114 SNEDIKER AVENUE SITE

221-241 GLENMORE AVENUE
BROOKLYN, NEW YORK

Draft Remedial Action Work Plan

AKRF Project Number: 220249
NYSDEC BCP Site Number: TBD

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau B
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On Behalf Of:

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DECEMBER 2022

CERTIFICATIONS

I, Rebecca Kinal, P.E., certify that I am currently a NYS registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

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

DRAFT DRAFT

NYS Professional Engineer # Date Signature/Stamp

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

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
ASP	Analytical Services Protocol
AWQSGV	Ambient Water Quality Standards and Guidance Value
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BMS	Building Management Systems
BSA	Board of Standards and Appeals
CAMP	Construction Air Monitoring Plan
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
COC	Contaminants of Concern
CoC	Certificate of Completion
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CVOC	Chlorinated Volatile Organic Compound
DD	Decision Document
DER	Division of Environmental Remediation
DMM	Division of Materials Management
DO	Dissolved Oxygen
DPP	Direct Push Probe
DRO	Diesel Range Organics
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
EDD	Electronic Data Deliverable
EE	Environmental Easement
EJ	Environmental Justice
ELAP	Environmental Laboratory Approval Program
EPH	Extractable Petroleum Hydrocarbons
EQuIS™	Environmental Quality Information System
ESA	Environmental Site Assessment
EPA	Environmental Protection Agency
eV	Electron Volt
FDNY	New York City Fire Department
FER	Final Engineering Report
GAC	Granular Activated Carbon
GPA	Gas Permeable Aggregate
GRO	Gasoline Range Organics

Acronym	Definition
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	High-Density Polyethylene
IC	Institutional Control
LBP	Lead-Based Paint
LIRR	Long Island Railroad
MCL	Maximum Contaminant Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAVD	North American Vertical Datum
NTU	Nephelometric Turbidity Unit
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYCRR	New York Code of Rules and Regulations
NYCT	New York City Transit
NYSDEC	New York State Department of Environmental Conservation/ Department
NYSDOH	New York State Department of Health
NYCRR	New York Code of Rules and Regulations
OHHEA	Overall Human Health Exposure Assessment
ORP	Oxidation Reduction Potential
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PFAS	Per-and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PCE	Tetrachloroethylene
PGWSCO	Protection of Groundwater Soil Cleanup Objective
PID	Photoionization Detector
PPE	Personal Protective Equipment
PPM	Parts Per Million
PPB	Parts Per Billion
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RA	Remedial Action
RAO	Remedial Action Objective

Acronym	Definition
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RE	Remedial Engineer
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
ROI	Radius of Influence
RRSCO	Restricted Residential Soil Cleanup Objective
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SDG	Sample Digestion Group
SI	Subsurface Investigation
SIM	Selective Ion Monitoring
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOE	Support of Excavation
SOP	Standard Operating Procedure
SPDES	State Pollution Elimination System
SPLP	Synthetic Precipitation Leachate Procedure
SRCAMP	Special Requirements Community Air Monitoring Program
SSDS	Sub-Slab Depressurization System
SVE	Soil Vapor Extraction
SVES	Soil Vapor Extraction System
SVOC	Semivolatile Organic Compound
SWPPP	Storm Water Pollution Prevention Plan
TAL	Target Analyte List
TCE	Trichloroethylene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TOGS	Technical and Operational Guidance Series
TPH	Total Petroleum Hydrocarbons
UST	Underground Storage Tank
UUSCO	Unrestricted Use Soil Cleanup Objective
VMP	Vacuum Monitoring Point
VOC	Volatile Organic Compounds
VFD	Variable Frequency Drive

EXECUTIVE SUMMARY

Site Description, Physical Setting, and Background

This Remedial Action Work Plan (RAWP) has been prepared by AKRF, Inc. (AKRF) on behalf of Glenmore Owner LLC (the Applicant) for the approximately 0.823-acre property located at 221-241 Glenmore Avenue in the New Lots sub-section of the East New York neighborhood in Brooklyn, New York , also identified as Block 3697, Lots 1 and 33 on the New York City Tax Map (hereafter referred to as the "Site" or "controlled property").

Currently, the Site consists of three adjoining vacant buildings most recently occupied by the Legion Lighting Co. Inc. (Legion), which operated as an industrial light manufacturer until May 2022; a two-story building on Lot 33, which was formerly utilized as storage and workshop spaces on the first floor and management offices on the second floor (southeast portion of the Site, 241 Glenmore Avenue); a single-story former manufacturing building on the northeastern portion of Lot 1 (northeast portion of Site, 221 Glenmore Avenue); and, a single-story manufacturing building on the western portion of Lot 1, which formerly operated as the lighting manufacturing area (west portion of the Site, 221 Glenmore Avenue). A small sub-grade cellar located in the southwestern corner of Lot 1 (221 Glenmore Avenue) contains an encased 1,000-gallon No. 2 fuel oil aboveground storage tank (AST) and two fuel-oil fired boilers. The Site location is shown on Figure 1 and a Site Plan is included as Figure 2.

Summary of Past Uses

Historic records indicated that the past uses at the Site included various industrial, residential, and manufacturing activities. Lot 1 operated as a lumber yard in 1908. Prior to 1908, the lot was subdivided and contained residential dwellings as early as 1886. In 1928, the western portion of Lot 1 was identified as a storage yard for "building materials" and a garage, and the eastern portion was shown as a chapel and multiple low-rise dwellings. By 1950, the western portion of Lot 1 operated as plumbing supplies manufacturing and the eastern portion contained multiple low-rise dwellings. From 1966 to present day, the western portion of Lot 1 operated as a lighting fixture manufacturing (Legion). From 1966 to 1977, the eastern portion of Lot 1 contained multiple low-rise dwellings. The dwellings were demolished and building additions were added to the northern and eastern portions of Lot 1 in 1985, and another addition to the southeastern portion of the Site was constructed in 1999 (Lot 33), which expanded the lighting fixture manufacturing operations to the eastern portion of Lot 1. Prior to the construction of the addition in 1999, Lot 33 operated as an auto repair shop from 1928 to 1996 with nail polish bottling shown as an additional operation in 1950, and an auto junkyard from 1983 to 1996.

The Site is abutted to the north by light manufacturing and a multi-family residential building; to the east by Snediker Avenue followed by a five-story office building and an asphalt-paved parking lot occupied by the New York City Police Department followed by light manufacturing with commercial, industrial, and residential uses beyond; to the south by Glenmore Avenue followed by mixed-use industrial, commercial, and residential properties; and to the west of Lot 1 by Van Sinderen Avenue and an elevated railway for the L-line of the New York City (NYC) Metropolitan Transit Authority (MTA). An adjacent property (Lot 36) divides a portion of Lot 1 along Glenmore Avenue and includes a 1-story metal frame garage and driveway. The surrounding area was primarily commercial and industrial properties with sparse residential development. One sensitive receptor (Brooklyn Children Learning Academy) is located at 91 Junius Street, approximately 262 feet to the west. No other sensitive receptors, such as schools, day care facilities, or hospitals, located within a 500-foot radius of the Site.

Summary of the Remedial Investigation (RI)

An RI was conducted at the Site by AKRF from September 29, 2022 to October 20, 2022. The RI included the following scope of work: a geophysical survey, the advancement of 20 soil borings with continuous soil sampling, the installation and development of six two-inch-diameter permanent groundwater monitoring wells, the installation of 12 temporary soil vapor points, and the laboratory analysis of 81 soil samples, six groundwater samples, and 12 soil vapor samples. The sample collection and laboratory analysis included NYSDEC's requirements for quality assurance/quality control (QA/QC), including Category B Reporting.

Field evidence of contamination, including petroleum-like odors and solvent-like odors, staining, and/or elevated PID readings, were observed at various depths within the top 7 feet below grade in all but one soil boring. No evidence of free phase product [non-aqueous phase liquid (NAPL)] was identified in any of the borings installed during the RI.

Soil from each of the continuous sampling intervals was placed into laboratory supplied containers and was either placed on hold or designated for analysis using a varying set of parameters based on location, depth, initial laboratory results, what contaminants were present, and delineation needs. The first round of analysis included surface soil [0-2 feet below grade (bg)]; a second sample was collected for analysis from the 2 to 4 feet bg interval; a third grab sample was collected for analysis from borings on the eastern portion of the Site from either 8 to 10 feet bg, 12 to 14 feet bg, or 14 to 16 feet bg; and, a fourth grab soil sample was collected for analysis at locations where groundwater monitoring wells were installed from the two-foot interval directly above the apparent groundwater interface, which varied between approximately 38 and 42 feet bg depending on the location. The first, third, and fourth soil samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by EPA Method 8260D, TCL semivolatile organic compounds (SVOCs) by EPA Method 8270E, polychlorinated biphenyls (PCBs) by EPA Method 8082A, TCL pesticides by EPA Method 8081B, herbicides by EPA Method 8151A, target analyte list (TAL) metals by EPA Method 6000/7000 series, cyanide by EPA Method 9012B, trivalent and hexavalent chromium by EPA Method 7196A, Per- and Polyfluoroalkyl Substances (PFAS) by EPA Method 537 (modified), and 1,4-dioxane by EPA Method 8270E SIM. The second soil sample was analyzed for chlorinated VOCs (CVOCs) only.

Additional grab samples were collected from all soil borings in two-foot increments from two feet bg to the terminus of the boring to vertically delineate the extent of CVOC contamination. These samples were initially placed on hold pending analysis of the sample from the previous interval. Additionally, a sample was collected at RI-SB-02 from 12 to 14 feet bg, which was analyzed for CVOCs and TAL metals only, corresponding to a hotspot identified during the April and May 2022 subsurface investigation. The soil samples collected also coincided with depth intervals where the highest levels of field contamination were observed (staining, odors, and/or PID readings).

Soil/fill sample analytical results were compared to the NYSDEC 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 Section 6.8 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs); and soil sample results for CVOCs were additionally compared to Protection of Groundwater Soil Cleanup Objectives (PGWSCOs). Soil sample analytical results for PFAS were compared to the NYSDEC UU and RR Guidance Values. Groundwater sample analytical results were compared to the NYSDEC Technical Operational and Guidance Series (TOGS) Class GA Ambient Water Quality Standards and Guidance Values (AWQSGVs) and groundwater sample analytical results for PFAS were compared to the NYSDEC PFAS Guidance Values. There are currently no regulatory or published guidance values for VOCs in soil vapor; therefore, the results of the soil vapor samples are presented herein without comparative standards.

The Site was underlain by an unconsolidated fill comprised of a mixture of sand, gravel, silt, clay, brick, concrete, metal, and plastic to depths down to approximately 10.5 feet bg. The fill was underlain by a dense sand and silt with varying amounts of gravel and cobbles down to the maximum boring terminus of 50 feet below grade. Bedrock was not encountered during the RI.

Groundwater beneath the Site was measured from surveyed monitoring wells to be at elevations ranging from 8.73 to elevation 8.91 feet above sea level [North American Vertical Datum 1988 (NAVD88)], or

approximately 40 to 42 feet below grade surface. Groundwater was calculated to flow in a south-southeasterly direction toward the Jamaica Bay, approximately 2.5 miles southeast of the Site. A groundwater contour map has been included as Figure 3. Groundwater elevations are presented in Table 1.

