junction Boulevard Queens, NY 844-692-4692
Liberty Mutual Claim Policy	**WC6-Z11-254100-035**
WorkCare Injury & Illness HOTLINE	**1-888-449-7787**
Emergency Response Number:	**911**
Other Local Emergency Response Number:	N/A
Other Ambulance, Fire, Police, or Environmental Emergency Resources:	911

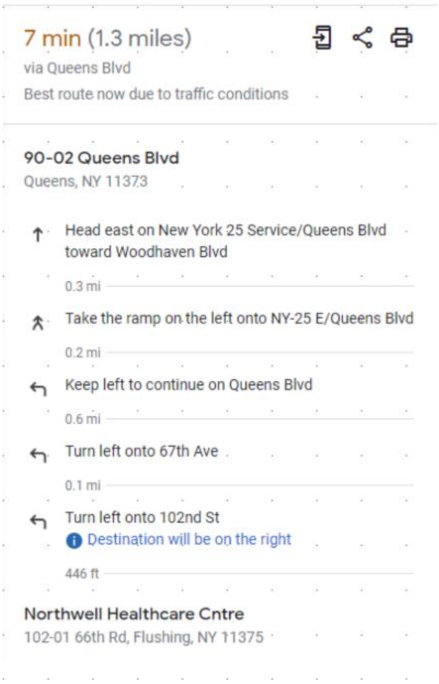
Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

DIRECTIONS TO THE NEAREST HOSPITAL

Liberty Mutual Medical Location Directory



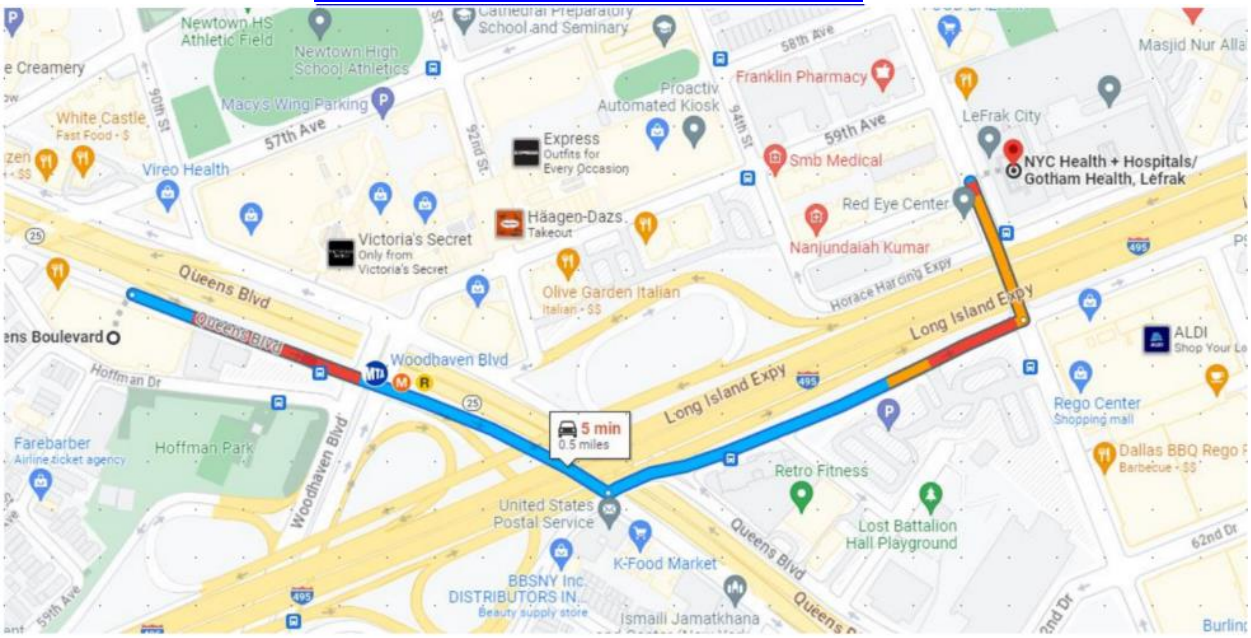
Directions to the Nearest Hospital:



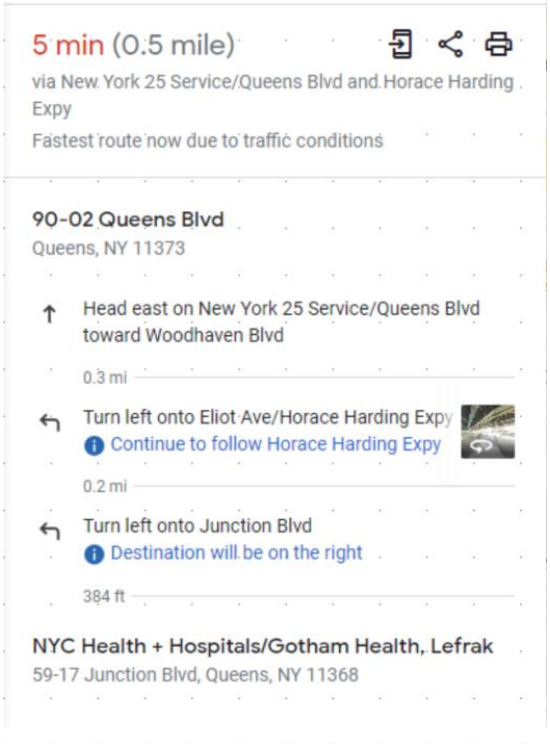
Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

DIRECTIONS TO THE NEAREST URGENT CARE

Liberty Mutual Medical Location Directory



Directions to the Nearest Occupational Clinic:



Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

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:

SSDS installation, LNAPL extraction

Project Task Breakdown

Task No.	Task Description	Employee(s) Assigned	Work Date(s) or Duration
1.	Remedial Oversight	Hailey Russell	3 Weeks Anticipated
2.	Groundwater Sampling	Hailey Russell	3 Days Anticipated
3.	Air Sampling	Hailey Russell	3 Days Anticipated

Subcontractor(s) Tasks

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

Projected Start Date: 12/1/2024

Projected Completion Date: 1/1/2025

10/2/2024 – The field work for this project does not have a start date. Before work commences, field staff need to contact Health & Safety to review procedures and protocols for Soil Vapor Sampling.

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

2. SITE OVERVIEW / DESCRIPTION

Site Classification

Residential and Commercial

Site Description

The Site, identified as Block 2857, Lot 7501 on the New York City tax map in a R6 residential zoning area with a C1-2 commercial overlay in the Elmhurst neighborhood of Queens, New York, is 54,500 square feet (sf) in size and improved by a 6-story mixed use commercial and residential building, with a partial basement. The first floor is intended for medical facility use, while the partial basement proposed for commercial office space and gym facilities.

Background and Historic Site Usage

Historic uses of the Site include residential dwellings as early as 1902. Beginning in 1950's, the property was the former St. John's Hospital until 2015 when the building was renovated converting the first through fifth floors into residential use.

Site Status

Indicate current activity status and describe operations at the site:

Active

Residential dwellings are occupied.

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.

Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

Site Plan



Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

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
Polycyclic aromatic hydrocarbons (PAHs)	**Soil**	**2.9**	**mg/kg**
Arsenic	**Soil**	**21.8**	**mg/kg**
Copper	**Soil**	**215**	**mg/kg**
Lead	**Soil**	**4390**	**mg/kg**
Mercury	**Soil**	**0.77**	**mg/kg**
Zinc	**Soil**	**578**	**mg/kg**
4,4-DDE	**Soil**	**0.0059**	**mg/kg**
4,4-DDE	**Soil**	**1,910**	**mg/kg**
PFOs	**Soil**	**0.88**	**ppb**
Volatile Organic Compounds (VOCs)	**Groundwater**	**2,700**	**ppb**
Semi-Volatile Organic Compounds (SVOCs)	**Groundwater**	**86**	**ppb**
Iron	**Groundwater**	**664**	**ppb**
Magnesium	**Groundwater**	**98,800**	**ppb**
Manganese	**Groundwater**	**7,830**	**ppb**
Nickel	**Groundwater**	**595**	**ppb**
Sodium	**Groundwater**	**427,000**	**ppb**
Iron	**Groundwater**	**3,280**	**ppb**

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Lead	**Groundwater**	**79.1**	**ppb**
Copper	**Groundwater**	**415**	**ppb**
Mercury	**Groundwater**	**0.77**	**ppb**
1,4-Dioxane	**Groundwater**	**9**	**ppb**
PFOs	**Groundwater**	**72**	**Other**
PFAs	**Groundwater**	**79**	**Other**
BTEX/VOCs	**Soil Vapor**	**1,278**	**ug/m3**
Chlorinated Volatile Organic Compounds (CVOCs)	**Soil Vapor**	**27.95**	**ug/m3**
Tetrachloroethylene	**Soil Vapor**	**17**	**ug/m3**
Volatile Organic Compounds (VOCs)	**Soil Vapor**	**4,345.9**	**ug/m3**
Choose an item.	Select Media.		Select Units
Choose an item.	Select Media.		Select Units

Polycyclic aromatic hydrocarbons (PAHs): are a class of chemicals that occur naturally in coal, crude oil, and gasoline. They also are produced when coal, oil, gas, wood, garbage, and tobacco are burned. PAHs generated from these sources can bind to or form small particles in the air. High-temperature cooking will form PAHs in meat and in other foods. Naphthalene is a PAH that is produced commercially in the United States to make other chemicals and mothballs. Cigarette smoke contains many PAHs.

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.

Copper: is a reddish, lustrous, malleable, odorless solid. It can be inhaled or ingested. Contact may cause irritation to the skin and/or eyes. Fume or dust inhalation may cause irritation in the nose or

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throat. Symptoms of exposure include eye, nose and/or throat irritation, nasal septum perforation, metallic taste, and dermatitis. Target organs include the eyes, skin, respiratory system, liver, and kidneys. The PEL is 1 mg/m^3 averaged over an 8-hour shift.

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.

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

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

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

1,4-Dioxane: Industrial chemical that is not found naturally in the environment. It is a colorless liquid with a mild, ether-like odor and dissolves in water at all concentrations. It is primarily used as a solvent in the manufacturing of chemicals and as a laboratory reagent. 1,4-Dioxane is also a trace contaminant of some chemicals found in cosmetics and detergents.

Organochlorine Pesticides: are chlorinated hydrocarbons used extensively from the 1940s through the 1960s in agriculture and mosquito control. Representative compounds include DDT, methoxychlor, dieldrin, chlordane, toxaphene, mirex, kepone, lindane, and benzene hexachloride. As neurotoxicants, many organochlorine pesticides were banned in the United States, few are still registered for use.

People can be exposed to organochlorine pesticides through accidental inhalation exposure if in an area where they were recently applied. The chemicals can also be ingested in fish, dairy products, and other fatty foods that are contaminated. Organochlorine pesticides accumulate in the environment and are very persistent and move long distances in surface runoff or groundwater.

Exposure to these chemicals over a short period may produce convulsions, headache, dizziness, nausea, vomiting, tremors, confusion, muscle weakness, slurred speech, salivation and sweating. Long-term exposure may damage the liver, kidney, central nervous system, thyroid and bladder. Many of these pesticides have been linked to elevated rates of liver or kidney cancer in animals. There is some evidence indicating that organochlorine pesticides may also cause cancer in humans.

Magnesium: Magnesium oxide fume is a finely divided white particulate dispersed in the air. Exposure may occur when magnesium is burned, thermally cut, or welded upon. Exposure routes include inhalation and contact with skin and/or eyes. Symptoms of exposure include eye and nose irritation, metal fume fever, coughing, chest pain, and flu-like fever. Target organs include the eyes and respiratory system. The PEL is 15 mg/m^3 averaged over an 8-hour shift.

Manganese: is a lustrous, brittle silvery solid. It can be inhaled or ingested. Symptoms of exposure include Parkinson's, asthenia, insomnia, mental confusion, metal fume fever, dry throat, coughing, chest tightness, dyspnea, rales, flu-like fever, lower-back pain, vomiting, malaise, lassitude, and kidney damage. Target organs include the respiratory system, central nervous system, blood, and kidneys. The PEL is 5 mg/m^3 averaged over an 8-hour shift.
Click + Add Additional Chemical Language

Nickel: is silvery-white metal with a gold tinge. It is used in batteries and making of alloys and is found in Earth's core and crust. If reduced to dust particles it can cause chronic bronchitis, reduced lung function and potential cancer of lung and sinus if overexposed.

Iron: is a silvery-gray, lustrous, malleable, odorless solid. It can be inhaled or ingested. Contact may cause irritation to the skin and/or eyes. Fume or dust inhalation may cause irritation in the nose or throat. Symptoms of exposure include eye, nose and/or throat irritation, metallic taste, and siderosis (a type of pneumoconiosis). Target organs include the eyes, skin, respiratory system, and lungs. The PEL is 1 mg/m^3 averaged over an 8-hour shift.
Click + Add Additional Chemical Language

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Sodium: is a soft, silvery-white, highly reactive, odorless solid. It can react violently with water and moisture, producing hydrogen gas and heat, which can cause burns. Contact may cause irritation to the skin and/or eyes. Symptoms of exposure include eye and skin irritation, coughing, and respiratory distress if inhaled. Target organs include the eyes, skin, and respiratory system. Due to its highly reactive nature, sodium is typically handled in a controlled environment under inert conditions. The PEL is not specifically established for elemental sodium, but handling guidelines emphasize minimizing exposure and ensuring proper protective measures are in place.

Perfluorooctanesulfonic acid (PFOS) / Perfluoroalkyl substances (PFAS): are synthetic chemicals that are colorless, odorless, and persistent in the environment. They are highly resistant to degradation and can accumulate in the human body and the environment over time. Exposure can occur through ingestion, inhalation, or dermal contact with contaminated water, food, or consumer products. Contact may cause irritation to the skin and/or eyes. Symptoms of exposure include liver damage, thyroid hormone disruption, increased cholesterol levels, immune system effects, and potential developmental effects in fetuses and infants. Target organs include the liver, thyroid, and immune system. The EPA's Health Advisory Level for PFOS and PFOA is 70 parts per trillion (ppt) in drinking water. It is important to minimize exposure and follow safety guidelines to reduce risk.

BTEX/VOCs: BTEX is an acronym for benzene, toluene, ethylbenzene and xylenes. These compounds are VOCs, are common in petroleum-related products (e.g., oil, gasoline, coal-tar DNAPL, etc.), and frequently co-occur at hazardous waste sites. Benzene, toluene, ethylbenzene, and xylenes have acute and chronic harmful effects on the central nervous system. Benzene is classified as a carcinogen. Short-term health effects of low-level BTEX exposure include drowsiness, dizziness, accelerated heart rate, headaches, tremors, confusion, and unconsciousness.

Click + Add Additional Chemical Language

Tetrachloroethylene: is a colorless liquid with a sharp sweet odor. Tetrachloroethylene vapor is heavier than air and will be found in low lying areas.

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

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

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

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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.

Site Hazards Checklist			
Weather			
Hot Temperatures	High Winds	Lightning Storms	Cold Temperatures

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.

High Winds

While high winds are commonly associated with severe thunderstorms and hurricanes they may also occur as a result of differences in air pressures, such as when a cold front passes across the area. They can cause downed trees and power lines, and flying debris (such as dust or larger debris), which adds additional risks and could lead to power outages, transportation disruptions, damage to buildings and vehicles, and serious injury.

Wind Advisory are issued for sustained winds 25 to 39 mph and/or gusts to 57 mph. High Wind warnings are issued by the National Weather Service when high wind speeds may pose a hazard or is life threatening. The criteria for this warning will varies by state. The Beaufort Wind Scale is a helpful tool to when dealing with high winds.

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.

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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			
Mosquitoes	Stinging Insects	Small Mammals	Choose an item.

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

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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.

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, squirrels, racoons, skunks, and opossums.

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

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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.

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.

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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.

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Task Hazard Summary

Task 1 – Drilling (Remedial Oversight; Injection and Extraction Well Installation)

Drilling is conducted for a range of services that can include but are not limited to: soil characterization, environmental investigation, well installation, and ore exploration. Familiarity with basic drilling safety is an essential component of all drilling projects. Potential hazards related to drilling operations include, but are not limited to encountering underground or overhead utilities, traffic and heavy equipment, hoisting heavy tools, steel impacts, open rotation entanglement, and the planned or unexpected encountering of toxic or hazardous substances. While staff members do not operate drilling equipment, they may work in close proximity to operating drilling equipment and may be exposed to many of the same hazards as the drilling subcontractor. It is imperative that staff are aware of emergency stops and establish communication protocols with the drillers prior to the start of work.

See OP 1002 Drilling Safety for more information.

Task 2 – 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

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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).

Task 3 – Air Sampling

Air sampling is conducted to monitor levels of air contaminants. Air is the most transient environmental medium and subject to extreme spatial and temporal heterogeneity. Air sampling matrices include: Ambient (outdoor) air, indoor air, point sources (stacks, exhausts, and other emission sources), fugitive emissions (sources of air pollutants other than stacks or vents), and monitor and evaluate remediation processes. Samples can be collected in tedlar bags, sorbent tubes, or summa canisters.

Safety precautions during air sampling include a review of possible environmental hazards before entering the site and the use of proper clothing and equipment. Workers performing stack sampling and air monitoring during emergency situations may be exposed to hazardous levels of air pollutants. Therefore, the JHA must specify what kind of real-time air monitoring will be performed, the action levels for the use of respirators, and the types of respirators to be worn if action levels are exceeded. Safety must always be considered to ensure that the chosen field measurement instrument is compatible with the potential hazard. For example, some instruments are capable of detecting explosive hazards, but not all are safe for operations under these conditions. If the atmospheric concentration is potentially greater than 25% of the lower explosive limit, the meter itself must be certified safe for operation (FM, UL or MSHA certified). Operators should be thoroughly familiar with the instrument and operating instructions before use. Always read or review the manual prior to using an instrument in the field.