The October 2022 RI and May 2022 Phase II sample locations are shown on Figure 2. The complete analytical results for soil, groundwater, and soil vapor samples collected during the RI are presented in Tables 2A through 2F, 3A through 3F, 4A through 4G, 5A through 5G, 6, and 7, respectively. Soil/fill sample concentrations above UUSCOs, PGWSCOs and RRSCOs are presented on Figures 4A and 4B; Isocontour maps for tetrachloroethene (PCE) and trichloroethene (TCE) in shallow soil (0 to 2 feet bg) are presented on Figures 5A and 5B; Isocontour maps for PCE and TCE in shallow soil (2 to 4 feet bg) are presented on Figures 6A and 6B groundwater sample concentrations above AWQSGVs and Screening Levels are presented on Figure 7; Isocontour maps for PCE and TCE in groundwater are presented on Figures 8A and 8B; soil vapor sample detections are presented on Figures 9A and 9B; and Isocontour maps for PCE and TCE in soil vapor are presented on Figures 10A and 10B. The following is a summary of the findings from the soil/fill, groundwater, and soil vapor analytical results.

Soil Sample Summary

A summary of soil detections exceeding their respective UUSCOs, PGWSCOs and/or RRSCOs is shown in Table E-I.

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
Acetone	RI-SB-07_2-4_20221004	0.05	100	NA	0.087
	RI-SB-21_0-2_20221005				0.20
	RI-SB-19_4-6_20221006				0.19
	RI-SB-17_4-6_20221006				0.16
Methylene Chloride	RI-SB-05_4-6_20221004	0.05	100	0.05	0.069 J

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
PCE	RI-SB-02_2-4_20221003	1.3	**19**	1.3	**20**
	RI-SB-02_4-6_20221003				17
	RI-SB-03_2-4_20221003				1.7
	RI-SB-04_0-2_20221004				4.2 JL
	RI-SB-06_0-2_20221004				5.8 J
	RI-SB-DUP-02_20221004				2.8 J
	RI-SB-07_0-2_20221004				4.1
	RI-SB-05_0-2_20221004				**37**
	RI-SB-05_2-4_20221004				18
	RI-SB-05_4-6_20221004				12
	RI-SB-09_0-2_20221004				**27**
	RI-SB-08_2-4_20221005				4.1
	RI-SB-10_0-2_20221005				4.4
	RI-SB-18_0-2_20221006				2.0
	RI-SB-18_2-4_20221006				1.7
	RI-SB-14_4-6_20221006				1.5
	RI-SB-12_2-4_20221006				2.4
	RI-SB-12_4-6_20221006				1.7
	RI-SB-11_0-2_20221006				7.1 J
	SB-1 (0-2)				**43 D**
	SB-2 (0-2)				16
	SB-4 (0-2)				4.7
	SB-5 (0-2)				**45 D**
	SB-5 (2-4)				**98 D**
	SB-7 (0-2)				11
	SB-DUP-1				8.8
TCE	RI-SB-02_4-6_20221003	0.47	21	0.47	1.6
	RI-SB-05_0-2_20221004				1.1
	RI-SB-05_4-6_20221004				0.55
	RI-SB-10_0-2_20221005				2.8
	RI-SB-14_4-6_20221006				1.3
	RI-SB-12_0-2_20221006				1.3
	RI-SB-12_2-4_20221006				3.4

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
TCE (continued)	RI-SB-12_4-6_20221006	0.47	21	0.47	0.96
	RI-SB-11_0-2_20221006				8 J
	SB-1 (0-2)				0.70
	SB-2 (0-2)				0.75
	SB-5 (0-2)				1
	SB-5 (2-4)				1.2
	SB-7 (0-2)				2.6
Cis-1,2-DCE	SB-6 (0-2)	0.25	100	0.25	0.47
Benzo(a)anthracene	RI-SB-01_0-2_20221003	1	**1**	N/A	**1.8 J**
	RI-SB-05_0-2_20221004				**2.8**
	RI-SB-05_2-4_20221004				**2.3**
	RI-SB-17_0-2_20221006				**15 D**
	RI-SB-16_0-2_20221006				**1.7**
	SB-5 (0-2)				**3.0**
	SB-5 (2-4)				**3.1**
	SB-6 (0-2)				**1.5**
	SB-7 (0-2)				**1.3**
	SB-9 (2-4)				**1.0**
Benzo(a)pyrene	RI-SB-01_0-2_20221003	1	**1**	N/A	**1.6 J**
	RI-SB-05_0-2_20221004				**2.3**
	RI-SB-05_2-4_20221004				**1.8**
	RI-SB-17_0-2_20221006				**14 D**
	RI-SB-16_0-2_20221006				**1.9**
	SB-5 (0-2)				**2.6**
	SB-5 (2-4)				**2.6**
	SB-6 (0-2)				**1.8**
	SB-7 (0-2)				**1.6**
Benzo(b)fluoranthene	RI-SB-01_0-2_20221003	1	**1**	N/A	**2.4 J**
	RI-SB-05_0-2_20221004				**3.4**
	RI-SB-05_2-4_20221004				**2.4**
	RI-SB-09_0-2_20221004				**1.1**
	RI-SB-17_0-2_20221006				**17 D**
	RI-SB-16_0-2_20221006				**2.3**

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
Benzo(b)fluoranthene (continued)	SB-5 (0-2)	1	**1**	N/A	**2.8**
	SB-5 (2-4)				**2.9**
	SB-6 (0-2)				**2.1**
	SB-7 (0-2)				**1.5**
Benzo(k)fluoranthene	RI-SB-05_0-2_20221004	0.8	**3.9**	N/A	0.98
	RI-SB-17_0-2_20221006				**5.6**
	RI-SB-16_0-2_20221006				0.93
	SB-5 (0-2)				2.2
	SB-5 (2-4)				2.2
	SB-6 (0-2)				1.9
	SB-7 (0-2)				1.3
	SB-9 (2-4)				0.98
Chrysene	RI-SB-01_0-2_20221003	1	**3.9**	N/A	1.7 J
	RI-SB-05_0-2_20221004				2.9
	RI-SB-05_2-4_20221004				3.0
	RI-SB-17_0-2_20221006				**14 D**
	RI-SB-16_0-2_20221006				1.8
	SB-5 (0-2)				**3.9**
	SB-5 (2-4)				3.8
	SB-6 (0-2)				2.1
	SB-7 (0-2)				1.3
	SB-9 (2-4)				1.1
Dibenz(a,h)anthracene	RI-SB-05_0-2_20221004	0.33	**0.33**	N/A	**0.47**
	RI-SB-17_0-2_20221006				**2.0**
	SB-5 (0-2)				**0.41**
	SB-5 (2-4)				**0.44**
	SB-6 (0-2)				**0.49**
Indeno(1,2,3-cd)pyrene	RI-SB-01_0-2_20221003	0.5	**0.5**	N/A	**0.98 J**
	RI-SB-05_0-2_20221004				**2.0**
	RI-SB-05_2-4_20221004				**0.95**
	RI-SB-09_0-2_20221004				**0.71**
	RI-SB-17_0-2_20221006				**9.2**
	RI-SB-16_0-2_20221006				**1.4**

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
Indeno(1,2,3-cd)pyrene (continued)	RI-SB-14_0-2_20221006	0.5	**0.5**	N/A	**0.66**
	SB-5 (0-2)				**1.5**
	SB-5 (2-4)				**1.7**
	SB-6 (0-2)				**1.5**
	SB-7 (0-2)				**1.3**
	SB-9 (2-4)				**0.78**
Naphthalene	RI-SB-04_0-2_20221004	12	100	N/A	13 D
Dieldrin	RI-SB-07_0-2_20221004	0.005	0.2	N/A	0.015
	RI-SB-05_0-2_20221004				0.0069
	RI-SB-09_0-2_20221004				0.0060
	SB-5 (0-2)				0.033
	SB-DUP-1				0.0053
p,p'-DDD	RI-SB-04_0-2_20221004	0.0033	13	N/A	0.024
	RI-SB-06_0-2_20221004				0.0066 J
	RI-SB-07_0-2_20221004				0.022
	RI-SB-05_0-2_20221004				0.026
	RI-SB-09_0-2_20221004				0.0055 JN
	RI-SB-08_0-2_20221005				0.015 JKN
	SB-5 (0-2)				0.170
	SB-5 (2-4)				0.0056
	SB-9 (2-4)				0.0046
p,p'-DDE	RI-SB-04_0-2_20221004	0.0033	8.9	N/A	0.017
	RI-SB-06_0-2_20221004				0.0055 J
	RI-SB-07_0-2_20221004				0.0048 J
	RI-SB-05_0-2_20221004				0.0085
	RI-SB-09_0-2_20221004				0.019
	RI-SB-08_0-2_20221005				0.0088 JKN
	SB-1 (0-2)				0.0034
	SB-4 (0-2)				0.0077
	SB-5 (0-2)				0.040
	SB-DUP-1				0.0056
p,p'-DDT	RI-SB-DUP-01_20221003	0.0033	7.9	N/A	0.014 J
	RI-SB-02_0-2_20221003				0.0055 JN

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
p,p'-DDT (continued)	RI-SB-04_0-2_20221004	0.0033	7.9	N/A	0.062
	RI-SB-06_0-2_20221004				0.018
	RI-SB-07_0-2_20221004				0.015
	RI-SB-05_0-2_20221004				0.020
	RI-SB-09_0-2_20221004				0.076
	RI-SB-08_0-2_20221005				0.035 JKN
	SB-1 (0-2)				0.0098
	SB-4 (0-2)				0.033
	SB-5 (0-2)				0.280
	SB-5 (2-4)				0.0081
	SB-8 (0-2)				0.016
	SB-9 (2-4)				0.022
	SB-11 (0-2)				0.0066
	SB-DUP-1				0.031
Arsenic	RI-SB-02_2-4_20221003	13	**16**	N/A	13.4
	RI-SB-08_8-9_20221005				**18**
	RI-SB-18_2-4_20221006				13.3
	SB-8 (2-4)				13.8
Barium	RI-SB-07_0-2_20221004	350	**400**	N/A	**432**
	RI-SB-05_0-2_20221004				**622**
	RI-SB-05_2-4_20221004				**744**
	RI-SB-08_0-2_20221005				**814**
	SB-5 (0-2)				**702**
	SB-6 (0-2)				**685**
Cadmium	RI-SB-DUP-01_20221003	2.5	**4.3**	N/A	**4.4 J**
	RI-SB-02_0-2_20221003				**7.6**
	RI-SB-02_2-4_20221003				**11.1**
	RI-SB-05_0-2_20221004				**2.6**
	RI-SB-09_0-2_20221004				**3.6**
	SB-4 (12-14)				2.73
	SB-5 (0-2)				3.9
	SB-6 (0-2)				3.11
Trivalent Chromium	SB-5 (0-2)	30	NS	N/A	30.7