Safety concerns are of critical importance in performing sampling at heights due to the possibility of, falling, dropping equipment on workers below, and possibly weather related hazards such as ice, snow, and rain if sampling outdoors.

Gases used to calibrate and operate some instruments come in pressurized cylinders and many are flammable. Proper care should be taken when handling these materials. Light sources from some instruments can cause eye damage when viewed directly.

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Task Physical Hazards Checklist			
Potential Task Hazards	**Task 1** **Remedial Oversight**	**Task 2** **Groundwater Sampling**	**Task 3** **Air Sampling**
Compressed Gas	☒	☒	☒
Congested Area	☒	☒	☒
Ergonomics	☒	☒	☒
Excavation/Trenching	☐	☐	☐
Energized Equipment	☒	☒	☐
Generated Wastes	☒	☒	☐
Ground Disturbance	☒	☐	☐
Hand/Power Tools	☒	☒	☒
Heavy Equipment	☒	☐	☐
Line of Fire	☒	☒	☒
Manual Lifting	☒	☒	☒
Noise	☒	☐	☐
Overhead Utilities	☒	☐	☐
Slippery Surfaces	☒	☒	☒
Sharp Objects	☒	☒	☒
Underground Utilities	☒	☐	☐
Other: Specify	☐	☐	☐

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Summary of Physical Hazards & Controls

Compressed Gas

Hazards associated with compressed gases include oxygen displacement, fires, explosions, and toxic gas exposures, as well as the physical hazards associated with pressurized containers. In most instances, accidents are caused by improper application, misuse of the gas, or its container by inadequately trained personnel. Special storage, use, and handling precautions are necessary to minimize accidents and control these hazards above.

See OP 1048 Compressed Gas Safety for more information.

Controls

- Visually inspect the cylinder prior to and after use for any damage. Report any damage to the vendor for direction.
- Ensure that cylinders are clearly identified. Labels must not be defaced or removed.
- Leave valve protection caps in place (if provided) until cylinders are secured and connected for use.
- Keep cylinder valves closed except when the cylinder is being used.
- When opening a cylinder valve, stand so the valve outlet is pointed away from yourself and all other employees. Open valves slowly.
- Replace protective caps and outlet caps or plugs before returning empty cylinders to the supplier.
- Never tamper with or alter cylinders, valves, or safety relief devices.
- Do not tighten connections or leaking fittings or attempt repairs while the system is under pressure.
- Do not subject cylinders to artificially low temperatures or temperatures above 125 F. Do not place them next to heat sources or allow a flame to contact any part of the cylinder.
- Avoid dragging or sliding cylinders. Do not lift cylinders by the caps.
- Firmly secure the cylinder and move with a suitable hand truck, lift truck, or crane with a cradle or platform.

Storage

- Provide adequate space or segregate by partitions and post a conspicuous sign that identifies the gas or hazard class.
- Storage areas should be dry, well-drained, ventilated, and fire resistant.
- Cylinders can be stored in the open, but they should be protected from the ground or continuous dampness to prevent rusting.
- Cylinders can usually be stored in the sun; but, cylinders must not exceed temperatures >125 F.
- Always refer to the manufacturers' storage requirements and SDSs.
- Storage areas should protect cylinders from damage. Do not store on unprotected platform edges or obstruct walkways or exits.
- Use brackets, chains, or straps around the upper third of the cylinder to secure cylinders in storage or in use.

Transport

- Cylinders must be stored upright, firmly secured, and be capped during transport.

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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.

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

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.

Note: This HASP is developed for Haley & Aldrich purposes only and not for use by others.

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.

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.

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- 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.

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- 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.

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.

Line of Fire

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

Controls

- Never walk under a suspended load.
- Be aware and stay clear of tensioned lines such as cable, chain and rope.
- Be cautious of torque stresses that drilling equipment and truck augers can generate. Equipment can rotate unexpectedly long after applied torque force has been stopped.
- Springs and other items can release tremendous energy if compressed and suddenly released
- Items under tension and pressure can release tremendous energy if it is suddenly released.
- Not all objects may be overhead; be especially mindful of top-heavy items and items being transported by forklift or flatbed.
- Secure objects that can roll such as tools, cylinders, and pipes.
- Stay clear of soil cuttings or soil stockpiles generated during drilling operations and excavations, be aware that chunks of soil, rocks, and debris can fall or roll.

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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**

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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.

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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.

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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**	
	Remedial Oversight	Groundwater Sampling	Air Sampling	Enter task description.
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	Select
Required Safety Equipment				
First Aid Kit	☒	☒	☒	☐

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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)

Task Specific Training Requirements				
Required Training Type	**Task 1**	**Task 2**	**Task 3**	
	Remedial Oversight	Groundwater Sampling	Air Sampling	Enter task description.
RCRA Haz Waste Generator	☒	☐	☐	☐

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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? Yes

Is perimeter monitoring required for community protection? Yes

Air monitoring plan not applicable No

Air Monitoring/Screening Equipment Requirements

Photo-Ionization Detector (PID) 10.6eV

Dust Monitor (Dustrak)

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.			

***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.**

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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.

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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.

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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.

Disposal Method for Contaminated Soil

- 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.

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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.

Nicole Mooney 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

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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

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Table 9.1 Emergency Equipment and Emergency PPE			
Emergency Equipment	**Specific Type**	**Quantity Stocked**	**Location Stored**
First Aid Kit	ANSI	1 kit	With H&A Staff
Emergency PPE	**Specific Type**	**Quantity Stocked**	**Location Stored**
Gloves	Nitrile	1 box	With H&A Staff

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 location(s) after site specific training
EVACUTION RESPONSE DRILLS
The Site relies on outside emergency responders and a drill is not required.

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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.			

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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

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

ATTACHMENT A
HASP AMENDMENT FORM

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

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

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ATTACHMENT B
TRAINING REQUIREMENTS

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

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

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ATTACHMENT C
ROLES AND RESPONSIBILITIES

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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.

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- 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

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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.

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ATTACHMENT D
JOB SAFETY ANALYSES

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90-02 QUEENS BOULEVARD

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.
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.
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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.

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ATTACHMENT E
PROJECT SITE FORMS

Note: This HASP has been developed for Haley & Aldrich purposes only and is not for use by others.

ATTACHMENT F
SITE-SPECIFIC OPERATING PROCEDURES

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APPENDIX E
Project Personnel Resumes



SCOTT A. UNDERHILL, PE

Principal | Senior Environmental Remediation Engineer

EDUCATION

MS, Environmental Engineering, State University of New York
BS, Civil Engineering, State University of New York

PROFESSIONAL REGISTRATIONS

1998/ NY: Professional Engineer (PE 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 more than 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 includeed attending weekly meetings, reviewing contractor submittals, issuing field orders and work change directives, reviewing and responding to change order requests, developing change orders, responding to request for information, and documenting remediation activities in a remedial action report.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

PUBLICATIONS

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

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

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

INVITED LECTURER OR SPEAKER

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

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

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

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

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

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

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

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

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

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

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

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



JAMES BELLEW

Principal

EDUCATION

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

PROFESSIONAL SOCIETIES

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

SPECIAL STUDIES AND COURSES

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

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

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

RELEVANT PROJECT EXPERIENCE

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

Development's, Speedway Portfolio, Multiple Boroughs, New York. Principal responsible for the expedited due diligence during acquisition of 5 former Speedway Sites of Phase I ESA's and Limited Phase II ESI's, preparation of the Brownfield Cleanup Program Applications, Remedial Investigation Work Plans, Interim Remedial Measure Work Plans and Air/Noise Remedial Action Work Plans (NYCOER). Four of the Sites were accepted into the NYSDEC Brownfield Cleanup program with one currently pursuing the program pending the acquisition. Remedial Investigations for compliance with the Brownfield Cleanup Program have been completed and the Remedial Investigation Reports are being drafted.

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

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

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

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

Development, Former Techtronics Site (8 Walworth Street), Brooklyn, New York. Principal for the remedial investigation, remedial action design and remedial action implementation for the former Techtronics Site under the New York State Brownfield Cleanup program as a Participant where trichloroethene (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. For this Site we have designed source removal to 20'bgs, Zero Valent Iron (ZVI) Reactive Barrier Wall, in situ ZVI injections sitewide and a vertical vapor mitigation system. The Site is currently in the remedial implementation phase.

Development, 346 Grand Concourse, Bronx, New York. Principal for the proposed 9-story, 60 key commercial building with one-level deep cellar. Design phase environmental services consist of guiding the Site through the New York City Office of Environmental of Remediation Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality and Noise requirements. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise) and the Final Installation Report for the Certificate of Occupancy.

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

590-594 Myrtle Avenue, Brooklyn, New York. Principal for the proposed 6-story, 12-unit residential building with one-level deep cellar. Design phase environmental services consist of guiding the Site through the New York City Office of

Environmental of Remediation Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality and Noise requirements. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise) and the Final Installation Report for the Certificate of Occupancy.

Development, 3530 Webster Avenue, Bronx, New York. Principal for the proposed 8-story, 75 key commercial building with one-level deep cellar. Design phase environmental services consist of guiding the Site through the New York City Office of Environmental of Remediation Voluntary Cleanup and E-Designation Programs, including Hazmat, Air Quality and Noise requirements. This program included submission of a Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise). The project is currently in the construction phase of the NYCOER program.

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

New York State Brownfield Site, Former Delta Metals Site, Brooklyn, New York. Senior Project manager for the remedial investigation and remedial action design for the former Delta Metal Products Company. Project is under the New York State 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 track down for the immediate area and identify additional Potentially Responsible Parties. The design for an Air Sparge Soil Vapor Extraction system has been accepted and the project is currently under construction.

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

Manufacturing-Industrial, PQ Corporation, Northeastern United States. Senior Project Manager responsible for the design and implementation of a three phased program for handling polychlorinated biphenyl (PCB) containing materials on approximately 100 tank structures at large, active industrial sites, which included coating removal, encapsulation, demolition, and Toxic Substances Control Act (TSCA) remediation. He was responsible for development of the overall program, specifications, drawings, bid packages, construction oversight and project administration until closure. The program also included 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, New York. Senior Project Manager responsible for environmental and construction management services required to successfully navigate a seven-building redevelopment project through the NYSDEC Brownfield Cleanup Program (BCP) and NYCOER E-Designation Program (Air/Noise). Project included site investigation, design, and remediation for development of seven buildings within a 2-acre site in Brooklyn, New York. Remediation included excavation of approximately 40,000 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, New York. James was responsible for environmental site investigation and remediation activities required to successfully navigate the project through the NYCOER's E-Designation and Voluntary Cleanup Programs. This program included submission of a

Remedial Investigation Work Plan, implementation of a Remedial Investigation, submittal of a Remedial Investigation Report, Remedial Action Work Plans (Hazmat Air and Noise). The project is currently in the construction phase of the NYCOER program.

Development, New York State Brownfield Site, BJ's Wholesale, Brooklyn, New York. Senior Project Manager for the remedial execution within the NYSDEC BCP and NYCOER E-Designation programs at an 8-acre peninsula in Gravesend Bay being redeveloped by BJ's Wholesale Club (BJ's) into a "big-box" warehouse and parking garage, and a publicly accessible, waterfront open space. He implemented a comprehensive community air monitoring plan (CAMP), managed the design and installation of a passive 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, New York. Senior Project Manager responsible for the environmental design during the rehabilitation and expansion of a 1970s-era mixed-use complex, which covers an area equivalent to three city blocks. He facilitated the BCP applications for two adjacent parcels within the complex impacted by historic dry-cleaning uses. Site investigations performed had documented the presence of PCE in soil gas and 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, New York. Project Manager for environmental remediation for this MSKCC development project. James was solely responsible for subsurface investigation and remediation activities, large, manufactured gas plant (MGP) gas holder removal (from former Con Edison Operations), UST removal, daily status updates to the NYCOER, implementation of the CAMP and the management, handling, characterization, and off-site disposal of MGP impacted soil and dewatering fluids.

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

Various Public Schools, New York City School Construction Authority, New York, New York. Project Manager responsible for environmental remediation proposed several school developments 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, New Jersey. Project manager responsible for the design and environmental remediation on-site. Implemented the construction plan for remediation of arsenic, pitch- and PCB-impacted soil for excavation and off-site disposal of 20,000 tons. He managed the air monitoring system on-site which consisted of four permanent stations set upwind and downwind on-site for volatile organic compounds (VOCs) and particulate migration off-site. Also, James performed redesigns throughout the project to keep within the current schedule and budget.

Development, New York State Brownfield, Queens West, Long Island City, New York. Project Manager responsible for oversight of the Environmental Remediation on-site. James implemented the construction plan for remediation of 20,000 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, New York. James aided in the design and implementation of the soil characterization plan for MGP impacted sands. After delineation of the contamination plume, drafted work plans and site layout of the negative pressure tent. He performed and trained the on-site staff on the use of personal air monitoring equipment and aided with design considerations on the installation of a waterloo barrier to be advanced to minus 80 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, New York. Environmental engineer for responsible party for all environmental issues associated with this job, including transportation and disposal of 8,000 tons of MGP contaminated soil from former Con Edison operations. James scheduled weekly work for all civil and environmental tasks on the job. He was responsible for the design and installation of the dewatering treatment system with a daily discharge of 25,000 gallons per day of MGP -impacted water.

New York State Superfund Project, NYSDEC, Hicksville, New York. James performed O&M and reporting on the Site's Potassium Permanganate Injection system, which was on a timed system; 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, New York. Environmental Engineer responsible for the design and installation of groundwater and soil vapor remedial systems at over 30 retail petroleum stations for Hess. Responsible for ensuring that the remedial systems were operating properly and performing repairs as necessary during operation. He performed groundwater and soil vapor monitoring and drafted O&M reports for the NYSDEC. Plume size ranged from within the retail station property with monitoring off-site impacts in local neighborhoods greater than a 3-mile radius.

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

Development, 524 West 19th Street, New York, NY (Metal Shutter Homes). Project Engineer 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, New York. Environmental Engineer who aided in the design of the pump and treat system installed at Peerless Importers. He also aided in the design and installation of the harbor boom set up. Operated and Maintained groundwater/LNAPL extraction systems on-site and performed monthly site gauging as part of the O&M plan.

MATTHEW J. LEVY

Senior Project Manager | Environmental Scientist

EDUCATION

BS, Biochemistry and Environmental Science, Muhlenberg College

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)
30-Hour OSHA Construction
NYSDEC Erosion and Sediment Control Inspector
American Red Cross First Aid Training and CPR Course

Matthew is a project manager with experience in soil, groundwater and soil vapor investigation, specializing in remedial design and implementation. During his time at Haley & Aldrich, Matthew's focus has been serving the environmental and real estate markets. He is experienced in 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.

Matthew has experience in composing site closure documentation including Remedial Closure Reports reviewed by the Office of Environmental Remediation as well as Final Engineering Reports reviewed by the New York State Department of Environmental Conservation. His background includes the development of and compliance with regulator-approved site management plans, overseeing the operation and maintenance of on-site engineering controls and ensuring the protection of human health and the environment.

Matthew 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 Harlem, Manhattan and Gowanus, Brooklyn as well as Industry City, Brooklyn.

RELEVANT PROJECT EXPERIENCE

Redevelopment and Remediation

The Jay Group, Brownfield Cleanup Program Remediation Site, 101 Fleet Place, Brooklyn, New York. Project manager for environmental consulting services during the redevelopment of a former childcare center into a mixed-use commercial and residential high-rise. The Site has been assigned New York City Office of Environmental Remediation (NYC OER) E-Designation status for hazardous materials, noise and air quality and has received its Certificate of Completion for remedial work completed in the NYS Brownfield Cleanup Program (BCP). OER Services development of an Air Quality/Noise Remedial Action Plan and Installation Report. New York State BCP services included completion of a remedial investigation, composition of a Remedial Investigation Report (RIR), development of a BCP Remedial Action Work Plan (RAWP), Remedial Oversight during the implementation of the RAWP, composition of the Site Management Plan and composition of the Final Engineering Report (FER).

The Jay Group, Brownfield Cleanup Program Remediation Site, 401 West 207th Street, New York, New York. Project manager for environmental consulting services during the redevelopment of a former gas station into a mixed-use commercial and residential high-rise. The Site has been assigned New York City Office of Environmental Remediation

(NYC OER) E-Designation status for hazardous materials, noise and air quality and has received its Certificate of Completion for remedial work completed in the NYS Brownfield Cleanup Program (BCP). OER Services development of an Air Quality/Noise Remedial Action Plan and Installation Report. New York State BCP services included completion of a remedial investigation, composition of a Remedial Investigation Report (RIR), development of a BCP Remedial Action Work Plan (RAWP), Remedial Oversight during the implementation of the RAWP, composition of the Final Engineering Report (FER).

Manhattan Management, Brownfield Cleanup Program Remediation Site, Bedford Beverly Redevelopment, Brooklyn York, New York. Project manager for environmental consulting services during the redevelopment of a former auto service center, landmark commercial building and associated parking lots into a development renovating the landmarked building and redeveloping the surrounding space into four mixed-use commercial and residential high-buildings. The Site is being remediated under the NYS Brownfield Cleanup Program (BCP). BCP services included completion of a remedial investigation, composition of a Remedial Investigation Report (RIR), development of a BCP Remedial Action Work Plan (RAWP), Remedial Oversight during the implementation of the RAWP, composition of the Final Engineering Report (FER) and composition of a Site Management Plan (SMP).

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.

Private Developer, Mixed-Use Redevelopment, Queens, New York. Project manager for a mixed-use residential and commercial redevelopment in Queens. The Site has been assigned New York City Office of Environmental Remediation (NYC OER) E-Designation status for hazardous materials. Services included completion of a remedial investigation, composition of a Remedial Investigation Report and development of Hazardous Material Remedial Action Work Plan as per NYC OER requirements.



BRIAN FITZPATRICK, CHMM

Corporate Director, Health and Safety

EDUCATION

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

CERTIFICATIONS

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

PROFESSIONAL SOCIETIES

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

SPECIAL STUDIES AND COURSES

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

AWARDS

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

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

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

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

RELEVANT PROJECT EXPERIENCE

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

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

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

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

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

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

BRIAN A. FERGUSON

Senior Engineer

EDUCATION

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

PROFESSIONAL SOCIETIES

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

SPECIAL STUDIES AND COURSES

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

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

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

RELEVANT PROJECT EXPERIENCE

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

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

reviewing weekly field construction reports, reviewing and responding to geotechnical design submittals and attending project meetings.

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

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

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

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

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

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

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

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

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

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

NICOLE MOONEY

Project Geologist

EDUCATION

B.S., Earth and Environmental Science with a minor in Oceanography, University of Michigan-Ann Arbor

SPECIAL STUDIES AND COURSES

40-Hour OSHA Hazardous Waste Operations and Emergency Response Training (29 CFR 1910.120)
8-Hour OSHA Hazardous Waste Worker Refresher Training (29 CFR 1910.120)
8-Hour OSHA HAZWOPER Supervisor for Construction Training
OSHA 10-Hour Construction Safety
OSHA 30-Hour Construction
NYC SST-307 8-Hour Fall Prevention for Construction
NYC SST-302 2-Hour Drug and Alcohol Awareness for Construction
DOT Hazmat Employee & RCRA Hazardous Waste Generator Training
American Red Cross Adult First Aid/CPR/AED Training and Bloodborne Pathogens Training
USACE Construction Quality Management for Contractors
Level I Antiterrorism Awareness Training

Nicole is a geologist with over 4 years of experience in site characterization and investigation, subsurface investigations, preparation of technical reports and work plans, and data collection and analysis. She has extensive experience conducting Phase I Environmental Site Assessments (ESAs), Phase II Environmental Site Investigations (ESIs), and other aspects of environmental due diligence. She has experience with preparation and overseeing execution of remedial investigation and actions at sites within the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) and the New York City Mayor's Office of Environmental Remediation (NYCOER). She has performed soil, groundwater, and soil vapor sampling events and has drafted various site investigation plans and reports.

RELEVANT PROJECT EXPERIENCE

Environmental Investigation, Site Characterization, and Remediation

340 Myrtle Development LLC, 340 Myrtle Avenue, Brooklyn, New York. As a project geologist, Nicole coordinated and managed implementation of the Remedial Action Work Plan (RAWP) at the approximately 8,828 square foot site enrolled in the NYSDEC BCP. The remedial action included excavation and off-site disposal of soil, installation of an active sub-slab depressurization system (including cover system), installation of injection wells, and reinstallation of permanent monitoring wells for post-remedy groundwater monitoring. Nicole was responsible for the preparation of the Final Engineering Report (FER) and the Site Management Plan (SMP) which are undergoing review by the NYSDEC. Construction for the new development is currently ongoing and, when completed, the site will be improved with a new eight-story mixed-use commercial and residential building with a full cellar level.

B Contractors Group, LLC, 711-713 East 214th Street, Bronx, New York. As a project geologist, Nicole was responsible for coordinating and managing the implementation of the NYCOER-approved Remedial Action Plan (RAP) and preparing the Remedial Closure Report (RCR) for the approximately 6,252 square foot site. The redevelopment included a new eight-story residential building with a full cellar level.

650 Southern Blvd Bronx LLC, 650 Southern Boulevard, Bronx, New York. As a project geologist, Nicole was responsible for preparation and implementation of the Remedial Investigation Work Plan (RIWP), which included the installation of eleven soil borings, seven permanent groundwater monitoring wells (some of which extended into

bedrock), and seven soil vapor points, and the collection of soil, groundwater, and soil vapor samples. Nicole was also responsible for preparation of the Citizen Participation Plan (CPP), Remedial Investigation Report (RIR), and RAWP. The site is in the pre-construction phase.

Degraw Holdings LLC, 563 Sackett Street Site, Brooklyn, New York. As a project geologist, Nicole was responsible for due diligence during acquisition, including preparation of the Phase I ESA and Limited Phase II ESI. The initial Limited Phase II ESI and delineation sampling have been completed and the Limited Phase II ESI Delineation Report, Brownfield Cleanup Agreement (BCA) Major Amendment Application, and Supplemental Remedial Investigation Report (SRIR) are being drafted.

291 Wallabout Realty LLC, 291 Wallabout Street, Brooklyn, New York. As a project geologist, Nicole was responsible for the due diligence during aquisition of the property, including preparation of a Phase I ESA, Phase II ESI, BCP Application, and RIWP.

401 West 207th Realty LLC, 401 West 207th Street, New York, New York. As a project geologist, Nicole was responsible for oversight during implementation of the RAWP under the NYSDEC BCP. During remediation, Nicole observed and documented the excavation and proper disposal of on-site soil required for installation of the foundational elements. Nicole oversaw the proper cleaning and removal of two underground storage tanks encountered during excavation.

BCP Applications and Remedial Investigation Work Plans for NYSDEC. Nicole has prepared several BCP Application packages for various clients in New York State, which requires reviewing the site's history, including any previous investigation reports available, to assist with entry into the BCP to be remediated and redeveloped in accordance with applicable NYSDEC requirements. Nicole also prepares an RIWP to be submitted to the NYSDEC either concurrently or following submittal of the BCP Application for full investigation of the site to facilitate proper remedial action.

Excavation Oversight and CAMP Monitoring, Various Sites, Bronx, Brooklyn, and Queens, New York. As a project geologist, Nicole completed remedial oversight for several projects in the NYCOER cleanup program and NYSDEC BCP. Her responsibilities included excavation oversight, air monitoring, truck logging during off-site disposal of excavated materials, collection of endpoint and/or documentation samples, vapor barrier inspection, and oversight of installation of post-remedy groundwater monitoring wells.

Multiple Clients, Phase I ESAs and Due Diligence, Multiple Locations in New York. As a project geologist, Nicole completed several Phase I ESAs for buyers of properties in New York. She has extensive experience completing site reconnaissance and reviewing historical site documentation to identify potential environmental concerns at properties.

Multiple Clients, Phase II ESIs, Multiple Locations in New York. As a project geologist, Nicole conducted several Phase II ESIs for projects in New York, including oversight of the installation of soil borings, groundwater monitoring wells, and soil vapor points and the collection of soil, groundwater, and soil vapor samples. She assisted with the development of sampling plans based on previous environmental investigations and due diligence findings.

Former Grissom Air Force Base, Kokomo, Indiana. As a project geologist, Nicole was responsible for coordinating and performing quarterly groundwater sampling and/or Land Use Control (LUC) inspections in accordance with the deeds and Decision Documents for nine sites (FT001, FT002, SS190, SS035, SS053, SS058, LF003, LF004, and SS049) located on the 2,722-acre former Grissom Air Force Base under Base Realignment and Closure (BRAC)/Environmental Construction Optimization Services (BECOS) program. Nicole was also responsible for the coordination and implementation of a Data Gap Investigation (DGI) at the SS035, SS053, and SS058 sites and a Site Investigation (SI) at the former Navy Skeet Range (site SR406). Nicole prepared LUC Inspection reports, Annual Groundwater Monitoring Reports, an SI Report, a DGI Report, and the Five-Year Review Report for this work.

APPENDIX F
Community Air Monitoring Plan

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

Overview

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

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

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

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

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

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

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

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

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

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

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

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

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

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

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

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

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

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

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

HALEY ALDRICH

www.haleyaldrich.com

SPECIAL REQUIREMENTS
COMMUNITY AIR MONITORING PLAN
90-02 QUEENS BOULEVARD
QUEENS, NEW YORK
NYSDEC SITE NO. 241249

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

File No. 0208933
October 2025

Table of Contents

Page

1. Introduction 1

2. Special Requirements Community Air Monitoring Program 2

2.1 SPECIAL REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR STRUCTURES 2

2.2 SPECIAL REQUIREMENTS FOR INDOOR WORK WITH CO-LOCATED RESIDENCES OR FACILITIES 2

3. Reporting 3

4. Data Quality Assurance 4

HALEY ALDRICH

1. Introduction

This Special Requirements Community Air Monitoring Plan (CAMP) has been prepared for the proposed activities to be performed under special requirements outlined in the Interim Remedial Measures Work Plan (IRMWP) at the 90-02 Queens Boulevard Site (the "Site"). This Special Requirements CAMP details measures for the protection of the potentially exposed individuals or structures within 20 feet of the work area and potentially exposed individuals in adjacent rooms from potential airborne contaminant releases resulting from ground intrusive activities at the Site.

Compliance with this CAMP is required during all activities associated with intrusive activities such as drilling, excavation, stockpiling, equipment idling, transport, etc. that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs) that are defined by the special requirements. These activities include drilling and monitoring well installation. This CAMP is specific to the Site and was developed in accordance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan and the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation.

2. Special Requirements Community Air Monitoring Program

2.1 SPECIAL REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUALS OR STRUCTURES

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls, such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices, should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part per million (ppm), monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be predetermined). Background readings in the occupied spaces must be taken prior to the commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

If total particulate concentrations opposite the wall of occupied structures or next to intake vents exceed 150 micrograms per cubic meter ($\mu g/m^3$), the work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 $\mu g/m^3$ or less at the monitoring point.

Depending upon the nature of contamination and Interim Remedial Measures, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

2.2 SPECIAL REQUIREMENTS FOR INDOOR WORK WITH CO-LOCATED RESIDENCES OR FACILITIES

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under Section 2.1, except that in this instance, “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to the adjoining rooms, should be understood, and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during Interim Remedial Measures. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g., weekends or evenings) when building occupancy is at a minimum.

3. Reporting

Exceedances of action levels observed during performance of the CAMP will be reported to the NYSDEC and NYSDOH via email and included in the daily report to be submitted to NYSDEC the morning after site activities are completed, along with actions and responses. Daily reports will include the following information:

- Date;
- Personnel;
- Wind direction;
- Meteorological data (i.e., temperature, weather, atmospheric pressure);
- Site map;
- CAMP station locations;
- Notes regarding any equipment malfunctions; and
- Notes regarding any mitigation efforts or work stoppage due to CAMP exceedances.

4. Data Quality Assurance

To ensure data quality, instrument calibration will be completed, as required by the manufacturer, and recorded daily. Calibration checks and duplicate readings may be completed as needed to confirm instrument response and accuracy. All instruments will be operated in accordance with the manufacturer's specifications, copies of which will be kept on the Site.

The on-site field engineers will review monitoring data throughout the day and evaluate it in comparison to the action levels. The project manager will review monitoring data periodically and/or when action levels are triggered.

APPENDIX G
Environmental Footprint Analysis

H & A OF NEW YORK ENGINEERING
AND GEOLOGY, LLP
213 W. 35th Street
7th Floor
New York, NY 10001
646.277.5685

October 28, 2025
File No. 0208933

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

Attention: Mr. Manfred Magloire

Subject: Green Site Remediation
90-02 Queens Boulevard
Queens, New York
NYSDEC SITE 241249

H & A of New York Engineering and Geology, LLP (Haley & Aldrich of New York) presents the following environmental footprint analysis in accordance with U.S. Environmental Protection Agency (EPA) 542-R-12-002 for the Remedy of the above-referenced site at 90-02 Queens Boulevard, Queens, New York (Site).

90-02 QUEENS BOULEVARD INTERIM REMEDIAL MEASURES

The remedy is anticipated to result in estimated totals of:

- 235.83 million British Thermal Units (MMBtus) of energy used
- 17.19 tons of total greenhouse gas emissions (CO2e)
- 225.50 pounds (lbs) of NOx + SOx +PM emissions
- 2.79 lbs of HAP emissions

Energy

- 67.76 MMbtus used for on-site activitiesClick or tap here to enter text.
- 0.00 MMbtus used for Grid Electricity Generation
- 78.4 MMbtus used for transportation of personnel and Remedy materials
- 89.67 MMbtus used for off-site activities

Greenhouse Gas Emissions (CO_2e)

- 10,968.75 lbs of CO_2e produced from on-site activities
- 0.81 lbs of CO_2e produced from Grid Electricity Generation
- 12,674 lbs of CO_2e produced from transportation of personnel and Remedy materials
- 10,731 lbs of CO_2e produced from off-site activities

Overall, the footprint of the Site Remedy is anticipated not to be dominated by off-site activities, which are anticipated to include landfill use and diesel fuel production. Off-site energy use is anticipated to comprise 38.02 percent of all energy use, and off-site greenhouse gas emissions are anticipated to comprise 31.22 percent of all emissions for the Remedy.

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

Matthew Levy
Senior Project Manager

https://haleyaldrich.sharepoint.com/sites/MadisonRealtyCapital/Shared Documents/0208933.90-02 Queens Boulevard/Deliverables/4. IRMWP/Appendices/Appendix G - GSR Footprint Analysis/1. GSR_Overview_Letter.docx

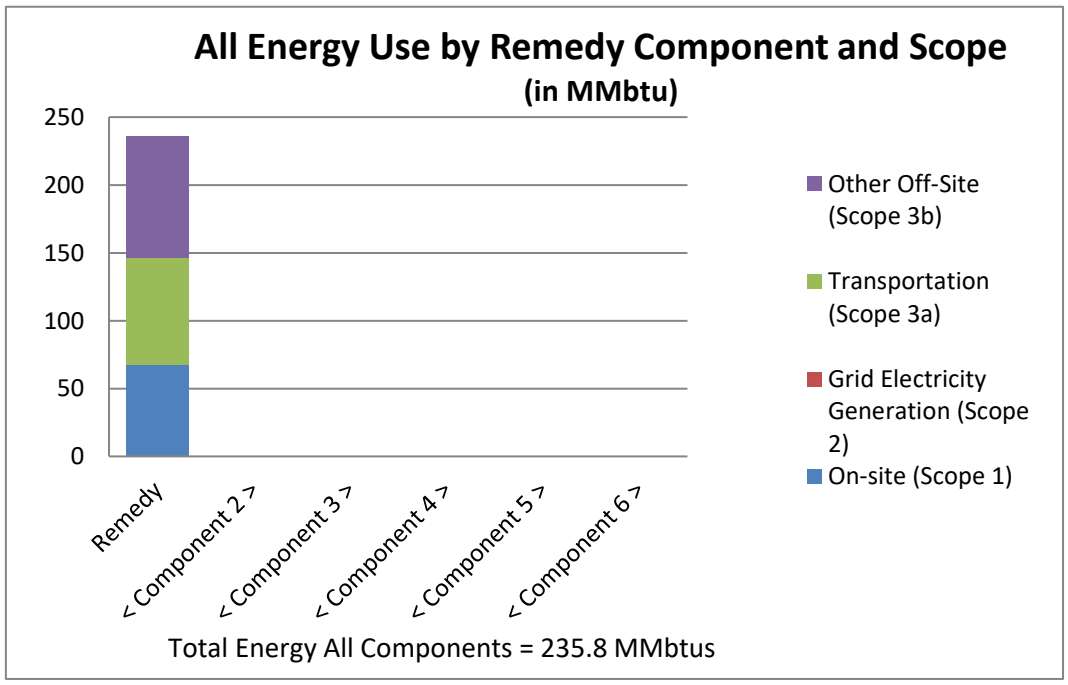
Environmental Footprint Summary

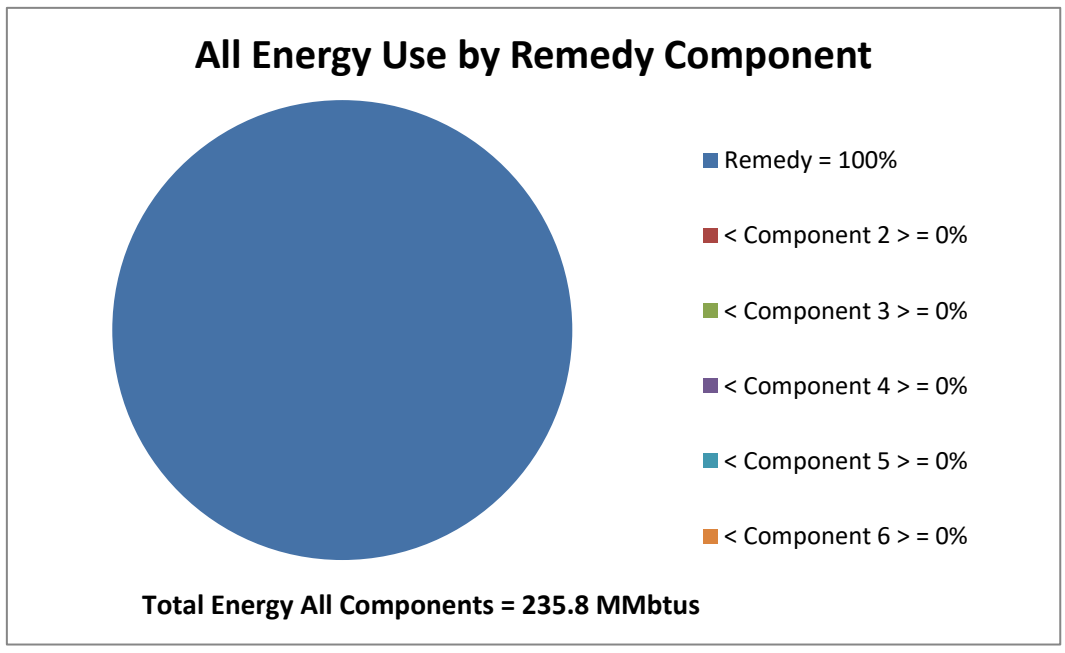
Core Element	Metric		Unit of Measure	Footprint						
				Remedy	< Component 2 >	< Component 3 >	< Component 4 >	< Component 5 >	< Component 6 >	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	4.3	0.0	0.0	0.0	0.0	0.0	4.3
	M&W-2	% of refined materials from recycled or reused material	%	0.0%						0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000	0.000	0.000	0.0
	M&W-4	% of unrefined materials from recycled or reused material	%							
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-7	Recycled or reused waste	Tons	2.1	0.0	0.0	0.0	0.0	0.0	2.1
	M&W-8	% of total potential waste recycled or reused	%	100.0%						100.0%
Water (used on-site)	W-1	Public water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	235.8	0.0	0.0	0.0	0.0	0.0	235.8
	E-2	Energy voluntarily derived from renewable resources								
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.001	0.000	0.000	0.000	0.000	0.000	0.0
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	87.2	0.0	0.0	0.0	0.0	0.0	87.2
	A-2	On-site HAP emissions	Pounds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	A-3	Total NOx, SOx, and PM emissions	Pounds	225.5	0.0	0.0	0.0	0.0	0.0	225.5
	A-3A	Total NOx emissions	Pounds	178.2	0.0	0.0	0.0	0.0	0.0	178.2
	A-3B	Total SOx emissions	Pounds	37.3	0.0	0.0	0.0	0.0	0.0	37.3
	A-3C	Total PM emissions	Pounds	10.0	0.0	0.0	0.0	0.0	0.0	10.0
	A-4	Total HAP emissions	Pounds	2.8	0.0	0.0	0.0	0.0	0.0	2.8
	A-5	Total greenhouse gas emissions	Tons CO2e*	17.2	0.0	0.0	0.0	0.0	0.0	17.2
Land & Ecosystems	Qualitative Description									