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
Trivalent Chromium (continued)	SB-8 (0-2)	30	NS	N/A	214
	SB-8 (2-4)				51.1
	SB-9 (0-2)				48.9
	SB-11 (0-2)				181
	SB-11 (2-4)				30.4
Hexavalent Chromium	SB-8 (0-2)	1	110	N/A	3.72
	SB-8 (2-4)				2.51
	SB-9 (0-2)				2.85
Copper	RI-SB-DUP-01_20221003	50	**270**	N/A	159 J
	RI-SB-02_0-2_20221003				**432**
	RI-SB-02_2-4_20221003				**936**
	RI-SB-04_0-2_20221004				54.9 J
	RI-SB-05_0-2_20221004				88.1
	RI-SB-05_2-4_20221004				127
	RI-SB-10_2-4_20221005				52.5
	RI-SB-20_0-2_20221005				**302**
	RI-SB-19_0-2_20221006				**453**
	RI-SB-19_2-4_20221006				166
	RI-SB-DUP-05_20221006				**428**
	RI-SB-18_2-4_20221006				64.3
	SB-5 (0-2)				149
	SB-6 (0-2)				163
	SB-8 (0-2)				**494**
	SB-8 (2-4)				182
	SB-9 (2-4)				82
	SB-11 (0-2)				268
	SB-DUP-1				105
Cyanide	SB-8 (0-2)	27	**27**	N/A	**36.9**
Lead	RI-SB-01_0-2_20221003	63	**400**	N/A	247 J
	RI-SB-DUP-01_20221003				**993**
	RI-SB-01_2-4_20221003				67
	RI-SB-02_0-2_20221003				**1,360**
	RI-SB-02_0-2_20221003				**1,310**

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
Lead (continued)	RI-SB-03_0-2_20221003	63	**400**	N/A	225
	RI-SB-04_0-2_20221004				179
	RI-SB-07_0-2_20221004				333
	RI-SB-05_0-2_20221004				**741**
	RI-SB-05_2-4_20221004				**1,060**
	RI-SB-09_0-2_20221004				322
	RI-SB-08_0-2_20221005				361
	RI-SB-19_0-2_20221006				65.5 J
	RI-SB-DUP-05_20221006				125 J
	RI-SB-17_0-2_20221006				165
	RI-SB-16_0-2_20221006				372
	RI-SB-14_0-2_20221006				118
	RI-SB-12_0-2_20221006				**617**
	RI-SB-11_0-2_20221006				67.1
	SB-1 (0-2)				366
	SB-5 (0-2)				**830**
	SB-6 (0-2)				**1,070**
	SB-8 (0-2)				146
	SB-9 (2-4)				**569**
	SB-11 (0-2)				96.5
	SB-DUP-1				226
Manganese	SB-4 (12-14)	1,600	**2,000**	N/A	**2,140**
Mercury	RI-SB-01_0-2_20221003	0.18	**0.81**	N/A	0.71 J
	RI-SB-02_0-2_20221003				**1.1**
	RI-SB-02_2-4_20221003				0.52
	RI-SB-03_0-2_20221003				0.53
	RI-SB-07_0-2_20221004				0.26
	RI-SB-05_0-2_20221004				0.65
	RI-SB-05_2-4_20221004				**2.7**
	RI-SB-08_0-2_20221005				0.30
	SB-4 (0-2)				0.19
	SB-5 (0-2)				**0.88**
	SB-6 (0-2)				**3.71**

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
Mercury (continued)	SB-7 (0-2)	0.18	**0.81**	N/A	0.41
Nickel	RI-SB-DUP-05_20221006	30	**310**	N/A	36.4
	RI-SB-18_0-2_20221006				**318**
	RI-SB-18_2-4_20221006				42
	SB-8 (0-2)				109
	SB-11 (0-2)				79.7
Silver	SB-5 (0-2)	2	180	N/A	4.55
Zinc	RI-SB-01_0-2_20221003	109	10,000	N/A	323 J
	RI-SB-DUP-01_20221003				1,110 J
	RI-SB-01_2-4_20221003				140
	RI-SB-02_0-2_20221003				511
	RI-SB-02_2-4_20221003				747
	RI-SB-03_0-2_20221003				202
	RI-SB-04_0-2_20221004				184 JK
	RI-SB-07_0-2_20221004				212
	RI-SB-05_0-2_20221004				556
	RI-SB-05_2-4_20221004				826
	RI-SB-09_0-2_20221004				376
	RI-SB-08_0-2_20221005				392
	RI-SB-DUP-05_20221006				139 J
	RI-SB-16_0-2_20221006				124
	RI-SB-12_0-2_20221006				194
	SB-3 (0-2)				171
	SB-5 (0-2)				1,020
	SB-6 (0-2)				749
	SB-9 (2-4)				191
	SB-11 (0-2)				263
	SB-DUP-1				220

Table E-I

Analytes Detected in Soil/Fill Above UUSCOs, PGWSCOs, and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)

Notes:

*PGWSCO comparison performed for CVOCs only.

Sample detections that exceed RRSCOs are bolded.

J – The concentration given is an estimated value.

L – Sample results is estimated and biased low.

D – Sample results identified compound in an analysis that has been diluted.

K- Reported concentration value is proportional to dilution factor and may be exaggerated.

N- Indicates presumptive evidence of a compound. This flag is usually used for a tentatively identified compound, where the identification is based on a mass spectral library search.

RI-SB-DUP-01_20221003 RI-SB-01_0-2_20221003

RI-SB-DUP-02_20221004 is a blind duplicate of sample RI-SB-06_0-2_20221004.

RI-SB-DUP-05_20221006 is a blind duplicate of sample RI-SB-19_0-2_20221006.

IEC did not indicate the parent sample for SB-DUP-1.

Sample detections that exceed RRSCOs are bolded.

NA = Not applicable.

A summary of soil detections exceeding their NYSDEC Unrestricted Use Guidance Values (UUGVs) is shown in Table E-II.

Table E-II

PFAS Analytes in Soil/Fill Above UUGVs

Analyte	Sample Identification	UUGV (ppb)	RRGV (ppb)	Concentration (ppb)
Perfluorooctanesulfonic acid (PFOS)	RI-SB-01_0-2_20221003	0.88	44	10.8 J
	RI-DUP-01_20221003			3.74 J
	RI-SB-02_0-2_20221003			1.92
	RI-SB-03_0-2_20221003			1.25
	RI-SB-09_0-2_20221004			1.7
	SB-1 (0-2)			1.18
	SB-1 (2-4)			3.72
	SB-5 (0-2)			2.11
	SB-5 (2-4)			1.97
	SB-DUP-1			1.8
	SB-9 (0-2)			11.4
	SB-9 (2-4)			8.05
	SB-11 (0-2)			3.87

Table E-II

PFAS Analytes in Soil/Fill Above UUGVs

Analyte	Sample Identification	UUGV (ppb)	RRGV (ppb)	Concentration (ppb)
Perfluorooctanoic acid (PFOA)	RI-SB-01_0-2_20221003	0.66	33	0.84 J
	RI-SB-02_0-2_20221004			3.08
	RI-SB-08_0-2_20221005			0.71

Notes:

RI-SB-DUP-01_20221003 is a blind duplicate of sample RI-SB-01_0-2_20221003

IEC did not indicate the parent sample for SB-DUP-1.

J- The concentration given is an estimated value.

ppb – parts per billion

Groundwater Sample Summary

A summary of groundwater detections above the AWQSGVs is shown in Table E-III.

Table E-III
Analytes Detected in Groundwater Samples Above AWQSGVs

Analyte	Sample	AWQSGV (ppb)	Concentration (ppb)
Acetone	RI-MW-02_20221019	50	74 JK
PCE	RI-MW-01_20221019	5	2,300
	RI-MW-02_20221019		3,800
	RI-MW-03_20221019		17,000
	RI-MW-DUP_20221019		19,000
	RI-MW-04_20221020		400
	RI-MW-05_20221020		470
	RI-MW-06_20221020		500
	P2-MW-2		1,700 D
	P2-MW-3		2,000 D
	P2-MW-5		840 D
	P2-MW-DUP		2,200 D
TCE	RI-MW-01_20221019	5	12
	RI-MW-02_20221019		14
	RI-MW-03_20221019		30 J
	RI-MW-DUP_20221019		29 J
	RI-MW-05_20221020		5.2
	RI-MW-06_20221020		6.0
	P2-MW-2		8.8
	P2-MW-3		7.7
	P2-MW-5		5
Chloroform	RI-MW-03_20221019	7	18 J
	RI-MW-DUP_20221019		16 J
Antimony	P2-MW-2	0.003	0.005
Arsenic	P2-MW-2	0.025	0.03

Table E-III
Analytes Detected in Groundwater Samples Above AWQSGVs

Analyte	Sample	AWQSGV (ppb)	Concentration (ppb)
Chromium	P2-MW-2	0.05	0.167
	P2-MW-3		0.099
	P2-MW-5		0.076
	P2-MW-DUP		0.076
Iron	RI-MW-01_20221019	300	1,250
	RI-MW-02_20221019		850
	RI-MW-03_20221019		1,700 J
	RI-MW-DUP_20221019		1,090 J
	RI-MW-05_20221020		314
	RI-MW-06_20221020		619
Lead	P2-MW-2	0.025	0.077
Manganese	RI-MW-01_20221019	300	1,810
	RI-MW-02_20221019		1,570
	RI-MW-03_20221019		2,000
	RI-MW-DUP_20221019		1,630
	RI-MW-04_20221020		1,360
	RI-MW-05_20221020		1,530
	RI-MW-06_20221020		1,220
Nickel	P2-MW-2	0.1	0.275
Sodium	RI-MW-01_20221019	20,000	50,100
	RI-MW-02_20221019		84,500
	RI-MW-03_20221019		66,800
	RI-MW-DUP_20221019		75,300
	RI-MW-04_20221020		88,900
	RI-MW-05_20221020		75,200
	RI-MW-06_20221020		81,500
Iron (dissolved)	RI-MW-01_20221019	300	393
	RI-MW-02_20221019		602
	RI-MW-03_20221019		1,600 J
	RI-MW-DUP_20221019		1,090 J
	RI-MW-06_20221020		575
Manganese (dissolved)	RI-MW-01_20221019	300	1,770
	RI-MW-02_20221019		1,490
	RI-MW-03_20221019		1,940
	RI-MW-DUP_20221019		1,610
	RI-MW-04_20221020		1,340
	RI-MW-05_20221020		1,460
	RI-MW-06_20221020		1,180
Sodium (dissolved)	RI-MW-01_20221019	20,000	48,400
	RI-MW-02_20221019		54,600
	RI-MW-03_20221019		66,400
	RI-MW-DUP_20221019		67,700
	RI-MW-04_20221020		81,500

Table E-III
Analytes Detected in Groundwater Samples Above AWQSGVs

Analyte	Sample	AWQSGV (ppb)	Concentration (ppb)
Sodium (dissolved)	RI-MW-05_20221020	20,000	74,300
	RI-MW-06_20221020		81,200

Notes:
RI-MW-DUP_20221019 is a blind duplicate of RI-MW-03_20221019.
MW-DUP is a blind duplicate of P2-MW-5.
J – The concentration given is an estimated value.
D – Sample results identified compound in an analysis that has been diluted.
K- Reported concentration value is proportional to dilution factor and may be exaggerated.

A summary of groundwater detections exceeding their NYSDEC Screening Levels is shown in Table E-IV.

Table E-IV
PFAS Analytes in Groundwater Samples Above NYSDEC Screening Levels

Analyte	Groundwater Sample ID	Screening Level (ng/L)	Concentration (ng/L)
PFOS	RI-MW-01_20221019	10	13 J
	P2-MW-3		20.4
	P2-MW-DUP		16.8
	P2-MW-5		23.8
PFOA	RI-MW-01_20221019	10	89.5
	RI-MW-03_20221019		35.9
	RI-MW-DUP_20221019		35.5
	P2-MW-3		79.8
	P2-MW-DUP		83
	P2-MW-5		105

Notes:
RI-MW-DUP_20221019 is a blind duplicate of RI-MW-03_20221019.
P2-MW-DUP is a blind duplicate of P2-MW-5.
J – The concentration given is an estimated value.

Soil Vapor Sample Summary

Soil vapor analytical results indicated low levels of petroleum-related VOCs and low to high levels of chlorinated VOCs. Elevated concentrations of chlorinated VOCs (CVOCs) were detected all soil vapor samples including PCE, ranging from 200 micrograms per cubic meter (µg/m^3) to 980,000 µg/m^3, and TCE ranging from 23 µg/m^3 to 250,000 µg/m^3. Additional CVOCs including cis-1,2-DCE (max. 5,800 µg/m^3), trans-1,2-dichloroethene (max. 1,200 µg/m^3), carbon tetrachloride (max. 0.86 µg/m^3), methylene chloride (max. 6.3 µg/m^3) and 1,1,1-trichloroethane (111-TCA) (max. 5.3 µg/m^3) were detected in various soil vapor samples. Petroleum-related VOCs and other VOCs, including BTEX (benzene, toluene, ethylbenzene, and xylenes), butane, cyclohexane, cymene, isopropylbenzene, n-heptane, n-hexane, n-propylbenzene, tert butyl alcohol (TBA), 2-hexanone, 4-ethyltoluene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,2,4-trimethylpentanecymene, and 4-methyl-2-pentanone, 2-butanone (MEK), trichlorofluoromethane, and 1,1,2-trichloro-1,2,2-trifluoroethane were detected in the soil vapor samples at concentrations up to 363 µg/m^3.

Qualitative Human Health Exposure Assessment (QHHEA)

Currently, there is a potential exposure pathway from soil vapor intrusion into the existing building; however, as the building is currently vacant it is not expected that the exposure pathway would become complete. There is also a potential exposure pathway from soil vapor intrusion into the adjacent structures. Once redevelopment activities begin, there will be a potential exposure pathway from contaminated surface soil/fill to construction workers as these workers could potentially ingest, inhale, or have dermal contact with any exposed contaminated fill/soil. If future redevelopment plans require dewatering (although unlikely), there will be an additional potential exposure pathway as workers could potentially inhale or have dermal contact with the contaminated groundwater. Without remediation, once redevelopment of the Site has been completed, there will be a potential exposure pathway from the potential off-gassing of residual organic vapors in the soil, groundwater, and/or soil vapor to adult and child residents, medical personnel, building support staff, building maintenance staff, and visitors, through cracks or openings in the foundation of the new building and surrounding buildings. In addition, there will be a potential exposure pathway from direct contact to soil and any particulates emanating from open areas (courtyard) at the Site to off-site pedestrians, visitors, cyclists, and adult and child residents. Implementation of the RA outlined in this RAWP will prevent the potential exposure pathways from becoming complete.

Summary of the Remedy

Remedial activities will be performed at the Site in accordance with this RAWP and the Department-issued Decision Document (DD). All deviations from this RAWP and/or the DD will be promptly reported to NYSDEC for approval and will be fully explained in the Final Engineering Report (FER). It is anticipated that Interim Remedial Measures (IRM), including excavation of soil down to 2 feet across the entire Site with deeper excavation in several areas to remove additional material exceeding the RRSCOs and PGWSCOs (chlorinated VOCs only), will be conducted prior to the full scale remedial action. The selected remedial actions include:

1. Demolition and abatement (e.g., asbestos, lead based paint, universal waste, etc.) of the existing building if any remains after completion of the IRM.
2. Excavation of soil above RRSCOs and PGWSCOs within the upper 15 feet below grade in the eastern portion of the Site and to 2 feet below grade across the remainder of the Site with targeted deeper excavation of soil exceeding PGWSCOs for chlorinated VOCs (CVOCs) in source areas defined by 6 NYCRR Part 375-6.8 if any contaminated soil remains after completion of the IRM. In addition, any tanks and associated piping, other structures associated with a source of contamination, and/or grossly contaminated soil, if encountered, will be removed in accordance with applicable regulations.
3. Installation of support of excavation (SOE) necessary to enable excavation of soil. SOE installation will comply with applicable local and state-controlled inspections.
4. A Site-specific health and safety plan (HASP) and associated community air monitoring plan (CAMP) will be implemented during all ground-intrusive Site activities, which includes soil disturbance and loading activities, to monitor levels of VOCs and airborne particulates within the active work zones and around the perimeter of the Site.
5. A Special Requirements Community Air Monitoring Program (SRCAMP) will be implemented during all ground-intrusive Site activities within 20 feet of occupied structures and/or potentially exposed populations to monitor levels of VOCs and airborne particulates.
6. Screening for indications of contamination (by visual means, odor, and monitoring with a photoionization detector [PID]) of soil during all ground-intrusive Site work, including soil disturbance and loading activities.
7. Characterization and off-site disposal of all materials removed from the Site in accordance with all federal, state, and local rules and regulations for handling, transport, and disposal. Waste disposal facilities will be selected based on the data collected to date and the results of the planned waste classification sampling.

8. Importation of clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) to replace the excavated soil/fill and/or establish the design grades as necessary. On-site soil/fill that does not exceed RRSCOs for any compound and PGWSCOs for CVOCs may be used on-site to backfill the excavation areas or re-grade the Site. Soil exceeding the UUSCO for 1,4-Dx will not be imported, per DER-10: Appendix 5 - Allowable Constituent Levels for Imported Fill or Soil, Subdivision 5.4(e). If PFOA or PFOS are detected in any sample at or above 1 part per billion (ppb), it will also be tested by the Synthetic Precipitation Leaching Procedure (SPLP). If the SPLP results exceed 10 parts per thousand (ppt) for the combined analysis, the soil will not be reused or imported. Analytical results will be compared to Table 375-6.8(b) of 6 NYCRR Part 375 and submitted to NYSDEC via a *Request to Import/Reuse Soil or Fill* form for review and approval prior to importation and placement on-site.
9. Collection and analysis of confirmatory and documentation endpoint samples across the additional remedial excavation area(s), if any, to document remaining concentrations of contaminants in soil/fill after excavation is complete. Endpoint sampling will occur around hotspots and any additional areas of concern (AOCs) identified during the remedial action based on the sampling frequency outlined in Section 5.4 of DER-10.
10. Implementation of a groundwater treatment program to address elevated concentrations of CVOCs in groundwater. The groundwater treatment program will include in-situ chemical oxidation, reductive dechlorination, and/or enhanced bioremediation. Details of the groundwater treatment program will be presented in a groundwater treatment design report.
11. Installation and operation of an active sub-slab depressurization system (SSDS) below the proposed new building foundation to prevent vapor intrusion into the proposed building.
12. Installation of a soil vapor extraction system (SVES) across the Site to treat residual soil vapor and prevent the off-site migration of soil vapor.
13. Recording of an Environmental Easement (EE) with the New York City Register to prevent future exposure to any residual contamination remaining at the Site. The EE will: require the remedial parties/Site owners to complete and submit a periodic certification of ECs and ICs to the Department in accordance with Part 375-1.8 (h)(3); allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws; restrict the use of groundwater as a source of potable or process water without necessary water quality treatment, as determined by NYSDOH; and require compliance with a Site-specific NYSDEC-approved Site Management Plan (SMP).
14. Preparation of a SMP for long term management of residual contamination as required by the EE including plans for: (1) Engineering Controls and Institutional Controls, (2) monitoring, (3) operation and maintenance, and (4) reporting.
15. In areas where a Track 2 restricted residential use cleanup is not achieved, the remedy will include construction and maintenance of a cover system to prevent human exposure to residual contaminants in soil/fill remaining under the Site, which will consist of: (1) a minimum two-foot clean fill buffer with demarcation barrier in all landscaped and non-covered areas, (2) concrete building foundations underlain by a minimum 20-mil vapor barrier membrane, which doubles as a demarcation barrier, in areas within the building footprint; and/or (3) paved surfaces underlain by a demarcation barrier in parking lot, pathways, and sidewalk areas. Any fill material brought to the Site will meet the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d).

DRAFT REMEDIAL ACTION WORK PLAN (RAWP)

1.0 INTRODUCTION

Glenmore Owner LLC (the Applicant) is requesting to enter into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC or the Department) Brownfield Cleanup Program (BCP) to remediate the approximately 0.823-acre property located at 221-241 Glenmore Avenue in the New Lots sub-section of the East New York neighborhood of Brooklyn, New York, also identified as Block 3697, Lots 1 and 33 on the New York City Tax Map (hereafter referred to as the "Site" or "controlled property"). Upon acceptance into the BCP, it is anticipated that Glenmore Owner LLC will be classified as a Volunteer. The proposed development plan includes construction of a 5-story 62,700-square foot (SF) community shelter facility on the eastern half of the Site and common spaces, landscaping, and parking on the western half of the Site. The Site will provide community services and dormitory-style residential uses for the "Women's Intake and Assessment Shelter" under the New York City Department of Homeless Services (DHS); therefore, restricted residential use is proposed for the Site.

This RAWP has been prepared by AKRF, Inc. (AKRF) on behalf of the Applicant. A Remedial Investigation (RI) Report (RIR) and an Interim Remedial Measures Work Plan (IRMWP) have been prepared and are being submitted to NYSDEC concurrently with this Draft RAWP. The data summarized in the RIR was used to prepare this RAWP, which provides an evaluation of Remedial Action (RA) alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in Division of Environmental Remediation (DER)-10 and complies with all applicable standards, criteria, and guidance (SCG), which are provided in Appendix A. The remedy described in this document also complies with all applicable federal, state, and local laws, regulations, and requirements.

1.1 Site Location

The Site is located at 221-241 Glenmore Avenue in the New Lots subsection of the East New York neighborhood of Brooklyn, New York and is identified as Block 3697, Lots 1 and 33 on the New York City Tax Map. Currently, the Site contains two contiguous tax parcels developed with three adjoining buildings consisting of: a two-story building on Lot 33, which was formerly utilized as storage and workshop spaces on the first floor and management offices on the second floor (SE portion of the Site, 241 Glenmore Avenue), a single-story former manufacturing building on the northeastern portion of Lot 1 (NE portion of Site, 221 Glenmore Avenue), and a single-story former manufacturing building on the western portion of Lot 1, which formerly operated as the lighting manufacturing area (W portion of the Site, 221 Glenmore Avenue). The three buildings located within the Site are currently unoccupied, except for storage of materials.