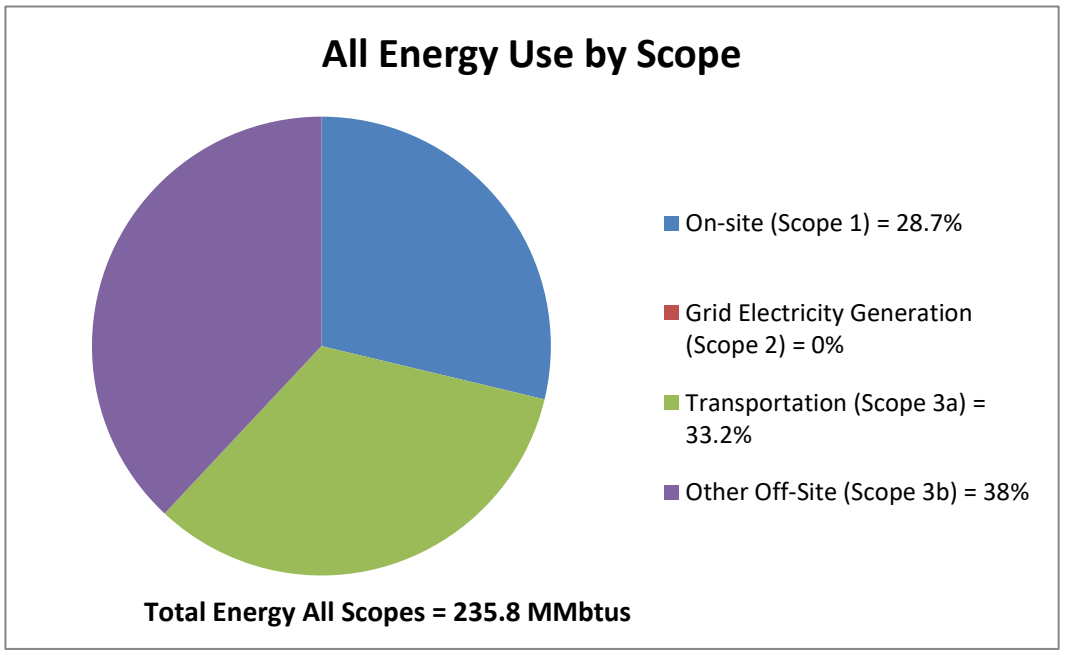
** Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)

The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

Notes:


All Energy Use by Remedy Component and Scope
(in MMbtu)
250
200
150
100
50
0
Remedy
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 235.8 MMbtus


All Energy Use by Remedy Component
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
Total Energy All Components = 235.8 MMbtus


All Energy Use by Scope
On-site (Scope 1) = 28.7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 33.2%
Other Off-Site (Scope 3b) = 38%
Total Energy All Scopes = 235.8 MMbtus

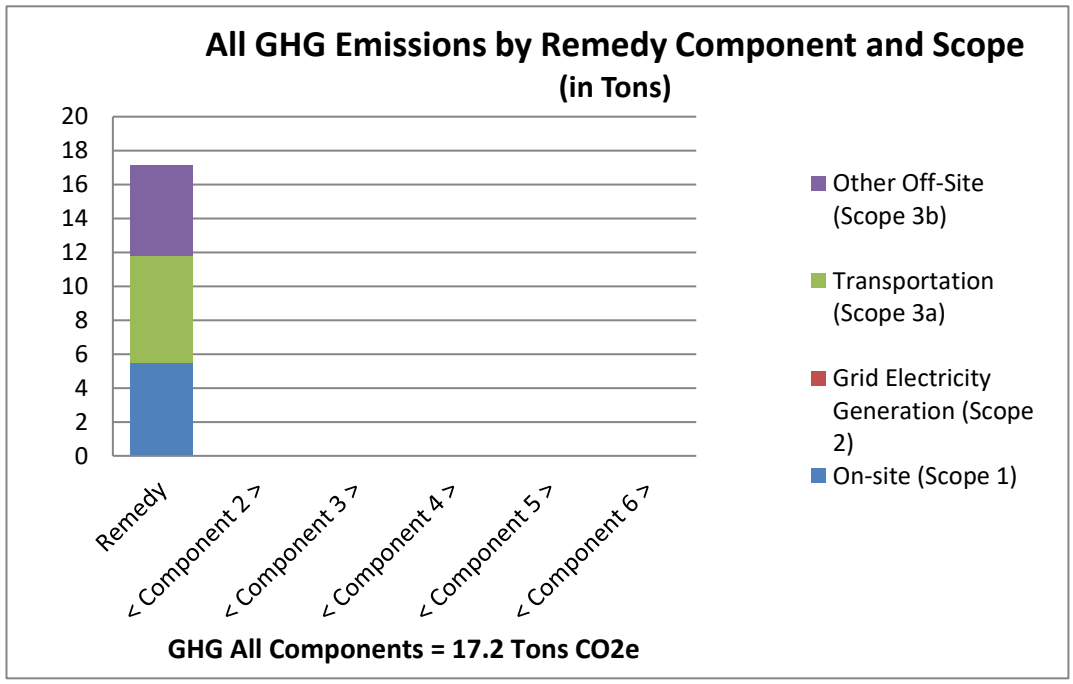
Total Energy
MMbtus

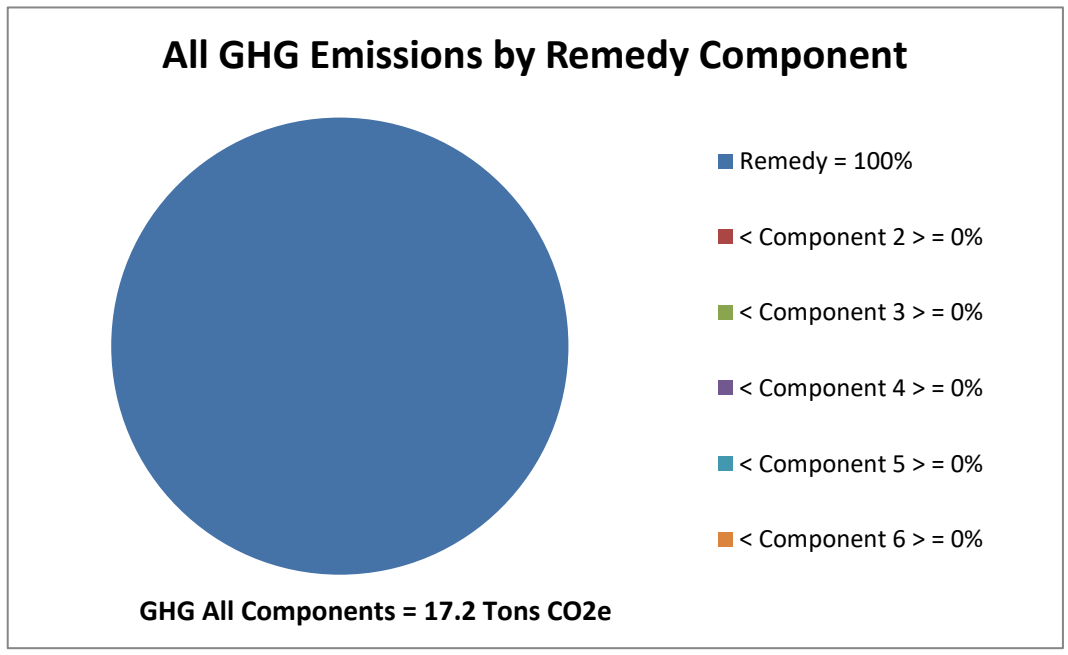
	Remedy	< Compon	< Compon	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	67.8	0.0	0.0	0.0	0.0	0.0	67.8	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
nsportation (Scope 3a)	78.4	0.0	0.0	0.0	0.0	0.0	78.4	Tran
ner Off-Site (Scope 3b)	89.7	0.0	0.0	0.0	0.0	0.0	89.7	Oth
Total	235.8	0.0	0.0	0.0	0.0	0.0	235.8	

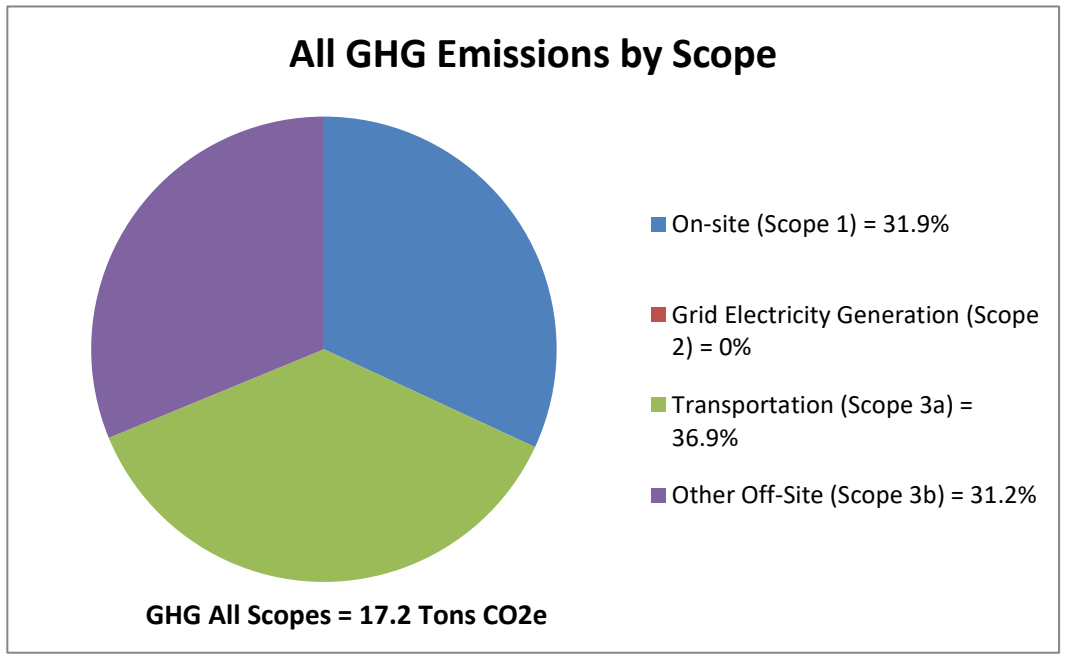
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 28.7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 33.2%
Other Off-Site (Scope 3b) = 38%

Total Energy All Components = 235.8 MMbtus
Total Energy All Scopes = 235.8 MMbtus


All GHG Emissions by Remedy Component and Scope
(in Tons)
20
18
16
14
12
10
8
6
4
2
0
Remedy
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
GHG All Components = 17.2 Tons CO2e


All GHG Emissions by Remedy Component
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
GHG All Components = 17.2 Tons CO2e

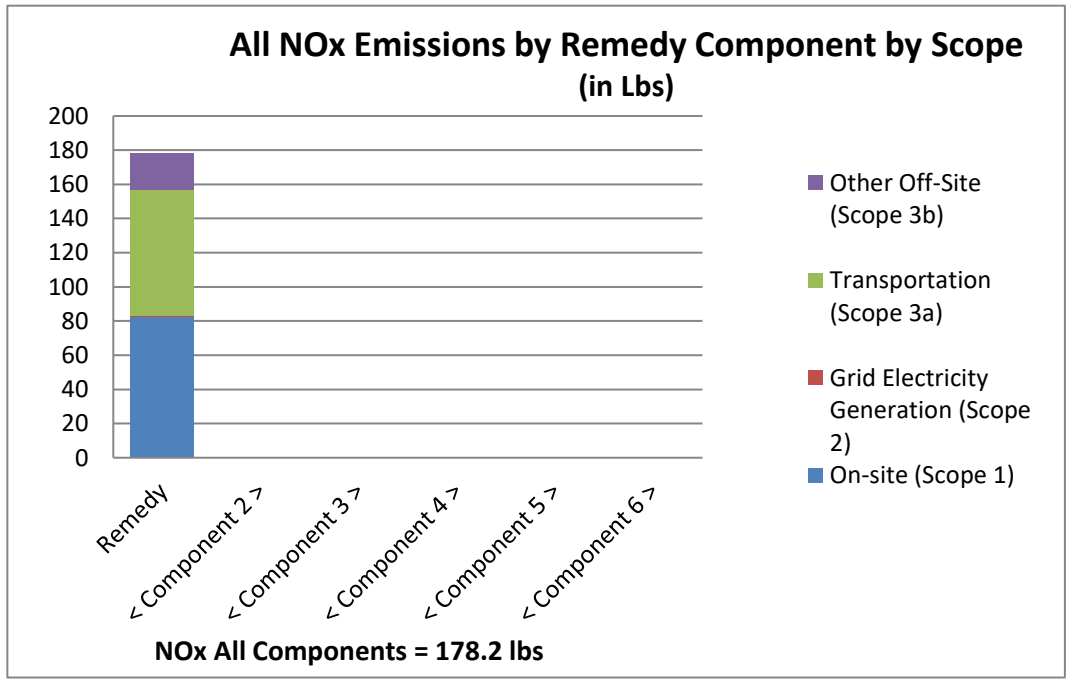

All GHG Emissions by Scope
On-site (Scope 1) = 31.9%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 36.9%
Other Off-Site (Scope 3b) = 31.2%
GHG All Scopes = 17.2 Tons CO2e

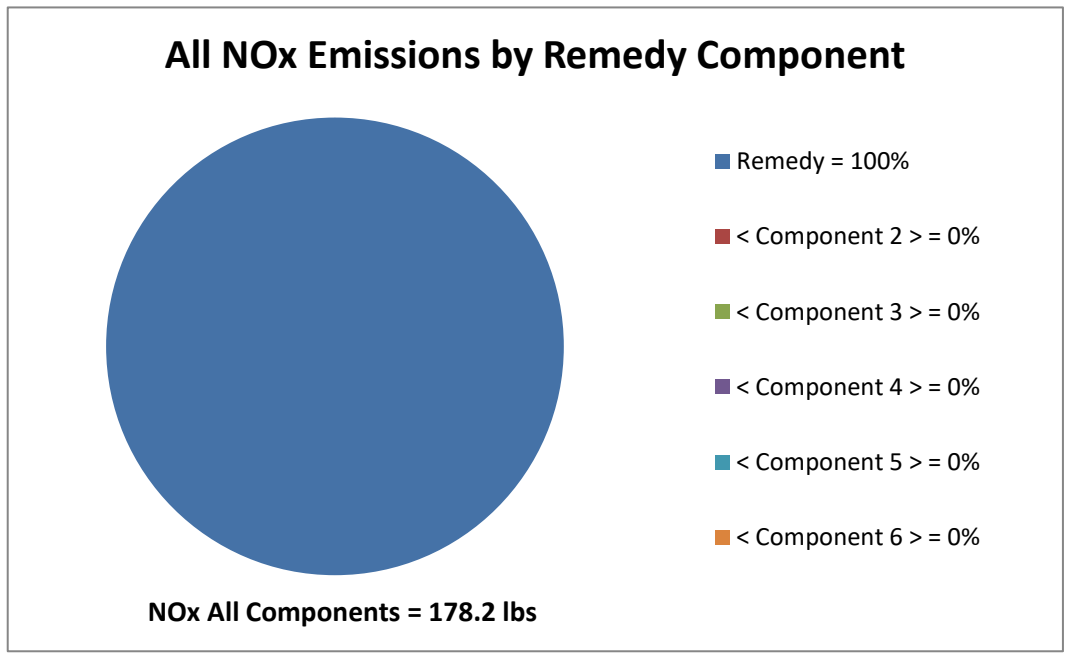
GHG Tons CO2e	Remedy	< Compon	< Compon	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	5.5	0.0	0.0	0.0	0.0	0.0	5.5	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
sportation (Scope 3a)	6.3	0.0	0.0	0.0	0.0	0.0	6.3	Tran
er Off-Site (Scope 3b)	5.4	0.0	0.0	0.0	0.0	0.0	5.4	Oth
Total	17.2	0.0	0.0	0.0	0.0	0.0	17.2	

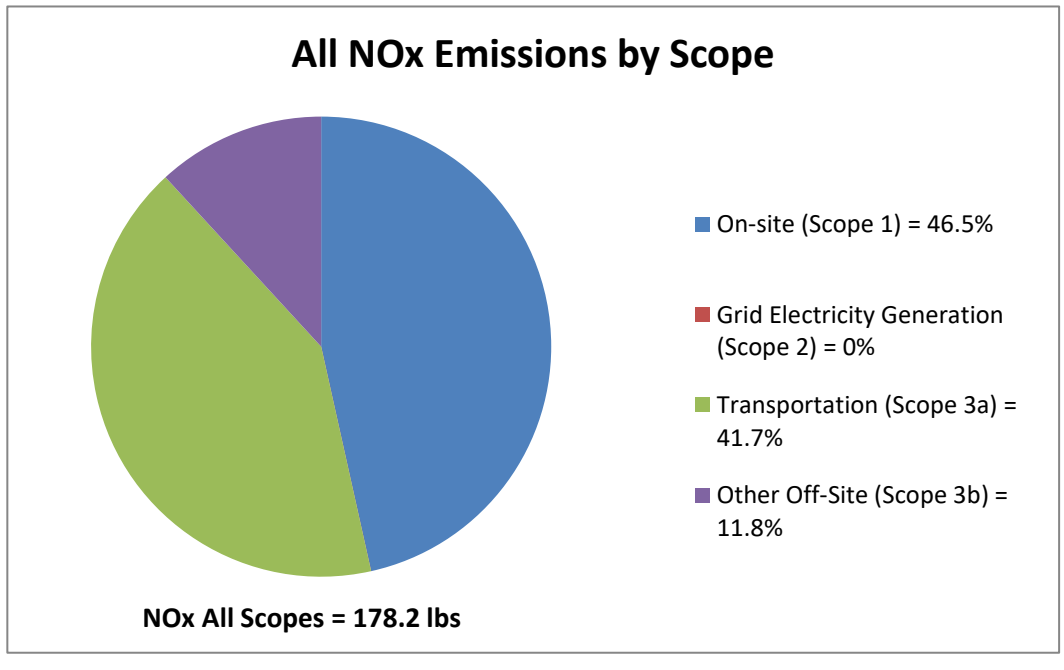
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 31.9%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 36.9%
Other Off-Site (Scope 3b) = 31.2%

GHG All Components = 17.2 Tons CO2e
GHG All Scopes = 17.2 Tons CO2e


All NOx Emissions by Remedy Component by Scope
(in Lbs)
200
180
160
140
120
100
80
60
40
20
0
Remedy
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 178.2 lbs


All NOx Emissions by Remedy Component
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
NOx All Components = 178.2 lbs

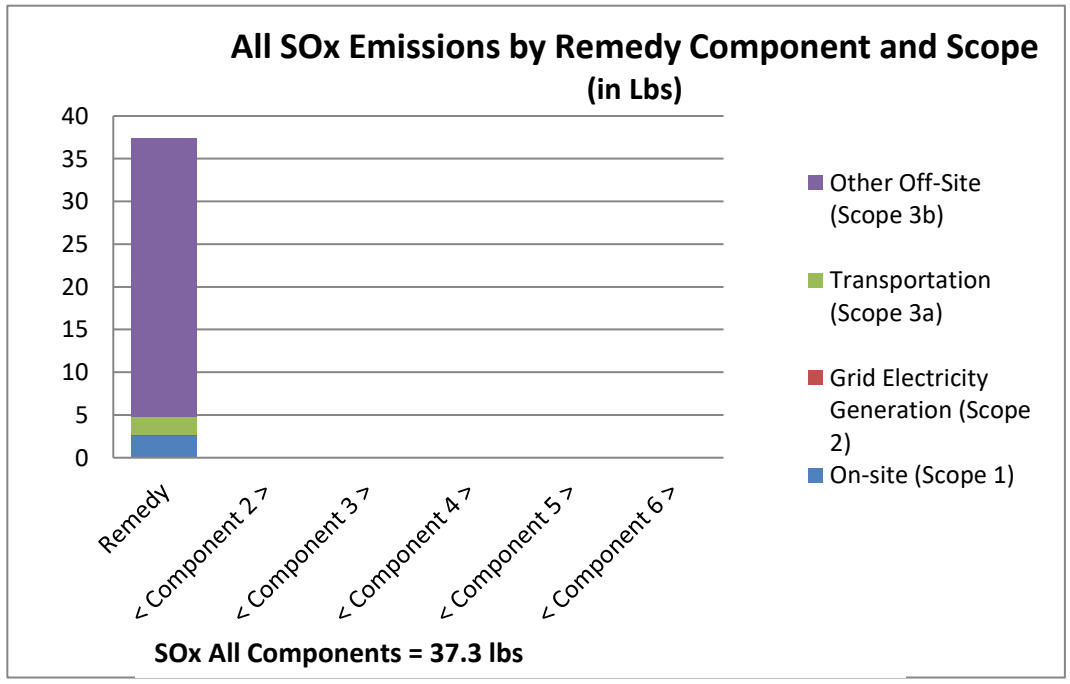

All NOx Emissions by Scope
On-site (Scope 1) = 46.5%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 41.7%
Other Off-Site (Scope 3b) = 11.8%
NOx All Scopes = 178.2 lbs

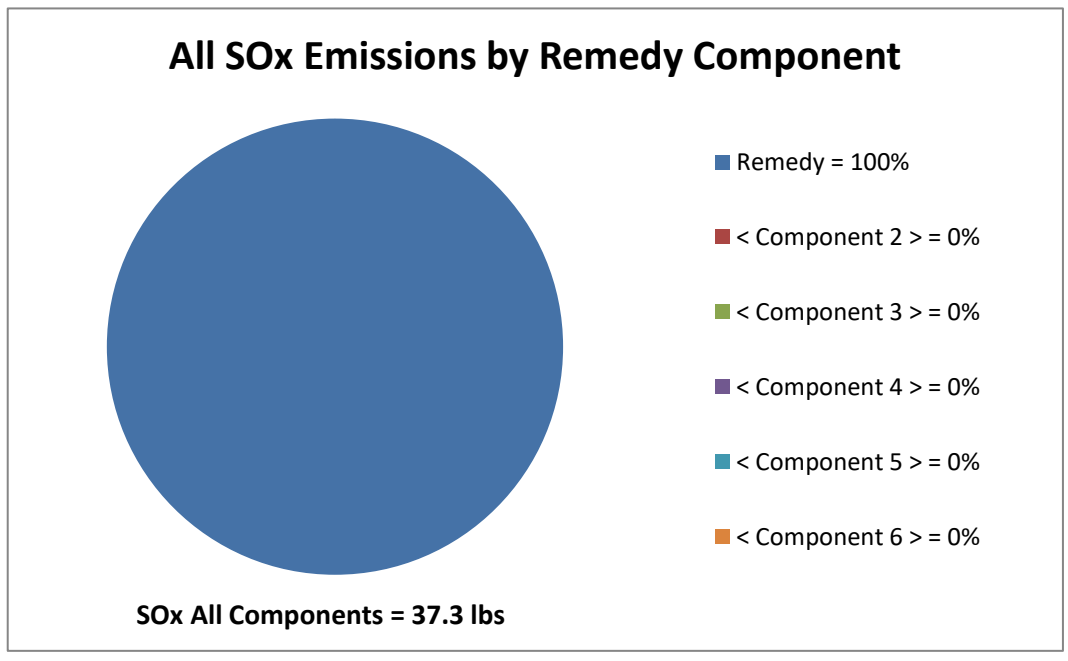
NOx lbs	Remedy	< Compon	< Compon	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	82.9	0.0	0.0	0.0	0.0	0.0	82.9	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	74.2	0.0	0.0	0.0	0.0	0.0	74.2	Tran
ıer Off-Site (Scope 3b)	21.1	0.0	0.0	0.0	0.0	0.0	21.1	Oth
Total	178.2	0.0	0.0	0.0	0.0	0.0	178.2	

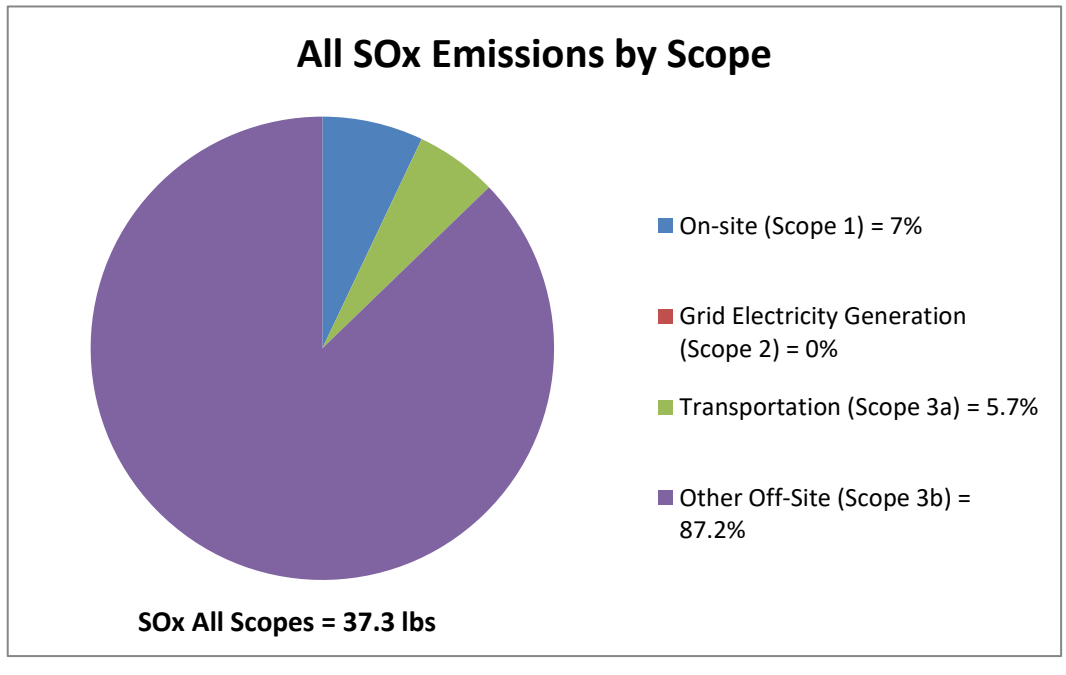
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 46.5%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 41.7%
Other Off-Site (Scope 3b) = 11.8%

NOx All Components = 178.2 lbs
NOx All Scopes = 178.2 lbs


All SOx Emissions by Remedy Component and Scope
(in Lbs)
40
35
30
25
20
15
10
5
0
Remedy
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 37.3 lbs


All SOx Emissions by Remedy Component
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
SOx All Components = 37.3 lbs

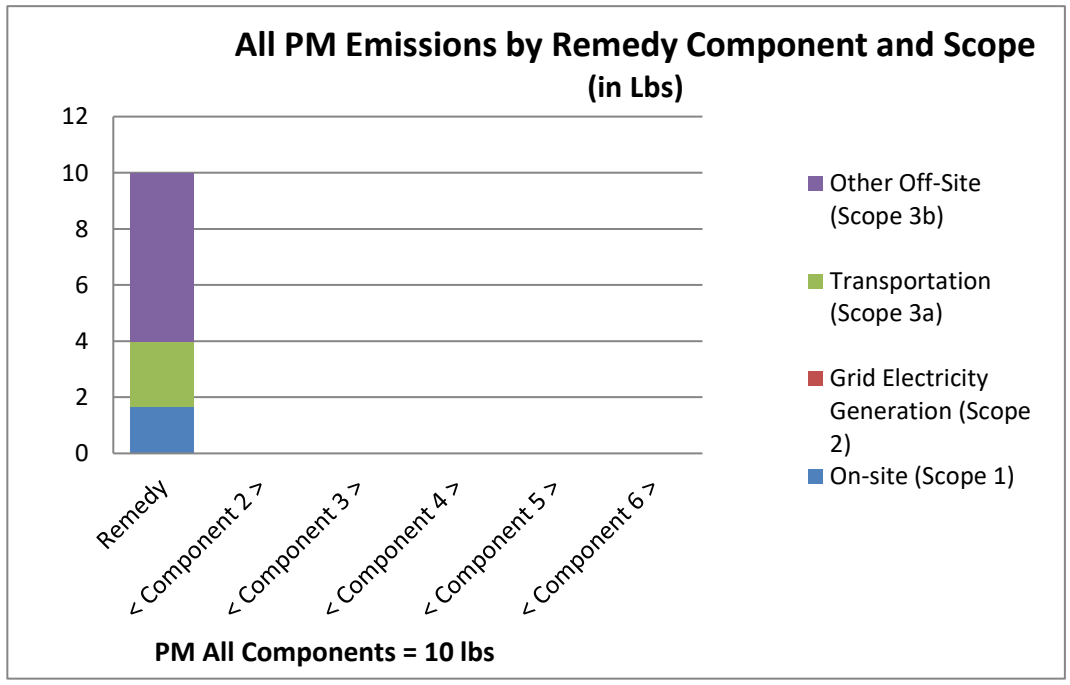

All SOx Emissions by Scope
On-site (Scope 1) = 7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 5.7%
Other Off-Site (Scope 3b) = 87.2%
SOx All Scopes = 37.3 lbs

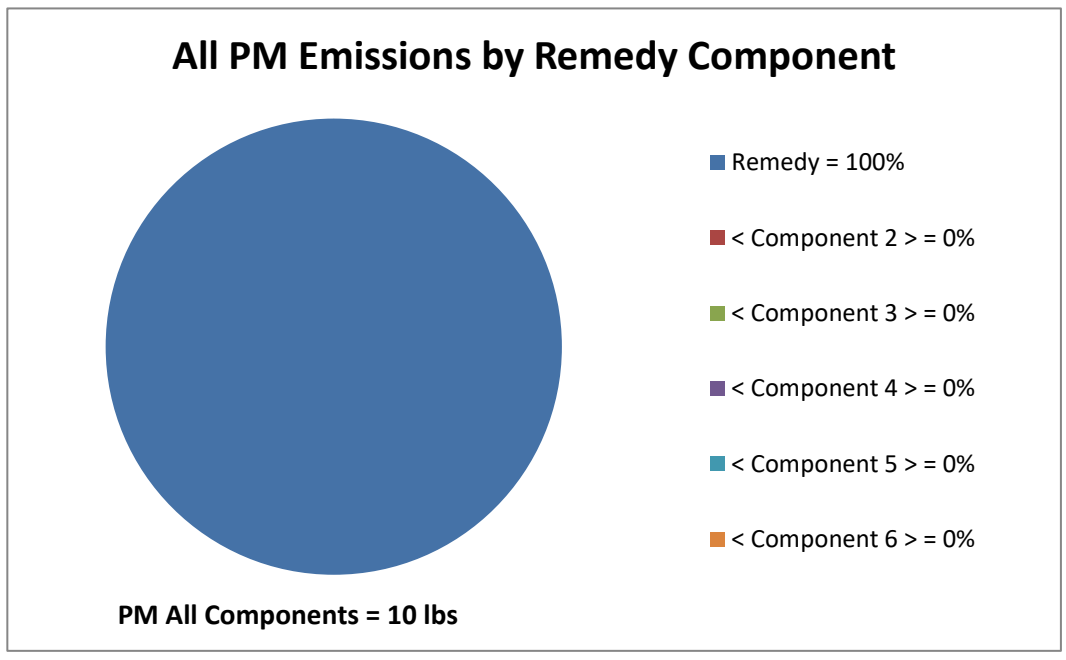
SOx lbs	Remedy	< Compon	< Compon	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	2.6	0.0	0.0	0.0	0.0	0.0	2.6	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	2.1	0.0	0.0	0.0	0.0	0.0	2.1	Tran
ıer Off-Site (Scope 3b)	32.6	0.0	0.0	0.0	0.0	0.0	32.6	Oth
Total	37.3	0.0	0.0	0.0	0.0	0.0	37.3	

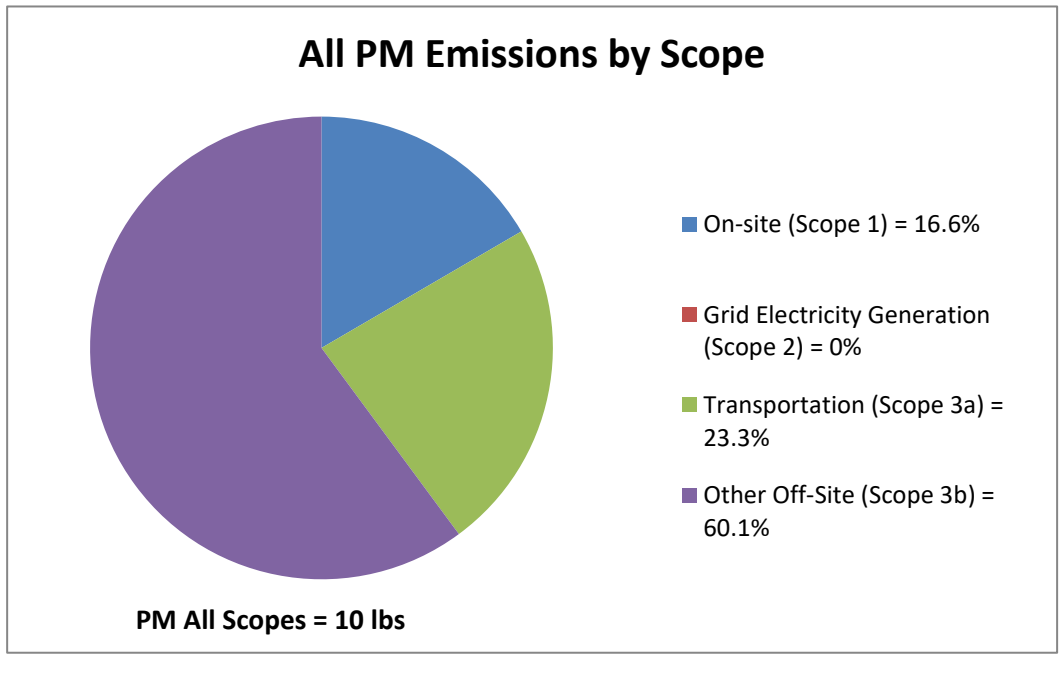
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