The Site is abutted to the north by light manufacturing and a multi-family residential building; to the east by Snediker Avenue followed by a 5-story office building occupied by the New York City Police Department and an asphalt-paved parking lot followed by light manufacturing with commercial, industrial, and residential uses beyond; to the south by Glenmore Avenue followed by mixed-use industrial, residential, and commercial properties; and to the west by Van Sinderen Avenue and an elevated railway for the L-line of the NYC Metropolitan Transit Authority. An adjacent property (Lot 36) divides a portion of on-Site Lot 1 along Glenmore Avenue and includes a 1-story metal frame garage and driveway. The Site location is shown on Figure 1 and a Site Plan is included as Figure 2. A site survey is provided as Appendix B.

1.2 Proposed Redevelopment Plan

The proposed redevelopment currently contemplated at the Site includes demolition of the existing building, followed by the construction of a includes a newly constructed 5-story, 62,700 SF community shelter facility on the eastern half of the Site. The western half of the Site will contain common spaces, landscaping, and parking. The entire facility will be ADA-compliant and provide

smaller dormitory-style rooms, with a mix of 2-5 person suites. The building will include 64 residential/shelter units. Residents will have access to an array of on-site social service and medical staff, a full-service commercial kitchen and dining hall, a client lounge, laundry, a landscaped courtyard located adjacent to the ground floor and rooftop terraces. The building will include a partial cellar to accommodate mechanical, maintenance, and storage for the facility. The building will be designed to meet/exceed Enterprise Green Communities' energy performance and sustainability standards, including 100% electric-powered mechanical systems, an energy efficient HVAC system, increased stormwater retention capacity and landscaped outdoor passive recreation areas.

The Site's current zoning designation is light manufacturing (M1-4). The proposed use is consistent with existing zoning. The remedial action contemplated under this RAWP will be implemented concurrent with the proposed redevelopment plan.

1.3 Description of Surrounding Property

The surrounding area is mixed-use and includes predominantly commercial and industrial properties with some residential development. Based on the NYC SPEED map, the following sensitive receptors are located within a 500-foot radius of the Site: Brooklyn Children Learning Academy and Day Care are located approximately 245 feet to the west and TLC Sculpture Park Garden is located approximately 340 feet to the east. No other sensitive receptors, such as schools, day care facilities, or hospitals, are located within a 500-foot radius of the Site.

2.0 DESCRIPTION OF PREVIOUS INVESTIGATION FINDINGS

The Site was thoroughly investigated to determine whether past usage adversely affected the Site subsurface during a Phase II Subsurface Investigation completed in April and May 2022 and a RI, which was completed between September and October 2022. The findings from the Phase II Subsurface Investigation and RI, which were conducted in general accordance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10) document, were documented in the December 2022 RIR. The Phase II Subsurface Investigation Report (SIR) and the RIR are included in Appendix C, and findings presented in the RIR are further discussed in the following sections. The work performed under both sampling events is summarized below:

2.1 Summary of Previous Remedial Investigations

The scope of the Phase II Investigation and the RI included the advancement of 30 soil borings with continuous sample collection and laboratory analysis of 103 soil samples and 6 blind duplicate samples; the installation of 3 semi-permanent and 6 permanent groundwater monitoring wells with collection and laboratory analysis of 9 groundwater samples and 1 blind duplicate sample; the installation of 20 temporary soil vapor points with collection and laboratory analysis of 20 soil vapor samples; and the performance of a groundwater monitoring well elevation survey to determine groundwater flow direction beneath the Site.

2.1.1 Geophysical Survey and Utility Mark Outs

As required by law, Dig Safely New York was contacted at least three days prior to the start of all intrusive work to obtain utility mark outs.

A geophysical survey comprising a ground penetrating radar (GPR) and magnetometer survey was conducted by Nova Geophysical Engineering of Douglaston, New York on September 29, 2022. Multiple anomalies resembling potential subsurface utilities (such as electric, water, sewer, and gas) were identified across the Site, including two anomalies resembling covered former drains noted to be connected to the sewer system. The geophysical survey also identified one large anomaly area on the southern portion of the Site that appeared to be consistent with potential buried tanks and was located near two suspected vent pipes and one fill port (see Figure 2).

2.1.2 Soil Boring Advancement

The April and May 2022 soil borings (P2-SB-1 through P2-SB-9 and P2-SB-11) were advanced at the Site using a track-mounted Geoprobe® direct push probe (DPP) unit and the October 2022 soil borings (RI-SB-01 through RI-SB-14 and RI-SB-16 through RI-SB-21) were advanced using a Geoprobe® DPP unit and Geoprobe® Sonic drill rig. Soil boring locations are presented on Figure 2.

Soil cores were field-screened for evidence of contamination using a calibrated photoionization detector (PID) equipped with an 10.6 electron volt (eV) lamp during the Phase II and an 11.7 eV lamp during the RI. At each boring location, AKRF field personnel recorded and documented subsurface conditions using the modified Burmister soil classification system. All sampling equipment was either dedicated or decontaminated between sampling locations.

The soil boring logs are included in Appendix D.

2.1.3 Groundwater Monitoring Well Installation and Development

In April/May 2022, two semi-permanent groundwater monitoring wells (P2-MW-3 and P2-MW-5) were installed to depths of 47 and 48 feet below grade, respectively. The temporary wells were constructed of 1-inch Schedule 40, threaded, flush-joint polyvinyl chloride (PVC) well materials with 10 feet of well screen installed across the water table. Three

permanent geotechnical wells (P2-MW-1, P2-MW-2, and P2-MW-4) were installed to depths ranging from 40 to 50 feet below grade. The geotechnical wells were constructed of 2-inch Schedule 40, threaded, flush-joint PVC well materials with 10 feet of well screen installed across the water table (except for P2-MW-2 which was screened just at the GW table interface). The annular space around the monitoring wells was backfilled with clean silica sand to approximately two feet above the screen.

In October 2022, six 2-inch diameter permanent groundwater monitoring wells (RI-MW-01 through RI-MW-06) were installed at the locations shown on Figure 2. Monitoring wells RI-MW-01, RI-MW-02, and RI-MW-03 were installed to a depth of 46 feet bgs; RI-MW-05 and RI-MW-06 were installed to a depth of 47 feet bgs; and RI-MW-08 was installed to a depth of 48 feet bgs. Each well was constructed with 10 feet of 0.020-inch slotted PVC well screen. A No. 2 morie sand pack was installed from the bottom of each well to approximately two feet above the well screen, followed by two feet of hydrated bentonite. The remaining annular space around the well was filled with bentonite-cement grout to approximately 0.5 feet bgs. The wells were subsequently finished with j-plugs, flush mount well caps, and a concrete pad.

Groundwater monitoring well installation details are shown on the soil boring logs provided in Appendix D. Groundwater well construction details and sampling location rationale are summarized in In-Text Table I.

Table I
Groundwater Monitoring Well Construction Details and Rationale

Monitoring Well ID	On-Site Well Location	Screened Intervals (feet below grade)	Rationale for Sampling Location
RI-MW-01	Southeastern	36.30-46.30	To assess downgradient groundwater quality in the southeastern portion of the Site, confirmation of Phase II groundwater sampling results/establish baseline conditions
RI-MW-02	Central	35.22-45.22	To assess groundwater quality in the central portion of the Site, confirmation of Phase II groundwater sampling results/establish baseline conditions
RI-MW-03	Northeastern	36.00-46.00	To assess groundwater quality in the northeastern portion of the Site, confirmation of Phase II groundwater sampling results/establish baseline conditions
RI-MW-04	Northwestern	38.00-48.34	To assess upgradient groundwater quality in the northwestern portion of the Site, confirmation of Phase II groundwater sampling results/establish baseline conditions
RI-MW-05	Southwestern	36.80-46.80	To assess downgradient groundwater quality in the southwestern portion of the Site, confirmation of Phase II groundwater sampling results/establish baseline conditions
RI-MW-06	Central	37.28-47.28	To assess downgradient groundwater quality in the central portion of the Site, confirmation of Phase II groundwater sampling results/establish baseline conditions

Notes:
bgs = below ground surface
Depth to groundwater was measured from the top of well casing.

2.1.4 Groundwater Monitoring Well Development

Following installation, each well was developed by AKRF via an electric Waterra® Hydrolift pump affixed with dedicated high-density polyethylene tubing to remove any accumulated fines and establish a hydraulic connection with the surrounding aquifer. Development water was monitored with a Horiba U-52 water quality meter throughout development. The goal of well development was to reduce turbidity within the well until less than 50 nephelometric turbidity units (NTUs) for three successive readings, and until water quality indicators (pH, temperature, oxidation reduction potential, dissolved oxygen, and specific conductivity) stabilized to within 10% for three successive readings. All development water was containerized in New York State Department of Transportation (DOT)-approved 55-gallon drums.

The depth to groundwater was measured using an oil/water interface probe. Depth to groundwater beneath the Site ranged from approximately 40.95 feet below grade (RI-MW-01) in the southeastern portion of the Site to approximately 42.86 feet below grade (P2-MW-5) in the northwestern portion of the Site.

2.1.5 Groundwater Monitoring Well Elevation and Location Survey

On October 19, 2022, the six groundwater monitoring wells installed as part of the RI (RI-MW-01 through RI-MW-06) and all accessible existing monitoring wells from the Phase II (P2-MW-1, P2-MW-3, P2-MW-4, and P2-MW-5) were surveyed by DPK Consulting, LLC of Edison, New Jersey, a New York State-licensed surveyor. Elevation measurements were taken on the north side of the top of the PVC casing at each of the temporary groundwater monitoring wells; location measurements were taken at the adjacent ground floor. Horizontal and vertical datum were tied to the North American Vertical Datum of 1988 (NAVD88). Based on Site-specific well point measurements, groundwater beneath the Site ranges from elevation 8.70 to elevation 8.91 NAVD88, or approximately 40.95 to 42.86 feet below ground surface (bgs) across the Site. Groundwater flows beneath the Site in a south-southeasterly direction toward Jamaica Bay, approximately 2.5 miles southeast of the Site. A groundwater elevation and contour map is enclosed as Figure 3.

2.1.6 Temporary Soil Vapor Point Installation

In April/May 2022, eight temporary soil vapor points (P2-SV-1 through P2-SV-8) were installed to approximately 2 feet below grade in areas proposed to be graded or minimally excavated during development and 12 feet below grade in areas of the proposed building cellar. In September 2022, 12 additional soil vapor points (RI-SV-01 through RI-SV-12) were installed to approximately 12 to 18 inches below the building slab. The soil vapor point locations are shown on Figure 2.

The temporary soil vapor sampling points were installed by advancing a drill bit into the subsurface. At each point, a 6-inch stainless steel screen implant connected to Teflon™-lined polyethylene tubing was installed in the boring, and the sample tubing was extended from the bottom end of the screen to above grade. The borings were backfilled with No. 2 morie sand to 6 inches above the screen. Hydrated bentonite was used to fill the remaining void around the sampling tubing to the ground surface. The RI soil vapor points were surveyed by a licensed surveyor.

The soil vapor sampling logs, provided as part of Appendix D, include vapor point construction details.

2.1.7 Soil/Fill Sampling

103 soil/fill samples and 6 blind duplicate samples were collected for laboratory analysis as part of the RI and Phase II Investigation. Field evidence of contamination, including petroleum-like odors, solvent-like odors, staining, and/or elevated PID readings, were

encountered in all soil borings across the Site, except for RI-SB-03 during the October 2022 RI. Petroleum-like odors and/or staining were detected in soil borings RI-SB-02, RI-SB-10, RI-SB-11, RI-SB-13, and RI-SB-19 between one and seven feet bgs; and solvent-like odors and/or staining were detected in soil borings RI-SB-04, RI-SB-05, RI-SB-16, and RI-SB-18 between one and four feet bgs. Elevated PID readings up to 70 ppm (RI-SB-10) were detected in all soil borings, except for RI-SB-03, at varying depths from surface grade to the terminus of the boring. Elevated PID readings encountered during the sonic drilling may have been biased high as a result of excessive moisture caused by high temperatures generated during the drilling. No evidence of free phase product [non-aqueous phase liquid (NAPL)] was identified in any of the borings installed during the RI.

A list of soil borings and the soil/fill samples submitted for laboratory analysis from each boring performed during the RI is presented in In-Text Table II.

Table II
Summary of Soil Borings and Soil/Fill Samples

Soil Boring	On-Site Location	Sample Depth Intervals (feet bgs)	Soil Sample Analytical Parameters	Rationale
RI-SB-01	Southeastern	0-2 2-4 12-14 38-40	*0-2, 12-14, and 38-40:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs., PAHs, and TAL metals	To assess soil quality and assess subsurface conditions in the southeastern portion of the Site and delineate vertical extent of VOC contamination
RI-SB-02	Southeastern	0-2 2-4 4-6 6-8 8-10 12-14	*0-2 and 8-10:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs and metals *4-6, and 6-8:* CVOCs *12-14:* TAL metals and CVOCs	To assess soil quality and assess subsurface conditions in the southeastern portion of the Site and delineate vertical extent of metals and VOC contamination
RI-SB-03	South-central	0-2 2-4 4-6 6-8 8-10 12-14	*0-2 and 12-14:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs *4 -6, 6-8, and 8-10:* CVOCs	To assess soil quality and assess subsurface conditions in the southeastern portion of the Site and delineate vertical extent of VOC contamination
RI-SB-04	Northeastern	0-2 2-4 14-16	*0-2 and 14-16:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs	To assess soil quality and assess subsurface conditions in the northeastern portion of the Site and delineate vertical extent of VOC contamination

Table II
Summary of Soil Borings and Soil/Fill Samples

Soil Boring	On-Site Location	Sample Depth Intervals (feet bgs)	Soil Sample Analytical Parameters	Rationale
RI-SB-05	Central	0-2 2-4 4-6 6-8 8-10	*0-2 and 8-10:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs, PAHs, and TAL metals *4-6, and 6-8:* CVOCs	To assess soil quality and assess subsurface conditions in the central portion of the Site and delineate vertical extent of VOC contamination
RI-SB-06	North-central	0-2 2-4 8-10 38-40	*0-2, 8-10, and 38-40:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs	To assess soil quality and assess subsurface conditions in the central portion of the Site and delineate vertical extent of VOC contamination
RI-SB-07	Northern	0-2 2-4 4-6	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the central portion of the Site and delineate vertical extent of VOC contamination
RI-SB-08	Northeastern	0-2 2-4 4-6 6-8 8-9 8-10 38-40	*0-2, 8-9, 8-10, and 38-40:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs *4-6 and 6-8:* CVOCs	To assess soil quality and assess subsurface conditions in the northeastern portion of the Site and delineate vertical extent of VOC contamination
RI-SB-09	Northeastern	0-2 2-4 8-10	*0-2 and 8-10:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs and PAHs	To assess soil quality and assess subsurface conditions in the northern portion of the Site and delineate vertical extent of VOC contamination
RI-SB-10	Northern	0-2 2-4 4-6 6-8	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs *6-8:* CVOCs	To assess soil quality and assess subsurface conditions in the northern portion of the Site and delineate vertical extent of VOC contamination

Table II
Summary of Soil Borings and Soil/Fill Samples

Soil Boring	On-Site Location	Sample Depth Intervals (feet bgs)	Soil Sample Analytical Parameters	Rationale
RI-SB-11	Northwestern	0-2 2-4 4-6 40-42	*0-2, 2-4, 4-6, and 40-42:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, 1,4-dioxane	To assess soil quality and assess subsurface conditions in the northwestern portion of the Site and delineate vertical extent of VOC contamination
RI-SB-12	Northwestern	0-2 2-4 4-6 6-8 8-10	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs *6-8, and 8-10:* CVOCs	To assess soil quality and assess subsurface conditions in the western portion of the Site and delineate vertical extent of VOC contamination
RI-SB-13	Western	0-2 2-4 4-6	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the western portion of the Site and delineate vertical extent of VOC contamination
RI-SB-14	Southwestern	0-2 2-4 4-6 6-8	*0-2 and 6-8:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *2-4:* VOCs *4-6:* CVOCs	To assess soil quality and assess subsurface conditions in the western portion of the Site and delineate vertical extent of VOC contamination
RI-SB-16	Southwestern	0-2 2-4 4-6 38-40	*0-2, 2-4, and 38-40:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the southwestern portion of the Site and delineate vertical extent of VOC contamination
RI-SB-17	South-central	0-2 2-4 4-6 38-40	*0-2, 2-4, and 38-40:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the western portion of the Site and delineate vertical extent of VOC contamination

Table II
Summary of Soil Borings and Soil/Fill Samples

Soil Boring	On-Site Location	Sample Depth Intervals (feet bgs)	Soil Sample Analytical Parameters	Rationale
RI-SB-18	Central	0-2 2-4 4-6	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the central portion of the Site and delineate vertical extent of VOC contamination
RI-SB-19	West-central	0-2 2-4 4-6	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the western portion of the Site and delineate vertical extent of VOC contamination
RI-SB-20	North-central	0-2 2-4 4-6	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the western portion of the Site and delineate vertical extent of VOC contamination
RI-SB-21	Northwestern	0-2 2-4 4-6	*0-2 and 2-4:* VOCs, SVOCs, PCBs, pesticides, herbicides, TAL metals, cyanide, trivalent and hexavalent chromium, PFAS, 1,4-dioxane *4-6:* VOCs	To assess soil quality and assess subsurface conditions in the western portion of the Site and delineate vertical extent of VOC contamination

Notes:
bgs = below ground surface

Soil/fill sampling locations are shown on Figure 2. Soil/fill sample analytical data is presented in Tables 2A through 2F and Tables 3A through 3F.

2.1.8 Groundwater Sampling

11 groundwater samples and two duplicate samples were collected for laboratory analysis as part of the RI and Phase II Investigation. No field evidence of groundwater contamination was observed in any of the groundwater monitoring wells during purging or sampling.

A list of groundwater monitoring wells and the groundwater samples collected from each well during the RI is presented in Table III.

Table III
Summary of Groundwater Monitoring Wells and Groundwater Samples

Groundwater Monitoring Well ID	Groundwater Sample ID
RI-MW-01	RI-MW-01_20221019
RI-MW-02	RI-MW-02_20221019
RI-MW-03	RI-MW-03_20221019
	RI-MW-DUP_20221019
RI-MW-04	RI-MW-04_20221020

Table III
Summary of Groundwater Monitoring Wells and Groundwater Samples

Groundwater Monitoring Well ID	Groundwater Sample ID
RI-MW-05	RI-MW-05_20221020
RI-MW-06	RI-MW-06_20221020
Notes: RI-MW-DUP_20221019 is a blind duplicate of sample RI-MW-03_20221019.	

Groundwater sampling locations are shown on Figure 2. A groundwater elevation contour map is shown on Figure 3. Groundwater sample analytical data is presented in Tables 4A through 4G and Tables 5A through 5G.

2.1.9 Soil Vapor Sampling

Seven soil vapor samples were collected for laboratory analysis as part of the RI. Methodologies used for soil vapor assessment conform to the NYSDOH Final Guidance on Soil Vapor Intrusion, October 2006.

A list of temporary soil vapor points and the soil vapor samples collected from each point during the October 2022 RI is presented in In-Text Table IV.

Table IV
Summary of Soil Vapor Points and Soil Vapor Samples

Temporary Soil Vapor Point	Soil Vapor Sample
RI-SV-01	RI-SV-01_201221013
RI-SV-02	RI-SV-02_201221013
RI-SV-03	RI-SV-03_201221013
RI-SV-04	RI-SV-04_201221013
RI-SV-05	RI-SV-05_201221013
	RI-SV-DUP_20190213
RI-SV-06	RI-SV-06_201221013
RI-SV-07	RI-SV-07_201221013
RI-SV-08	RI-SV-08_201221013
RI-SV-09	RI-SV-09_201221013
RI-SV-10	RI-SV-10_201221013
RI-SV-11	RI-SV-11_201221013
RI-SV-12	RI-SV-12_201221013
Notes: RI0-SV-Dup_20221013 is a blind duplicate of RI-SV-05_20221013.	

Soil vapor sampling locations are shown on Figure 2. Soil vapor sample analytical data is presented in Tables 6 and 7.

2.1.10 Chemical Analytical Work Performed

A list of Quality Assurance/Quality Control (QA/QC) personnel and the chemical analytical work performed is presented in Table V.

Table V
Chemical Analytical Work Performed

Factor	Description
Quality Assurance Officer	The chemical analytical QA/QC was directed by Deborah Shapiro of AKRF.

Table V
Chemical Analytical Work Performed

Factor	Description
Third Party Data Validator	The third-party data validation for the May 2022 Phase II Subsurface Investigation was performed by ddms, Inc. Third-party data validation for the October 2022 RI was performed by Lori Beyer of L.A.B. Validation Corp.
Chemical Analytical Laboratory	The chemical analytical laboratory used in the May 2022 Phase II Investigation were Phoenix Environmental Laboratories, Inc. of Manchester, CT an ELAP-certified laboratory. The chemical analytical laboratories used in the October 2022 RI were Eurofins TestAmerica of Edison, New Jersey and Burlington, Vermont, both ELAP-certified laboratories.
Chemical Analytical Methods	Soil analytical methods: • VOCs by EPA Method 8260C (rev. 2006) and EPA Method 8260D (rev. 2017) • SVOCs/PAHs by EPA Method 8270D (rev. 2007) and SVOCs/PAHs by EPA Method 8270E (rev. 2018) • Pesticides by EPA Method 8081A (rev. 2000) • Herbicides by EPA Method 8151A (rev. 1996) • PCBs by EPA Method 8082A (rev. 2000) • TAL Metals Method 6000/7000 series (rev. 2007) • Trivalent and Hexavalent Chromium by EPA Method 7196A • 1,4-Dioxane by EPA Methods 8270D SIM and 8270E SIM • 21 compound PFAS list by EPA Method 537 (modified) Groundwater analytical methods: • VOCs by EPA Method 8260C and 8260D • SVOCs by EPA Method 8270D and 8270E • Pesticides by EPA Method 8081A • Herbicides by EPA Method 8151A • PCBs by EPA Method 8082A • TAL Metals (total and dissolved) by EPA Method 6000/7000 series (rev. 2007) • 21 compound PFAS list by Modified EPA Method 537 (modified) • 1,4-Dioxane by EPA Methods 8270 SIM Soil vapor analytical method: • VOCs by EPA Method TO-15

2.1.11 Phase II Investigation and Remedial Investigation (RI) Findings

The data for soil are summarized in Tables 2A through 2F and Tables 3A through 3F; laboratory data for groundwater are summarized in Tables 4A through 4G and Tables 5A through 5G; and laboratory data for soil vapor are summarized in Tables 6 and 7. Soil sample concentrations above 6 New York Code of Rules and Regulations (NYCRR) Part

375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs), and/or Protection of Groundwater Soil Cleanup Objectives (PGWSCOs) are shown on Figures 5A and 5B. Isocontours for PCE and TCE detections in shallow soil (0 to 2 ft bg) and (2 to 4 ft bg) are shown on Figures 6A and 6B, respectively. Groundwater sample results above the NYSDEC Technical Operational and Guidance Series (TOGS) Class GA Ambient Water Quality Standards and Guidance Values (AWQSGVs) and PFAS Screening Levels are shown on Figure 7. Isocontours for PCE and TCE detections in groundwater are shown on Figures 8A and 8B. VOCs detected in soil vapor are shown on Figures 9A and 9B. Isocontours for PCE and TCE detections in soil vapor are shown on Figures 10A and 10B.