On-site (Scope 1) = 7%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 5.7%
Other Off-Site (Scope 3b) = 87.2%

SOx All Components = 37.3 lbs
SOx All Scopes = 37.3 lbs


All PM Emissions by Remedy Component and Scope
(in Lbs)
12
10
8
6
4
2
0
Remedy
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 10 lbs


All PM Emissions by Remedy Component
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
PM All Components = 10 lbs

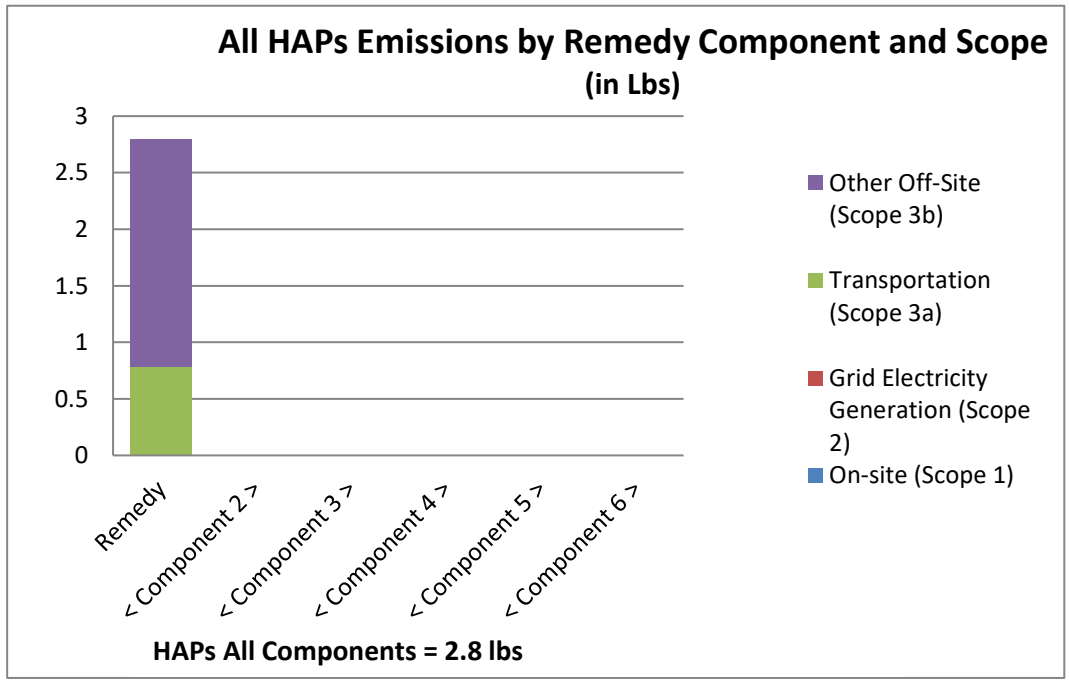

All PM Emissions by Scope
On-site (Scope 1) = 16.6%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 23.3%
Other Off-Site (Scope 3b) = 60.1%
PM All Scopes = 10 lbs

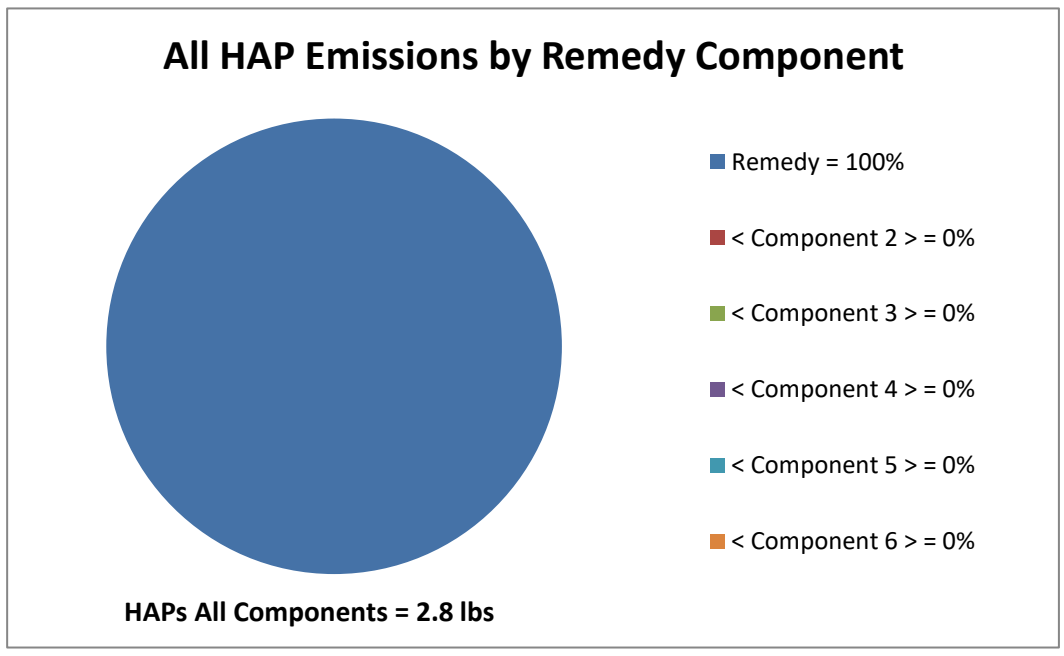
PM lbs	Remedy	< Compon	< Compon	< Compon	< Compon	< Compon	Total	
On-site (Scope 1)	1.7	0.0	0.0	0.0	0.0	0.0	1.7	
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	d Electricity
ısportation (Scope 3a)	2.3	0.0	0.0	0.0	0.0	0.0	2.3	Tran
ıer Off-Site (Scope 3b)	6.0	0.0	0.0	0.0	0.0	0.0	6.0	Oth
Total	10.0	0.0	0.0	0.0	0.0	0.0	10.0	

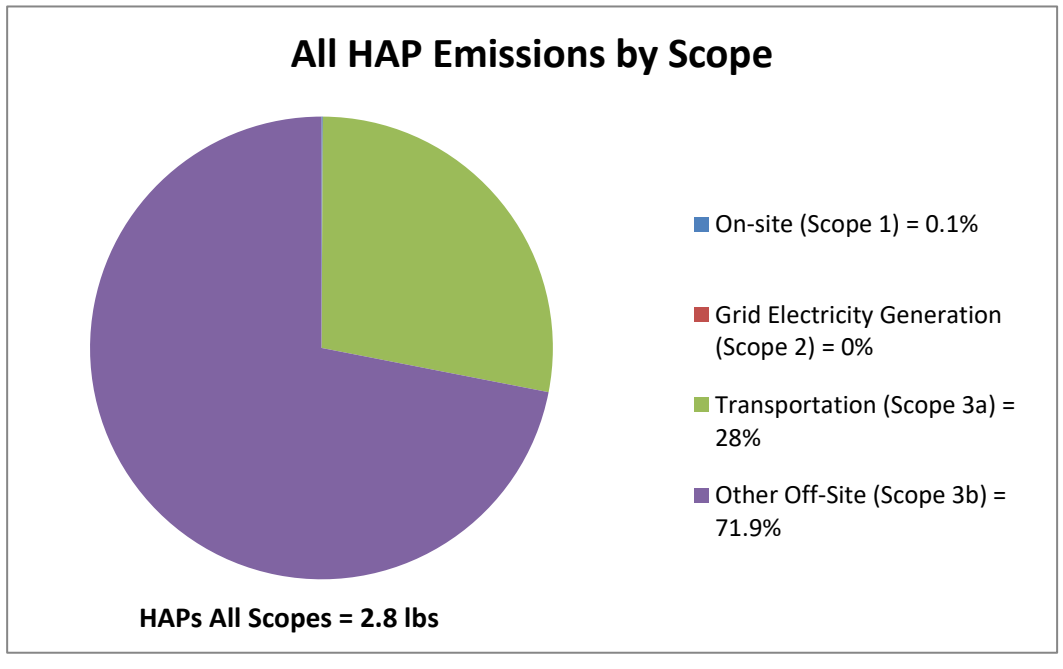
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

PM All Components = 10 lbs
PM All Scopes = 10 lbs

On-site (Scope 1) = 16.6%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 23.3%
Other Off-Site (Scope 3b) = 60.1%


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
3
2.5
2
1.5
1
0.5
0
Remedy
< Component 2 >
< Component 3 >
< Component 4 >
< Component 5 >
< Component 6 >
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 2.8 lbs


All HAP Emissions by Remedy Component
Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%
HAPs All Components = 2.8 lbs


All HAP Emissions by Scope
On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 28%
Other Off-Site (Scope 3b) = 71.9%
HAPs All Scopes = 2.8 lbs

HAPs
lbs

	Remedy	< Compon	< Compon	< Compon	< Compon	< Compon	Total
On-site (Scope 1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Generation (Scope 2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ısportation (Scope 3a)	0.8	0.0	0.0	0.0	0.0	0.0	0.8
ıer Off-Site (Scope 3b)	2.0	0.0	0.0	0.0	0.0	0.0	2.0
Total	2.8	0.0	0.0	0.0	0.0	0.0	2.8

Remedy = 100%
< Component 2 > = 0%
< Component 3 > = 0%
< Component 4 > = 0%
< Component 5 > = 0%
< Component 6 > = 0%

HAPs All Components = 2.8 lbs
HAPs All Scopes = 2.8 lbs

On-site (Scope 1) = 0.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 28%
Other Off-Site (Scope 3b) = 71.9%

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
90-02 Queens Boulevard - Remedial Action

Input Summary

Remedy Component Number →		1	2	3	4	5	6									Remedy Component Subtotals						
		Column headings in Row 6 must match the name of "Input" tabs in this workbook for Columns C - P in this table to be populated ("0" in Row 4 means "Input" tab is turned Off and will not be grouped to a Remedy Component (Columns Q - V) or used in subsequent calculations)																				
Item		Input Template	Input Template (2)	Input Template (3)	Input Template (4)	Input Template (5)	Input Template (6)	Input Template (7)	Input Template (8)	Input Template (9)	Input Template (10)	Input Template (11)	Input Template (12)	Input Template (13)	Input Template (14)	1	2	3	4	5	6	Total
On-Site																						
On-site Renewable Energy																						
Renewable electricity generated on-site	MWh	0														0	0	0	0	0	0	0
Landfill gas combusted on-site for energy use	ccf CH_4	0														0	0	0	0	0	0	0
On-site biodiesel use	gal	0														0	0	0	0	0	0	0
On-site biodiesel use - Other	gal	0														0	0	0	0	0	0	0
User-defined on-site renewable energy use #1	TBD	0														0	0	0	0	0	0	0
User-defined on-site renewable energy use #2	TBD	0														0	0	0	0	0	0	0
On-Site Conventional Energy																						
Grid electricity	MWh	0.00072														0.00072	0	0	0	0	0	0.00072
On-site diesel use - Other	Gal	487.5														487.5	0	0	0	0	0	487.5
On-site diesel use <75 hp	Gal	0														0	0	0	0	0	0	0
On-site diesel use 75<hp<750	Gal	0														0	0	0	0	0	0	0
On-site diesel use >750 hp	Gal	0														0	0	0	0	0	0	0
On-site gasoline use - Other	Gal	0														0	0	0	0	0	0	0
On-site gasoline use <25 hp	Gal	0														0	0	0	0	0	0	0
On-site gasoline use >25 hp	Gal	0														0	0	0	0	0	0	0
On-site natural gas use	ccf	0														0	0	0	0	0	0	0
On-site compressed natural gas use - Other	ccf	0														0	0	0	0	0	0	0
On-site compressed natural gas use	ccf	0														0	0	0	0	0	0	0
On-site liquified petroleum gas use - Other	gal	0														0	0	0	0	0	0	0
On-site liquified petroleum gas use	gal	0														0	0	0	0	0	0	0
Other forms of on-site conventional energy use #1	TBD	0														0	0	0	0	0	0	0
Other forms of on-site conventional energy use #2	TBD	0														0	0	0	0	0	0	0
Other On-site Emissions																						
On-site HAP process emissions	Lbs	0														0	0	0	0	0	0	0
On-site GHG emissions	Lbs CO2e	0														0	0	0	0	0	0	0
On-site carbon storage	Lbs CO2e	0														0	0	0	0	0	0	0
GHG avoided by flaring on-site landfill methane	ccf CH4	0														0	0	0	0	0	0	0
Other on-site NOx emissions or reductions	Lbs	0														0	0	0	0	0	0	0
Other on-site SOx emissions or reductions	Lbs	0														0	0	0	0	0	0	0
Other on-site PM emissions or reductions	Lbs	0														0	0	0	0	0	0	0
Electricity Generation																						
Grid electricity	MWh	0.00072														0.00072	0	0	0	0	0	0.00072
Voluntary purchase of renewable electricity	MWh	0														0	0	0	0	0	0	0
Voluntary purchase of RECs	MWh	0														0	0	0	0	0	0	0
Transportation																						
Transportation Fuel Use Breakdown																						
Biodiesel use - Personnel Transport	gal	0														0	0	0	0	0	0	0
Biodiesel use - Personnel Transport - User Defined	gal	0														0	0	0	0	0	0	0
Biodiesel use - Equipment Transport	gal	0														0	0	0	0	0	0	0
Biodiesel use - Equipment Transport - User Defined	gal	0														0	0	0	0	0	0	0
Biodiesel use - Material Transport	gal	0														0	0	0	0	0	0	0
Biodiesel use - Material Transport - User Defined	gal	0														0	0	0	0	0	0	0
Biodiesel use - Waste Transport	gal	0														0	0	0	0	0	0	0
Biodiesel use - Waste Transport - User Defined	gal	0														0	0	0	0	0	0	0
Diesel use - Personnel Transport - other vehicles	gal	231.8														231.8	0	0	0	0	0	231.8
Diesel use - Personnel Transport - car	gal	0														0	0	0	0	0	0	0
Diesel use - Personnel Transport - passenger truck	gal	113.8														113.8	0	0	0	0	0	113.8
Diesel use - Personnel Transport - User Defined	gal	0														0	0	0	0	0	0	0
Diesel use - Equipment Transport	gal	104.2														104.2	0	0	0	0	0	104.2
Diesel use - Equipment Transport - User Defined	gal	0														0	0	0	0	0	0	0
Diesel use - Material Transport	gal	25.001														25.001	0	0	0	0	0	25.001
Diesel use - Material Transport - User Defined	gal	0														0	0	0	0	0	0	0
Diesel use - Waste Transport	gal	25														25	0	0	0	0	0	25
Diesel use - Waste Transport - User Defined	gal	0														0	0	0	0	0	0	0
Gasoline use - Personnel Transport - other vehicles	gal	0														0	0	0	0	0	0	0
Gasoline use - Personnel Transport - car	gal	72														72	0	0	0	0	0	72
Gasoline use - Personnel Transport - passenger truck	gal	0														0	0	0	0	0	0	0
Gasoline use - Personnel Transport - User Defined	gal	0														0	0	0	0	0	0	0
Gasoline use - Equipment Transport	gal	0														0	0	0	0	0	0	0
Gasoline use - Equipment Transport - User Defined	gal	0														0	0	0	0	0	0	0
Natural Gas use - Personnel Transport	ccf	0														0	0	0	0	0	0	0
Natural Gas use - Personnel Transport - User Defined	ccf	0														0	0	0	0	0	0	0
Natural Gas use - Equipment Transport	ccf	0														0	0	0	0	0	0	0

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
90-02 Queens Boulevard - Remedial Action