2.2 Significant Threat Determination

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

2.3 Site History

2.3.1 Past Uses and Ownership

The May 2021 Phase I Environmental Site Assessment (ESA) and historical Sanborn maps indicated that the past uses at the Site included various industrial, residential, and manufacturing activities. Lot 1 operated as a lumber yard in 1908. Prior to 1908, the lot was subdivided and contained residential dwellings as early as 1886. In 1928, the western portion of Lot 1 was identified as a storage yard for "building materials" and a garage, and the eastern portion was shown as a chapel and multiple low-rise dwellings. By 1950, the western portion of Lot 1 operated as plumbing supplies manufacturing and the eastern portion contained multiple low-rise dwellings. From 1966 to present day, the western portion of Lot 1 operated as a lighting fixture manufacturing (Legion). From 1966 to 1977, the eastern portion of Lot 1 contained multiple low-rise dwellings. The dwellings were demolished and building additions were added to the northern and eastern portions of Lot 1 in 1985, and another addition to the southeastern portion of the Site was constructed in 1999 (Lot 33), which expanded the lighting fixture manufacturing operations to the eastern portion of Lot 1. Prior to the construction of the addition in 1999, Lot 33 operated as an auto repair shop from 1928 to 1996 with nail polish bottling shown as an additional operation in 1950, and an auto junkyard from 1983 to 1996. Historically, the surrounding area was mixed-use throughout its history and included iron works, a welding shop, plastic manufacturing, and other manufacturing.

Past owners of 221 Glenmore Avenue (Block 3697, Lot 1) included: "Jacob Globe & Ano" from 1967 to 1981; Jonas Bellovin from 1981 to 1985; and Josh Realty Co Inc. from 1985 to present. Past owners of 241 Glenmore Avenue (Block 3697, Lot 33) included: Michael Shapiro from 1966 to 1975; James Bradfield in 1975; Kenneth Lowson from 1975 to 1998; and Me2 Realty Co Inc. from 1998 to present. Ownership prior to 1967 for Lot 1 and 1966 for Lot 33 is unknown

2.3.2 Previous Environmental Reports

Phase I Environmental Site Assessment, 221 & 241 Glenmore Ave, Brooklyn, New York, Impact Environmental Closures, Inc., May 28, 2021

A Phase I Environmental Site Assessment (ESA) of the Site was completed by IEC in May 2021. At the time of IEC's assessment, the Site was developed with three adjoining buildings consisting of: a two-story building on Lot 33 utilized as storage and workshop spaces on the first floor and management offices on the second floor (southeastern portion of the Site, 241 Glenmore Avenue), a single-story manufacturing building on the northeastern portion of Lot 1 (northeastern portion of Site, 221 Glenmore Avenue), and a

single-story manufacturing building on the western portion of Lot 1 which operated as the light manufacturing area (western portion of the Site, 221 Glenmore Avenue). The three buildings located within the Site were occupied by Legion Lighting Co. Inc., which operated as an industrial light manufacturer until May 2022. A small sub-grade cellar was located in the southwestern corner of Lot 1 (221 Glenmore Avenue) and contained a concrete encased 1,000-gallon No. 2 fuel oil tank and two fuel-oil fired boilers. The Phase I ESA was conducted in conformance with the scope and limitations of American Society for Testing & Materials (ASTM) Practice E1527-13 and included a visual inspection of the Site and a review of regulatory database records and historical records. Based on the findings of the Phase I ESA, the following Recognized Environmental Conditions (RECs) were identified:

- Historic site operations have included a lumber yard (circa 1908), auto repair activities (circa 1928 and 1966-1996), a factory for metal stamping (circa 1947), plumbing manufacturing (circa 1950), and a nail polish bottling facility (circa 1950). Legion Lighting was identified as a RCRA Large Quantity Generator (LQG) in 1982 for the generation of halogenated solvents (F-listed wastes) and was registered under the USEPA ID: 110001602169 within USEPA's Enforcement and Compliance History Online (ECHO) database with multiple "Action Numbers" that correspond to "Pollutant Codes", one of which states "PCE on-Site". Other types of chemicals listed on the USEPA database which may be used currently and/or were used for historic operations include, but are not limited to, petroleum and solvent-related compounds. Based on past uses of identified for the Site dating back to at least 1947, the potential for releases or discharges resultant of use, storage and handling of the chemical compounds associated with these types of operations is considered a REC.
- On the 1928 Sanborn Fire Insurance Map, two gasoline tanks are identified at the Site. One tank is located on the 221 Glenmore Avenue portion of the Site (Lot 1), in the southern section of the warehouse, and the other is located at 243 Glenmore Avenue (Lot 33), within what was the former auto repair building. Neither tank appears on the following 1950 Sanborn Map or more recent Sanborn images. No documentation was obtained with respect to the referenced tanks. It is not known whether the tanks were removed or abandoned in-placed properly, and if contamination resultant from the tanks is present in surrounding soil.

Based on the findings of the Phase I ESA, IEC recommended a subsurface investigation to investigate the identified RECs.

Subsurface Investigation Report, 221 and 241 Glenmore Avenue, Brooklyn, New York, Impact Environmental Closures, Inc, July 1, 2022

IEC conducted a subsurface investigation in April and May 2022 on behalf of Camber Property Group, LLC. The scope of work was based on the findings of the May 2021 Phase I ESA prepared by IEC. The subsurface investigation included a private utility survey; the advancement of ten soil borings across the Site and collection of two soil samples from each boring; the installation of three semi-permanent groundwater monitoring wells and collection of three groundwater samples; and the installation of eight soil vapor points with collection of eight soil vapor samples.

Two soil samples were collected from each soil boring for laboratory analysis. One sample was collected from each boring from the 0 to 2-foot interval. A second sample was collected from each boring from the 12 to 14 below grade interval within the proposed cellar footprint and from the 2 to 4-feet below grade interval outside the proposed cellar footprint. Three small diameter semi-permanent polyvinyl chloride (PVC) groundwater monitoring wells were installed within three borings across the Site. Monitoring well MW-3 was installed using 1-inch inner diameter (ID) flush joint schedule 40 PVC, while

monitoring wells MW-2 and MW-5 were installed using 2-inch ID flush-joint schedule 40 PVC.

The soil samples were analyzed for the NYSDEC Part 375 List VOCs by USEPA methods 8260C/5035, semi-volatile organic compounds (SVOCs) by USEPA method 8270D, pesticides and herbicides by USEPA methods 8081B and 8151A, polychlorinated biphenyls (PCBs) by USEPA method 8082A, Metals by USEPA Methods 6010C. Nine soil samples and one duplicate sample were also analyzed for Per- and Polyfluoroalkyl Substances (PFAS) by USEPA Method 537 and 1,4-dioxane by USEPA method 8270 SIM isotope dilution.

Groundwater Samples were analyzed for the TCL VOCs by USEPA methods 8260C/5035, TCL SVOCs by USEPA method 8270D, Pesticides by USEPA method 8081B, PCBs by USEPA method 8082A, TAL Metals by USEPA Method 6010C. Two groundwater samples and one duplicate sample were also analyzed for PFAS/PFOA by USEPA Method 537 and 1,4-dioxane by USEPA method 8270 SIM isotope dilution.

Eight temporary soil vapor points were installed approximately two feet below the building slab, at points SV-3 through SV-8 and 12-feet below grade at points SV-1 and SV-2. Eight soil vapor samples and one duplicate soil vapor sample were analyzed for VOCs by EPA Method TO-15.

The results of the Phase II ESA is included in Section 3.0 as a comprehensive summary of data compiled from both the Phase II ESA and the Remedial Investigation (RI).

Geotechnical Evaluation Report, 221 Glenmore Avenue, Brooklyn, New York, GEODesign, Inc. P.C., July 2022

GEODesign, Inc. (GDI) performed a geotechnical investigation in April and May 2022 on behalf of Camber Property Group, LLC. The objective of the investigation was to evaluate the subsurface conditions at the Site and provide geotechnical recommendations for the design and construction of the proposed building. The scope of work was based on the April 4, 2022 architectural drawings which included proposed demolition of the existing buildings and construction of a new 5-story building with one cellar level ("Cellar Option #2") with an assumed cellar height of 10 feet. The geotechnical investigation included advancement of six test borings (B-1 through B-6) using a track mounted Fordia 300 drilling rig and a track mounted Geoprobe 7822DT drilling rig. Borings were advanced using mud rotary drilling techniques. Subsurface conditions generally consisted of approximately 5 to 10 feet of uncontrolled sandy fill (Stratum 1), 15 to 25 feet of very dense sand and gravel (Stratum 2), and very dense sand that extends to a depth of at least 100 feet (Stratum 3).

One groundwater observation well was installed at Boring B-3 and constructed with 2-inch diameter schedule 25 PVC pipe with a 20-foot-long screen between depths of approximately 20 and 40 feet, and 20 feet of riser pipe. Two environmental wells were installed in Borings B-1B and PT-1B and were constructed with a 10-foot-long screen between the depths of 40 to 50 feet, and 40 feet of rise pipe. The groundwater observation well was dry on May 18, 2022 and groundwater is estimated to be deeper than 40 feet. Groundwater measurements were not taken over an extended period of time; therefore, the measurements likely do not adequately reflect seasonal or other time dependent variations that may occur.

Remedial Investigation Report, 221 and 241 Glenmore Avenue, Brooklyn, New York, AKRF, Inc., December 2022

An RI was conducted at the Site by AKRF from September 29, 2022 to October 20, 2022. The soil, groundwater, and soil vapor data documented in IEC's May 2022 Phase II SIR (described above) was used as a foundation to identify data gaps and direct the rationale

for the RI sampling plan. The RI included the following scope of work: a geophysical survey, the advancement of 20 soil borings with continuous soil sampling, the installation and development of six two-inch-diameter permanent groundwater monitoring wells, the installation of 12 temporary soil vapor points, and the laboratory analysis of 81 soil samples, six groundwater samples, and 12 soil vapor samples. The sample collection and laboratory analysis included NYSDEC's requirements for quality assurance/quality control (QA/QC), including Category B Reporting.