Input Summary

Remedy Component Number →		1	2	3	4	5	6									Remedy Component Subtotals						
		Column headings in Row 6 must match the name of "Input" tabs in this workbook for Columns C - P in this table to be populated ("0" in Row 4 means "Input" tab is turned Off and will not be grouped to a Remedy Component (Columns Q - V) or used in subsequent calculations)																				
Item		Input Template	Input Template (2)	Input Template (3)	Input Template (4)	Input Template (5)	Input Template (6)	Input Template (7)	Input Template (8)	Input Template (9)	Input Template (10)	Input Template (11)	Input Template (12)	Input Template (13)	Input Template (14)	1	2	3	4	5	6	Total
Conventional Energy																						
Transportation diesel use	gal	499.801														499.801	0	0	0	0	0	499.801
Transportation gasoline use	gal	72														72	0	0	0	0	0	72
Transportation natural gas use	ccf	0														0	0	0	0	0	0	0
User-defined conventional energy transportation #1	TBD	10														10	0	0	0	0	0	10
User-defined conventional energy transportation #2	TBD	0														0	0	0	0	0	0	0
Renewable Energy																						
Transportation biodiesel use	gal	0														0	0	0	0	0	0	0
User-defined renewable energy transportation #1	TBD	0														0	0	0	0	0	0	0
User-defined renewable energy transportation #2	TBD	0														0	0	0	0	0	0	0
Off-Site																						
Construction Materials																						
Aluminum, Rolled Sheet	lb	0														0	0	0	0	0	0	0
Asphalt, mastic	lb	0														0	0	0	0	0	0	0
Asphalt, paving-grade	lb	0														0	0	0	0	0	0	0
Ethanol, Corn, 95%	lb	0														0	0	0	0	0	0	0
Ethanol, Corn, 99.7%	lb	0														0	0	0	0	0	0	0
Ethanol, Petroleum, 99.7%	lb	0														0	0	0	0	0	0	0
Gravel/Sand Mix, 65% Gravel	lb	3960														3960	0	0	0	0	0	3960
Gravel/sand/clay	lb	0														0	0	0	0	0	0	0
HDPE	lb	0														0	0	0	0	0	0	0
Photovoltaic system (installed)	W	0														0	0	0	0	0	0	0
PVC	lb	375														375	0	0	0	0	0	375
Portland cement, US average	lb	715																				
Ready-mixed concrete, 20 MPa	ft3	0														0	0	0	0	0	0	0
Round Gravel	lb	0														0	0	0	0	0	0	0
Sand	lb	0														0	0	0	0	0	0	0
Stainless Steel	lb	0														0	0	0	0	0	0	0
Steel	lb	0														0	0	0	0	0	0	0
Other refined construction materials	lb	1550														1550	0	0	0	0	0	1550
Other unrefined construction materials	lb	0														0	0	0	0	0	0	0
Treatment Materials & Chemicals																						
Cheese Whey	lbs	0														0	0	0	0	0	0	0
Emulsified vegetable oil	lbs	0														0	0	0	0	0	0	0
Granular activated carbon, primary	lbs	0														0	0	0	0	0	0	0
Granular activated carbon, regenerated	lbs	0														0	0	0	0	0	0	0
Hydrogen Peroxide, 50% in H2O	lbs	0														0	0	0	0	0	0	0
Iron (II) Sulfate	lbs	0														0	0	0	0	0	0	0
Lime, Hydrated, Packed	lbs	0														0	0	0	0	0	0	0
Molasses	lbs	0														0	0	0	0	0	0	0
Phosphoric Acid, 70% in H2O	lbs	0														0	0	0	0	0	0	0
Potassium Permanganate	lbs	0														0	0	0	0	0	0	0
Sodium Hydroxide, 50% in H2O	lbs	0														0	0	0	0	0	0	0
Other Treatment Chemicals & Materials	lbs	2000														2000	0	0	0	0	0	2000
Material Type																						
Total Virgin Refined Materials	tons	4.3														4.3	0	0	0	0	0	4.3
Total Recycled Refined Materials	tons	0														0	0	0	0	0	0	0
Total Reused Refined Materials	tons	0														0	0	0	0	0	0	0
Total Refined Material	tons	4.3														4.3	0	0	0	0	0	4.3
Total Virgin Unrefined Materials	tons	0														0	0	0	0	0	0	0
Total Recycled Unrefined Materials	tons	0														0	0	0	0	0	0	0
Total Reused Unrefined Materials	tons	0														0	0	0	0	0	0	0
Total Unrefined Material	tons	0														0	0	0	0	0	0	0
Fuel Processing																						
Biodiesel produced	gal	0														0	0	0	0	0	0	0
Diesel produced	gal	987.301														987.301	0	0	0	0	0	987.301
Gasoline produced	gal	72														72	0	0	0	0	0	72
Compressed natural gas produced	ccf	0														0	0	0	0	0	0	0
Liquified petroleum gas produced	gal	0														0	0	0	0	0	0	0
Natural gas produced	ccf	0														0	0	0	0	0	0	0
Water Use																						
Public Water Supply	gal x 1000	0														0	0	0	0	0	0	0
Extracted Groundwater	gal x 1000	0														0	0	0	0	0	0	0
Surface Water	gal x 1000	0														0	0	0	0	0	0	0
Reclaimed Water	gal x 1000	0														0	0	0	0	0	0	0
Collected/Diverted Storm Water	gal x 1000	0														0	0	0	0	0	0	0
User-defined water resource #1	gal x 1000	0														0	0	0	0	0	0	0
User-defined water resource #2	gal x 1000	0														0	0	0	0	0	0	0

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
90-02 Queens Boulevard - Remedial Action

Input Summary

Remedy Component Number →		1	2	3	4	5	6									Remedy Component Subtotals						
		Column headings in Row 6 must match the name of "Input" tabs in this workbook for Columns C - P in this table to be populated ("0" in Row 4 means "Input" tab is turned Off and will not be grouped to a Remedy Component (Columns Q - V) or used in subsequent calculations)																				
Item		Input Template	Input Template (2)	Input Template (3)	Input Template (4)	Input Template (5)	Input Template (6)	Input Template (7)	Input Template (8)	Input Template (9)	Input Template (10)	Input Template (11)	Input Template (12)	Input Template (13)	Input Template (14)	1	2	3	4	5	6	Total
Waste/Recycle Handling																						
Hazardous waste incineration	lbs	0														0	0	0	0	0	0	0
Off-site waste water treatment (POTW)	gal x 1000	0														0	0	0	0	0	0	0
Off-site non-hazardous waste landfill	tons	0														0	0	0	0	0	0	0
Off-site hazardous waste landfill	tons	0														0	0	0	0	0	0	0
Recycled/Reused On-Site	tons	0														0	0	0	0	0	0	0
Recycled/Reused Off-Site	tons	2.08														2.08	0	0	0	0	0	2.08
Solid Waste Totals																						
Total Non-Hazardous Waste	tons	0														0	0	0	0	0	0	0
Total Hazardous Waste	tons	0														0	0	0	0	0	0	0
Total Recycled/Reused	tons	2.08														2.08	0	0	0	0	0	2.08
Total Waste (all types)	tons	2.08														2.08	0	0	0	0	0	2.08
Lab Services																						
Off-site Laboratory Analysis - Other	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - Metals	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - Mercury	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - Inorganic Anions	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - Alkalinity	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - Perchlorate	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - Sulfate	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - PCBs	sample	0														0	0	0	0	0	0	0
Off-site Laboratory Analysis - VOCs	sample	18														18	0	0	0	0	0	18
Off-site Laboratory Analysis - SVOCs	sample	0														0	0	0	0	0	0	0
Resource Extraction for Electricity																						
Coal extraction and processing	MWh	0.0002196														0.0002196	0	0	0	0	0	0.0002196
Natural gas extraction and processing	MWh	0.0002441														0.0002441	0	0	0	0	0	0.0002441
Nuclear fuel extraction and processing	MWh	0.0001426														0.0001426	0	0	0	0	0	0.0001426
Oil extraction and processing	MWh	5.04E-06														5.04E-06	0	0	0	0	0	5.04E-06
Other fuel extraction and processing	MWh	7.2E-07														7.2E-07	0	0	0	0	0	7.2E-07
Electricity Transmission																						
Transmission and distribution losses	MWh	0.00072														0.00072	0	0	0	0	0	0.00072

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
90-02 Queens Boulevard - Remedial Action

Input Summary

Remedy Component Number →		1	2	3	4	5	6									Remedy Component Subtotals						
		Column headings in Row 6 must match the name of "Input" tabs in this workbook for Columns C - P in this table to be populated ("0" in Row 4 means "Input" tab is turned Off and will not be grouped to a Remedy Component (Columns Q - V) or used in subsequent calculations)																				
Item		Input Template	Input Template (2)	Input Template (3)	Input Template (4)	Input Template (5)	Input Template (6)	Input Template (7)	Input Template (8)	Input Template (9)	Input Template (10)	Input Template (11)	Input Template (12)	Input Template (13)	Input Template (14)	1	2	3	4	5	6	Total
Other																						
User-defined material #1	TBD	0														0	0	0	0	0	0	0
User-defined material #2	TBD	0														0	0	0	0	0	0	0
User-defined material #3	TBD	0														0	0	0	0	0	0	0
User-defined material #4	TBD	0														0	0	0	0	0	0	0
User-defined material #5	TBD	0														0	0	0	0	0	0	0
User-defined material #6	TBD	0														0	0	0	0	0	0	0
User-defined material #7	TBD	0														0	0	0	0	0	0	0
User-defined material #8	TBD	0														0	0	0	0	0	0	0
User-defined material #9	TBD	0														0	0	0	0	0	0	0
User-defined material #10	TBD	0														0	0	0	0	0	0	0
User-defined material #11	TBD	0														0	0	0	0	0	0	0
User-defined material #12	TBD	0														0	0	0	0	0	0	0
User-defined material #13	TBD	0														0	0	0	0	0	0	0
User-defined material #14	TBD	0														0	0	0	0	0	0	0
User-defined material #15	TBD	0														0	0	0	0	0	0	0
User-defined material #16	TBD	0														0	0	0	0	0	0	0
User-defined material #17	TBD	0														0	0	0	0	0	0	0
User-defined material #18	TBD	0														0	0	0	0	0	0	0
User-defined material #19	TBD	0														0	0	0	0	0	0	0
User-defined material #20	TBD	0														0	0	0	0	0	0	0
User-defined Waste Destinations																						
User-defined recycled/reused on-site #1	TBD	0														0	0	0	0	0	0	0
User-defined recycled/reused on-site #2	TBD	0														0	0	0	0	0	0	0
User-defined recycled/reused on-site #3	TBD	0														0	0	0	0	0	0	0
User-defined recycled/reused off-site #1	TBD	0														0	0	0	0	0	0	0
User-defined recycled/reused off-site #2	TBD	0														0	0	0	0	0	0	0
User-defined recycled/reused off-site #3	TBD	0														0	0	0	0	0	0	0
User-defined non-hazardous waste destination #1	TBD	0														0	0	0	0	0	0	0
User-defined non-hazardous waste destination #2	TBD	0														0	0	0	0	0	0	0
User-defined non-hazardous waste destination #3	TBD	0														0	0	0	0	0	0	0
User-defined hazardous waste destination #1	TBD	0														0	0	0	0	0	0	0
User-defined hazardous waste destination #2	TBD	0														0	0	0	0	0	0	0
User-defined hazardous waste destination #3	TBD	0														0	0	0	0	0	0	0

Remedy - On-Site Footprint (Scope 1)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
On-Site														
On-site Renewable Energy														
Renewable electricity generated on-site	MWh	0	3.413	0										
Landfill gas combusted on-site for energy use	ccf CH4	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined on-site renewable energy use #1	gal	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined on-site renewable energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
On-site Conventional Energy														
On-site grid electricity	MWh	0.00072	3.413	0.0024574										
On-site diesel use - Other	Gal	487.5	0.139	67.7625	22.5	10968.75	0.17	82.875	0.0054	2.6325	0.0034	1.6575	0.0000052	0.002535
On-site diesel use <75 hp	Gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	Gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	Gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
On-site gasoline use - Other	Gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	Gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	Gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
On-site compressed natural gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed natural gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site liquified petroleum gas use - Other	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	gal	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Other forms of on-site conventional energy use #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Other forms of on-site conventional energy use #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
On-site Conventional Energy Subtotals				**68**		**10,969**		**83**		**3**		**2**		**0**
Notes:														
Other On-site Emissions														
On-site HAP process emissions	lbs	0											1	0
On-site GHG emissions	lbs CO2e	0			1	0								
On-site carbon storage	lbs CO2e	0			1	0								
GHG avoided by flaring on-site landfill methane	Lbs	0			-262	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Other on-site NOx emissions or reductions	lbs	0					1	0						
Other on-site SOx emissions or reductions	lbs	0							1	0				
Other on-site PM emissions or reductions	lbs	0									1	0		
User-defined recycled/reused on-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused on-site #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
On-site Totals				**67.76**		**10,969**		**83**		**3**		**2**		**0**

Remedy - Electricity Generation Footprint (Scope 2)

Contributors to Footprints	Units	Usage	Energy		GHG		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Electricity Generation														
Grid electricity	MWh	0.00072	6.929	0.0049889	1124.3	0.809496	2.2421	0.0016143	4.6078874	0.0033177	0.057518	4.141E-05	0.2102371	0.0001514
Voluntary purchase of renewable electricity	MWh	0												
Voluntary purchase of RECs	MWh	0												
Notes:														

Remedy - Transportation Footprint (Scope 3a)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Conventional Energy														
Transportation diesel use	gal	386.001	0.139	53.654139	22.5	8685.0225	0.17	65.62017	0.0054	2.0844054	0.0034	1.3124034	0.0000052	0.0020072
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	113.8	0.139	15.8182	22.545	2565.621	0.0585	6.6573	0.0002	0.02276	0.007	0.7966	0.002605	0.296449
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	72	0.124	8.928	19.77	1423.44	0.027	1.944	0.00036	0.02592	0.003	0.216	0.0067	0.4824
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
User-defined conventional energy transportation #1	TBD	10	0	0	0	0	0	0	0	0	0	0	0	0
User-defined conventional energy transportation #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Conventional Energy Subtotals				**78**		**12,674**		**74**		**2**		**2**		**1**
Notes:														
Renewable Energy														
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
User-defined renewable energy transportation #1	TBD	0	Biodiesel		0	0	0	0	0	0	0	0	Ref.	
User-defined renewable energy transportation #2	TBD	0	npg or pmp		0	0	0	0	0	0	0	0	0	0
Renewable Energy Subtotals				**0**		**0**		**0**		**0**		**0**		**0**
Notes:														
Transportation Totals				**78**		**12674**		**74**		**2**		**2**		**1**

Remedy - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Construction Materials														
Aluminum, Rolled Sheet	lb	0	0.0633	0	9.15	0	0.0148	0	0.0283	0	0.0088	0	0.00102	0
Asphalt, mastic	lb	0	0.0412	0	0.85	0	0.00271	0	0.00798	0	0.000766	0	0.00107	0
Asphalt, paving-grade	lb	0	0.5	0	8.58	0	0.0299	0	0.0969	0	0.0091	0	0.0133	0
Ethanol, Corn, 95%	lb	0	0.0318	0	-0.0199	0	0.00425	0	0.00303	0	0.000469	0	0.0000846	0
Ethanol, Corn, 99.7%	lb	0	0.0324	0	0.0591	0	0.00431	0	0.0031	0	0.000472	0	0.000087	0
Ethanol, Petroleum, 99.7%	lb	0	0.0205	0	1.25	0	0.00199	0	0.00214	0	0.000277	0	0.0000589	0
Gravel/Sand Mix, 65% Gravel	lb	3960	0.0000248	0.098208	0.0024	9.504	0.000018	0.07128	4.52E-06	0.0178992	2.61E-06	0.0103356	3.08E-07	0.0012197
Gravel/sand/clay	lb	0	0.000028	0	0.00335	0	0.0000165	0	0.000015	0	0.000002	0	2.05E-10	0
HDPE	lb	0	0.0332	0	1.94	0	0.00325	0	0.00409	0	0.000439	0	0.0000641	0
Photovoltaic system (installed)	W	0	0.0336	0	4.47	0	0.015	0	0.032	0	0.00063	0	0.0000029	0
PVC	lb	375	0.0262	9.825	2.02	757.5	0.004	1.5	0.00274	1.0275	0.000372	0.1395	0.000375	0.140625
Portland cement, US average	lb	0	0.0139	0	1.34	0	0.00654	0	0.0104	0	0.00378	0	0.00097	0
Ready-mixed concrete, 20 MPa	ft3	0	0.217	0	19.5	0	0.0975	0	0.154	0	0.057	0	0.0141	0
Round Gravel	lb	0	0.0000248	0	0.0024	0	0.000018	0	4.52E-06	0	2.61E-06	0	3.08E-07	0
Sand	lb	0	0.0000248	0	0.0024	0	0.000018	0	4.52E-06	0	2.61E-06	0	3.08E-07	0
Stainless Steel	lb	0	0.0116	0	3.4	0	0.0075	0	0.012	0	0.0044	0	0.000144	0
Steel	lb	0	0.0044	0	1.1	0	0.0014	0	0.0017	0	0.00056	0	0.000067	0
Other refined construction materials	lb	1550	0.01885	29.2175	2.115	3278.25	0.0040375	6.258125	0.0051325	7.955375	0.0014428	2.2362625	0.0001625	0.2519138
Other unrefined construction materials	lb	0	0.000028	0	0.00335	0	0.0000165	0	0.000015	0	0.000002	0	2.05E-10	0

Notes:

Remedy - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Treatment Materials & Chemicals														
Cheese Whey	lbs	0	0.0025	0	0.031	0	0.000062	0	0.000033	0	0.000002	0	NP	
Emulsified vegetable oil	lbs	0	0.0077	0	3.44	0	0.0066	0	0.0019	0	0.000033	0	NP	
Granular activated carbon, primary	lbs	0	0.0356	0	4.82	0	0.0793	0	0.128	0	0.000987	0	0.000657	0
Granular activated carbon, regenerated	lbs	0	0.00873	0	1.7	0	0.00733	0	0.0129	0	0.000886	0	0.000671	0
Hydrogen Peroxide, 50% in H2O	lbs	0	0.00979	0	1.19	0	0.00142	0	0.0024	0	0.000308	0	0.0000629	0
Iron (II) Sulfate	lbs	0	0.00147	0	0.167	0	0.000316	0	0.000589	0	0.000103	0	0.000023	0
Lime, Hydrated, Packed	lbs	0	0.00206	0	0.762	0	0.000513	0	0.000358	0	0.00013	0	6.57E-06	0
Molasses	lbs	0	0.0044	0	0.48	0	0.0011	0	0.00024	0	0.0000041	0	NP	
Phosphoric Acid, 70% in H2O	lbs	0	0.0067	0	0.882	0	0.00282	0	0.0294	0	0.00171	0	0.000163	0
Potassium Permanganate	lbs	0	0.00981	0	1.16	0	0.00234	0	0.0032	0	0.000422	0	0.000122	0
Sodium Hydroxide, 50% in H2O	lbs	0	0.00977	0	1.09	0	0.00194	0	0.00352	0	0.000403	0	0.000129	0
Other Treatment Chemicals & Materials	lbs	2000	0.015	30	1.67	3340	0.003	6	0.0065	13	0.00061	1.22	0.000016	0.032
Notes:														
Fuel Processing														
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Diesel produced	gal	987.301	0.017	16.784117	3.02	2981.649	0.0051	5.0352351	0.0062	6.1212662	0.0017	1.6784117	0.0011	1.0860311
Gasoline produced	gal	72	0.033	2.376	2.8	201.6	0.0046	0.3312	0.005	0.36	0.0015	0.108	0.001	0.072
Liquefied Petroleum Gas Produced	gal	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Natural Gas - Compressed Produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Natural Gas Produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Fuel Processing Subtotals				**19.160117**		**3183.249**		**5.3664351**		**6.4812662**		**1.7864117**		**1.1580311**
Notes:														
Public water	gal x 1000	0	0.0092	0	5	0	0.0097	0	0.0059	0	0.016	0	0.000015	0
User-defined water resource #1	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined water resource #2	gal x 1000	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														

Remedy - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Off-Site Services														
Hazardous waste incineration	lb	0	0.00609	0	2.43	0	0.0016	0	0.00167	0	0.000209	0	0.000087	0
Off-site waste water treatment (POTW)	gal x 1000	0	0.015	0	4.4	0	0.016	0	0.015	0	NP		NP	
Off-site non-hazardous waste landfill	ton	0	0.16	0	25	0	0.14	0	0.075	0	0.4	0	0.0014	0
Off-site hazardous waste landfill	ton	0	0.18	0	27.5	0	0.154	0	0.0825	0	0.44	0	0.00154	0
Off-site Laboratory Analysis - Other	sample	0	0.058071	0	6.8534384	0	0.131402	0	0.3038758	0	0.0455698	0	0.0330165	0
Off-site Laboratory Analysis - Metals	sample	0	0.212	0	27.4693	0	0.6423	0	1.5072	0	0.2264	0	0.1643	0
Off-site Laboratory Analysis - Mercury	sample	0	0.0731715	0	9.325458	0	0.2127439	0	0.4982396	0	0.0747359	0	0.0542332	0
Off-site Laboratory Analysis - Inorganic Anions	sample	0	0.0074025	0	0.6459478	0	0.0067681	0	0.0147929	0	0.0022024	0	0.0015542	0
Off-site Laboratory Analysis - Alkalinity	sample	0	0.0174398	0	1.3381922	0	0.0070106	0	0.0132496	0	0.00194	0	0.0012831	0
Off-site Laboratory Analysis - Perchlorate	sample	0	0.023885	0	1.8717054	0	0.0079807	0	0.0141535	0	0.0020547	0	0.0012875	0
Off-site Laboratory Analysis - Nitrogen/Nitrate	sample	0	0.0336475	0	4.29897	0	0.0954592	0	0.2226646	0	0.0335099	0	0.0242506	0
Off-site Laboratory Analysis - Sulfate	sample	0	0.0141225	0	1.4726728	0	0.0079807	0	0.0136024	0	0.0019797	0	0.0012015	0
Off-site Laboratory Analysis - PCBs	sample	0	0.0512769	0	5.224902	0	0.0833339	0	0.1904774	0	0.0284393	0	0.0212083	0
Off-site Laboratory Analysis - VOCs	sample	18	0.0762045	1.3716808	9.016814	162.30265	0.104498	1.8809647	0.2270738	4.0873284	0.0339508	0.6111151	0.0235892	0.424606
Off-site Laboratory Analysis - SVOCs	sample	0	0.0715602	0	7.870422	0	0.1459445	0	0.3373038	0	0.0504853	0	0.0372577	0
Notes:														
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0.0002196	3.1	0.0006706	180.0	0.039528	0.8	0.0001691	0.2	3.294E-05	0.0	3.953E-06	NP	
Natural gas extraction and processing	MWh	0.0002441	1.6	0.0003983	270.0	0.0659016	0.2	4.393E-05	13.0	0.003173	0.0	1.733E-06	NP	
Nuclear fuel extraction and processing	MWh	0.0001426	0.2	2.216E-05	25.0	0.003564	0.2	2.138E-05	0.5	7.128E-05	0.0	2.138E-07	NP	
Oil extraction and processing	MWh	5.04E-06	2.3	1.157E-05	270.0	0.0013608	1.7	8.568E-06	0.1	3.478E-07	0.0	2.117E-07	NP	
Other fuel extraction and processing	MWh	7.2E-07	0	0	0	0	0	0	0	0	0	0	0	0
Resource Extraction Subtotals				**0.0011026**		**0.1103544**		**0.000243**		**0.0032776**		**6.111E-06**		**0**
Notes:														
Electricity Transmission														
Transmission and distribution losses	MWh	0.00072	1.0342	0.0007446	112.43	0.0809496	0.22421	0.0001614	0.4607887	0.0003318	0.0057518	4.141E-06	0.0210237	1.514E-05
Notes:														

Remedy - Off-Site Footprint (Scope 3b)

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
User-defined Materials														
User-defined material #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #4	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #5	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #6	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #7	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #8	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #9	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #10	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #11	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #12	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #13	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #14	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #15	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #16	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #17	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #18	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #19	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined material #20	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
User-defined Waste Destinations														
User-defined recycled/reused off-site #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined recycled/reused off-site #3	TBD	0	y(MMBtu/u		(lbs CO2e/u		Ox(lbs/unit)		Ox(lbs/unit)		M(lbs/unit)		APs(lbs/unit	
User-defined non-hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined non-hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #1	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #2	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
User-defined hazardous waste destination #3	TBD	0	0	0	0	0	0	0	0	0	0	0	0	0
Notes:														
Off-site Totals				**89.674353**		**10730.997**		**21.077209**		**32.572978**		**6.0036352**		**2.0084106**

Remedy - Intermediate Totals

Category	Units	Usage	Energy		Greenhouse Gas		NOx		SOx		PM		HAPs	
			Conv. Factor	MMBtus	Conv. Factor	lbs CO2e	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs	Conv. Factor	lbs
Total Grid Electricity Footprint														
On-site grid electricity	MWh	0.00072	3.413	0.0024574										
Electricity Generation														
Grid electricity	MWh	0.00072	6.929	0.0049889	1124.3	0.809496	2.2421	0.0016143	4.6078874	0.0033177	0.057518	4.141E-05	0.2102371	0.0001514
Resource Extraction for Electricity														
Coal extraction and processing	MWh	0.0002196	3.1	0.0006706	180.0	0.039528	0.8	0.0001691	0.2	3.294E-05	0.0	3.953E-06	NP	
Natural gas extraction and processing	MWh	0.0002441	1.6	0.0003983	270.0	0.0659016	0.2	4.393E-05	13.0	0.003173	0.0	1.733E-06	NP	
Nuclear fuel extraction and processing	MWh	0.0001426	0.2	2.216E-05	25.0	0.003564	0.2	2.138E-05	0.5	7.128E-05	0.0	2.138E-07	NP	
Oil extraction and processing	MWh	5.04E-06	2.3	1.157E-05	270.0	0.0013608	1.7	8.568E-06	0.1	3.478E-07	0.0	2.117E-07	NP	
Other fuel extraction and processing	MWh	7.2E-07	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Electricity Transmission														
Transmission and distribution losses	MWh	0.00072	1.0342	0.0007446	112.43	0.0809496	0.22421	0.0001614	0.4607887	0.0003318	0.0057518	4.141E-06	0.0210237	1.514E-05
Total Grid Electricity Footprint				**0**		**1**		**0**		**0**		**0**		**0**
Total Fuel Footprints														
Total Gasoline Footprint														
On-site gasoline use - Other	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
On-site gasoline use <25 hp	gal	0	0.124	0	17.48	0	0.037	0	0.00025	0	0.165	0	0.00008	0
On-site gasoline use >25 hp	gal	0	0.124	0	19.93	0	0.032	0	0.00029	0	0.002	0	0.00009	0
Transportation gasoline use	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Transportation gasoline use - car	gal	72	0.124	8.928	19.77	1423.44	0.027	1.944	0.00036	0.02592	0.003	0.216	0.0067	0.4824
Transportation gasoline use - passenger truck	gal	0	0.124	0	19.79	0	0.035	0	0.00036	0	0.003	0	0.00661	0
Transportation gasoline use - User Defined	gal	0	0.124	0	19.6	0	0.11	0	0.0045	0	0.00054	0	0.000039	0
Gasoline produced	gal	72	0.033	2.376	2.8	201.6	0.0046	0.3312	0.005	0.36	0.0015	0.108	0.001	0.072
Total Gasoline Footprint		**72**		**11.304**		**1625.04**		**2.2752**		**0.38592**		**0.324**		**0.5544**
Total Diesel Footprint														
On-site diesel use - Other	gal	487.5	0.139	67.7625	22.5	10968.75	0.17	82.875	0.0054	2.6325	0.0034	1.6575	0.0000052	0.002535
On-site diesel use <75 hp	gal	0	0.139	0	22.21	0	0.1565	0	0.000145	0	0.0145	0	0.00004	0
On-site diesel use 75<hp<750	gal	0	0.139	0	22.24	0	0.101	0	0.00013	0	0.009	0	0.00004	0
On-site diesel use >750 hp	gal	0	0.139	0	22.24	0	0.149	0	0.00013	0	0.006	0	0.00004	0
Transportation diesel use	gal	386.001	0.139	53.654139	22.5	8685.0225	0.17	65.62017	0.0054	2.0844054	0.0034	1.3124034	0.0000052	0.0020072
Transportation diesel use - car	gal	0	0.139	0	22.57	0	0.015	0	0.0002	0	0.003	0	0.00252	0
Transportation diesel use - passenger truck	gal	113.8	0.139	15.8182	22.545	2565.621	0.0585	6.6573	0.0002	0.02276	0.007	0.7966	0.002605	0.296449
Transportation diesel use - User Defined	gal	0	0.139	0	22.5	0	0.17	0	0.0054	0	0.0034	0	0.0000052	0
Diesel produced	gal	987.301	0.017	16.784117	3.02	2981.649	0.0051	5.0352351	0.0062	6.1212662	0.0017	1.6784117	0.0011	1.0860311
Total Diesel Footprint		**987.301**		**154.01896**		**25201.043**		**160.18771**		**10.860932**		**5.4449151**		**1.3870223**
Total Biodiesel Footprint														
On-site biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
On-site biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Transportation biodiesel use - User Defined	gal	0	0.127	0	22.3	0	0.2	0	0	0	0.00099	0	NP	
Biodiesel produced	gal	0	0.029	0	-16.8	0	0.018	0	0.033	0	0.00082	0	NP	
Total Biodiesel Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Natural Gas Footprint														
On-site natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Transportation natural gas use - User Defined	ccf	0	0.103	0	13.1	0	0.01	0	0.0000063	0	0.00076	0	0.0000084	0
Natural gas produced	ccf	0	0.0052	0	2.2	0	0.0037	0	0.0046	0	0.000072	0	0.0000061	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Liquified Petroleum Gas Footprint														
On-site liquified petroleum gas use - Other	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
On-site liquified petroleum gas use	ccf	0	NP		12.69	0	0.021	0	0.00013	0	0.001	0	0	0
Liquified petroleum gas produced	ccf	0	0.088	0	1.47	0	0.0016	0	0.0024	0	0.0007	0	0.0003	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**
Total Compressed Gas Footprint														
On-site compressed gas use - Other	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
On-site compressed gas use	ccf	0	NP		1957.835	0	16.0325	0	0.023045	0	0.2775	0	0	0
Compressed gas produced	ccf	0	19.983	0	343.92	0	0.4732	0	2.1651	0	0.1846	0	0.2895	0
Total Natural Gas Footprint		**0**		**0**		**0**		**0**		**0**		**0**		**0**

Notes:

Note: Please refer to the "Default Conversions" tab for references for the default conversion factors used on this calculation sheet.

Space below available for notes and calculations:

APPENDIX H
Climate Screening Checklist

Climate Screening Checklist

Background Information

- Project Manager: Matthew Levy
- Site Name: 90-02 Queens Boulevard (the "Site")
- Site Number: 241249
- Site Location: 90-02 Queens Boulevard, Queens, New York
- Site Elevation (average above sea level): Approximately 22 feet above sea level (Google Earth)



- ClimAID Region (Responding Climate Change in New York State (ClimAID) - NYSERDA): Region 4 – New York City and Long Island



- Remedial Stage/Site Classification: Remediation
- Contamination - Media Impacted/ Contaminants of Concern: Groundwater – volatile organic compounds (VOCs; specifically chlorinated VOCs [CVOCs]); and soil vapor – VOCs (specifically petroleum-related VOCs and CVOCs).
- Proposed/Current Remedy: Remedy will consist of product recovery centered around MW-3, treatment of CVOCs in groundwater via in-situ chemical reduction (ISCR) injections using zero-valent iron (ZVI), and vapor mitigation via a vapor barrier coating applied to the top of the slab beneath the cellar level flooring to prevent vapor intrusion into the building.
- What is the predicted timeframe of the remedy? Will components of the remedy still be in place in 10+ years? The predicted timeframe of the remedy is approximately one to two months. Engineering controls (ECs) and institutional controls (ICs) may be required to be managed under a Site Management Plan (SMP), which may be in place for 10+ years. As part of this remedy, an Environmental Easement (EE), as defined in Article 71, Title 36 of the Environmental Conservation Law, approved by the New York State Department of Environmental Conservation (NYSDEC), will be filed and recorded with Queens County. Adherence to ECs for the Site is mandated by the EE (an IC) and will be implemented under the SMP.
- Is the site in proximity to any sensitive receptors? (e.g., wetlands, waterbodies, residential properties, hospitals, schools, drinking water supplies, etc.) 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. Surrounding properties include commercial and residential buildings. There are four sensitive receptors located within a 500-foot radius of the Site: Happy Little Bear Daycare (listed as a daycare), John F. Kennedy Jr. School (listed as a school), Central Queens Academy Charter School (listed as a school), and P.S. 013 Clement C. Moore (listed as a preschool).

Is the site in a disadvantaged community (DAC) or potential environmental justice area (PEJA) (Use DECinfolocator: DECinfo Locator (ny.gov)?

☐ **Yes X No**



If the site is in a DAC or PEJA, will climate impacts be magnified? If yes, list how and why.

☐ **Yes X No**

Should thresholds of concern be lowered to account for magnification of impacts? If yes, indicate how lower thresholds will be used in the screening.

☐ **Yes X No**

Climate Screening Table*

Potential Climate Hazards	**Relevant to the Site Location** (Y/N/NA)[1]	**Projected Change** (Resilience Analysis and Planning Tool (RAPT)/arcgis.com[3]	**Potential to Impact Remedy** (Y/N)	**Is remedy/site already resilient?** (Y/N)[4]
Precipitation	N	N/A	N/A	N/A
Temperature[2] (Extreme Heat or Cold Weather Impacts)	N	N/A	N/A	N/A
Sea Level Rise	N	N/A	N/A	N/A
Flooding	N	N/A	N/A	N/A
Storm Surge	N	N/A	N/A	N/A
Wildfire	N	N/A	N/A	N/A
Drought	N	N/A	N/A	N/A
Storm Severity	N	N/A	N/A	N/A
Landslides	N	N/A	N/A	N/A
Other Hazards:	N/A	N/A	N/A	N/A

* Links to potential data sources can be found on the following page

[1] If the first column is N --> The rest of the columns will be N/A, the hazard is not applicable to the site.

[2] Extreme Heat: periods of three or more days above 90°F- Extreme Cold: Individual days with minimum temperatures at or below 0 degrees F (NYSERDA ClimAID report)

[3] List the projected change in specific terms or units e.g. inches of rainfall, feet of sea level rise, etc.

[4] If final column is Y, provide reasoning, if the final column is N --> Climate Vulnerability Assessment (CVA) required.

Required Next Steps (If no further action is required, provide justification):

Completion of the remedial action and implementation of an SMP following completion of Site remediation, as necessary.

Potential Data Sources (not an exhaustive list)- from Superfund Climate Resilience: Vulnerability Assessment | US EPA

NYSERDA ClimAID report- Responding Climate Change in New York State (ClimAID) - NYSERDA

FEMA- National Flood Hazard Layer | FEMA.gov

NOAA- National Storm Surge Risk Maps - Version 3 (noaa.gov)

Department of Agriculture, Forest Service Wildfire Risk to Communities

EPA Climate Change Indicators in the United States

EPA Climate Resilience Evaluation & Awareness Tool (CREAT) | U.S. Climate Resilience Toolkit

EPA National Stormwater Calculator

National Integrated Drought Information System U.S. Drought Portal

National Interagency Coordination Center National Interagency Fire Center

National Oceanic and Atmospheric Administration Coastal Services Digital Coast

- Resources to help communities assess coastal hazards, such as the Sea Level Rise Viewer for visualizing community-level impacts of flooding or sea level rise and downloadable LIDAR data

National Oceanic and Atmospheric Administration National Centers for Environmental Information website

National Oceanic and Atmospheric Administration Sea Level Trends

National Weather Service Climate Prediction Center

National Weather Service National Hurricane Center

National Weather Service Sea, Lake, and Overland Surges from Hurricanes (SLOSH)

National Weather Service Storm Surge Hazard Maps

U.S. Federal Government Climate Resilience Toolkit: The Climate Explorer

U.S. Army Corps of Engineers Climate Preparedness and Resilience

U.S. Geological Survey Coastal Change Hazards Portal

U.S. Geological Survey Landslide Hazards Program

U.S. Geological Survey National Ground-water Monitoring Network Data Portal

U.S. Geological Survey National Climate Change Viewer

U.S. Geological Survey National Water Dashboard

U.S. Geological Survey StreamStats

NYS Department of State- Assess | Department of State (ny.gov)

NYSERDA NY Costal Floodplain Mapper- Home Page (ny.gov)

NYSDEC Coastal Erosion Hazards- Coastal Areas Regulated By The CEHA Permit Program - NYDEC

NYSDOH Heat Index- health.ny.gov/environmental/weather/vulnerability_index/county_maps.htm