Soil from each continuous sampling interval was observed for evidence (i.e., staining, odors) of contamination, field screened using a photoionization detector (PID), and logged using the modified Burmister soil classification system. Field evidence of contamination, including petroleum-like odors and solvent-like odors, staining, and/or elevated PID readings, were observed at various depths within the top 7 feet below grade in all but one soil boring. No evidence of free phase product [non-aqueous phase liquid (NAPL)] was identified in any of the borings installed during the RI.

Soil from each of the continuous sampling intervals was placed into laboratory supplied containers and was either placed on hold or designated for analysis using a varying set of parameters based on location, depth, initial laboratory results, what contaminants were present, and delineation needs. The first round of analysis included surface soil [0-2 feet below grade (bg)]; a second sample was collected for analysis from the 2 to 4 feet bg interval; a third grab sample was collected for analysis from borings on the eastern portion of the Site from either 8 to 10 feet bg, 12 to 14 feet bg, or 14 to 16 feet bg; and, a fourth grab soil sample was collected for analysis at locations where groundwater monitoring wells were installed from the two-foot interval directly above the apparent groundwater interface, which varied between approximately 38 and 42 feet bg depending on the location. The first, third, and fourth soil samples were analyzed for Target Compound List (TCL) VOCs by EPA Method 8260D, TCL SVOCs by EPA Method 8270E, PCBs by EPA Method 8082A, TCL pesticides by EPA Method 8081B, herbicides by EPA Method 8151A, TAL metals by EPA Method 6000/7000 series, cyanide by EPA Method 9012B, trivalent and hexavalent chromium by EPA Method 7196A, PFAS by EPA Method 537 (modified), and 1,4-dioxane by EPA Method 8270E SIM. The second soil sample was analyzed for chlorinated VOCs (CVOCs) only.

Additional grab samples were collected from all soil borings in two-foot increments from two feet bg to the terminus of the boring to vertically delineate the extent of CVOC contamination. These samples were initially placed on hold pending analysis of the sample from the previous interval. Additionally, a sample was collected at RI-SB-02 from 12 to 14 feet bg, which was analyzed for CVOCs and TAL metals only, corresponding to a hotspot identified during IEC's April and May 2022 subsurface investigation. The soil samples collected also coincided with depth intervals where the highest levels of field contamination were observed (staining, odors, and/or PID readings).

Draft Interim Remedial Measures Work Plan, 221 and 241 Glenmore Avenue, Brooklyn, New York, AKRF, Inc., December 2022

The Interim Remedial Measures (IRM) Work Plan was prepared to remove an ongoing source of contamination affecting groundwater and soil vapor beneath the Site, and, in the process, collect targeted analytical, hydrogeological, and geological data to design the anticipated Site remedy. The actions proposed during the IRM to achieve the objectives include a PDI, and excavation and removal of the contamination source area in soil.

Previous environmental reports are included as Appendix C.

2.3.3 Sanborn Maps

Sanborn (historical fire insurance) maps were reviewed for indications of past uses on or near the Site that may have resulted in the generation of hazardous waste. Specifically, maps from 1887, 1908, 1928, 1950, 1966, 1977, 1979, 1981, 1983, 1986, 1987, 1989, 1991, 1992, 1994, 1995, 1996, and 2001 through 2007 were reviewed. All Sanborn maps available for the Site were reviewed prior to the preparation of this RAWP and are included as Appendix E.

1896

The Site was vacant.

The surrounding parcels to the north and east consisted of vacant land. The parcel to the west beyond Van Sinderen Avenue was shown as raised Long Island Railroad (LIRR) tracks. The parcel to the south contained multiple low-rise dwellings. The remainder of the surrounding area was primarily vacant, with sparse one- and two-story dwellings.

1908

The western portion of the Site contained a lumber yard and associated lumber sheds and the eastern portion of the Site contained multiple dwellings.

The surrounding area was more densely developed with dwellings. An iron works was depicted on the north-adjacent parcel. The adjacent parcel to the south contained multiple low-rise dwellings and a single-story building labeled “store”. The east-adjacent parcel contained additional low-rise dwellings.

1928

The western portion of the Site included a building labeled “Building Materials” and “Garage”. The southern portion of the building was depicted with a gasoline tank. The eastern portion of the Site contained multiple low-rise dwellings, a chapel, a single-story store, a single-story building labeled “Auto” with a gasoline tank, and a single-story shed labeled “Excelsior Storage”.

Significant development occurred in the surrounding area since 1908. The property to the north depicted two former residential structures that are now shown as office space and “iron storage”. The adjacent parcel to the south contained an additional one-story shed labeled “iron works”. Additional development in the surrounding area included residential swellings, a storage building, a two-story store, and a one-story warehouse labeled “Shapiro & Aronson Gas and Electric Fixtures”.

1950

The western portion of the Site was depicted as a rectangular building labeled “Mfg. Plumbing Supplies”. The eastern portion of the Site depicted multiple low-rise dwellings and a single-story building labeled “Nail Polish Bottling”. The two gasoline tanks previously identified in the 1928 Sanborn Map were no longer present.

Additional development occurred in the surrounding area since 1928. The iron works facility to the north of the Site expanded and took over a former residential building and included additional sheds labeled “Smithy” and “welding shop”. Former residential buildings were replaced with warehouse labeled “building material” to the south.

1966

The western portion of the Site was labeled as "Lighting Fixture Mfg.". The eastern portion of the Site contained multiple low-rise dwellings, a two-story church. The nail polish bottling building was depicted as "auto repair".

Parcels to the east and west remain unchanged. Sweater manufacturing was shown north of the north-adjacent "Iron Works" property. The parcel to the south contained additional residential structures and warehouses labeled "plastic extruding" and manufacturing.

1977

The western portion of the Site remained unchanged from the 1966 Sanborn map. Only two residential dwelling structures remained on the eastern portion of the Site. The auto repair building remained unchanged on the eastern portion of the Site.

The "Iron Works" property to the north of the Site expanded and encompassed two former residential structures. The adjacent parcel to the east contained a five-story building labeled "NYC HR administration".

1979-1981

No significant changes from the 1977 map were noted on the Site or in the surrounding area.

1983

The residential structures were no longer present on the eastern portion of the Site. The southeastern portion of the Site was labeled "Auto Junk". No further significant changes from the 1979 map were noted on the Site or in the surrounding area.

1986

The warehouse on the western portion of the Site was expanded and encompassed a portion of the eastern side of the Site. No significant changes from the 1983 map were noted on the Site or in the surrounding area.

1987-1996

No significant changes from the 1986 map were noted on the Site or in the surrounding area.

2001

The auto repair and auto junk facility on the southeastern portion of the Site was no longer depicted. The warehouse on the western and central portion of the Site now encompassed the full Site footprint. No other significant changes from the 1996 map were noted on the Site or in the surrounding area.

2002-2007

No significant changes from the 2001 map were noted on the Site or in the surrounding area.

2.4 Geological Conditions

The Site was underlain by an unconsolidated fill comprised of a mixture of sand, gravel, silt, clay, brick, concrete, metal, and plastic to depths down to approximately 10.5 feet bg. The fill was underlain by a dense sand and silt with varying amounts of gravel and cobbles down to the maximum boring terminus of 50 feet below grade. Bedrock was not encountered during the Phase II or RI.

Groundwater beneath the Site was measured from surveyed monitoring wells to be at elevations ranging from 8.73 to elevation 8.91 feet above sea level [North American Vertical Datum 1988 (NAVD88)], or approximately 40 to 42 feet below grade surface. Groundwater was calculated to

flow in a south-southeasterly direction toward the Jamaica Bay, approximately 2.5 miles southeast of the Site.

2.5 Contamination Conditions

The data compiled during the RI were compared to the following SCGs to determine the nature and extent of the contamination area associated with the Site:

Soil – NYSDEC UUSCOs, RRSCOs, and/or PGWSCOs (for CVOCs only) and NYSDEC Unrestricted Use Guidance Values (UUGVs) and Restricted Residential Guidance Values (RRGVs)

Groundwater – NYSDEC Class GA AWQSGVs and NYSDEC Proposed Screening Levels for PFOA and PFOS

Soil Vapor – No soil vapor standards currently exist.

2.5.1 Conceptual Model of Site Contamination

The primary contaminants of concern (COCs) at the Site include chlorinated VOCs (CVOCs) (TCE, PCE, and cis-1,2-dichloroethane), PAHs, and metals in shallow soil; CVOCs (PCE, TCE, and chloroform), metals, and PFAS in groundwater; and CVOCs and petroleum-related VOCs in soil vapor. Concentrations of PCE and TCE in shallow soil are likely related to historical operations at the Site, as the highest concentrations were identified in shallow soil and consistent with areas of the Site where manufacturing and equipment cleaning occurred, with trace detections noted extending to the groundwater interface. Elevated SVOCs and heavy metals concentrations found within the soils beneath the Site are likely due to fill material.

Concentrations of PCE and TCE in groundwater are likely related to historical operations at the Site. The concentrations of metals detected in groundwater are consistent with regional background conditions typical of groundwater quality in Brooklyn and are not related to historical operations at the Site. PFAS concentrations in groundwater appeared relatively consistent across the Site, with elevated readings on the western side of the Site. As PFAS concentrations across the Site were relatively consistent (including at the upgradient wells), the PFAS contamination in groundwater is more likely attributable to an upgradient source and/or consistent with regional groundwater quality for the area; however, it's unknown whether any products containing PFAS were used at the Site. Elevated concentrations of CVOCs and petroleum-related VOCs were detected in soil vapor, which are likely related to historical operations at the Site and in the surrounding area. The greatest concentrations of PCE were detected in the central and northern portions of the Site, decreasing to the south.

Based on Site-specific groundwater flow, the contaminants in groundwater could be potentially migrating to the south-southeast. Additionally, when organic compounds are exposed to air, contamination can evaporate from soil and groundwater and migrate in a vapor phase through pore space in unsaturated soil, which was present in high concentrations (specifically PCE and TCE) within the subsurface soil vapors below the Site. The vapors can build beneath structures such as pavement and building foundations.

2.5.2 Description of Areas of Concern (AOCs)

- Chlorinated Solvents – CVOCs were detected in shallow soil, groundwater, and soil vapor across the Site.
- Fill – Fill material consisting of sand, silt, and gravel with varying amounts of concrete and brick was observed from surface grade extending to approximately 10.5 feet below surface grade during the RI.

- Potential USTs/ASTs – Two "gasoline tanks" appeared on the 1928 Sanborn Fire Insurance Map for the Site. One 1,000-gallon AST is present in the partial cellar located on the southwestern portion of the Site. A subsurface anomaly was detected on the southern portion of the Site adjacent to two vent pipes during the geophysical investigation.
- Undocumented Discharges – Undocumented discharges from the Site's historical manufacturing operations and/or petroleum storage tanks.
- Historical Uses – Historic Sanborn Fire Insurance Maps identified a various manufacturing uses including lighting fixture manufacturing, nail polish bottling, auto repair, auto junk, building materials storage, a garage and plumbing supplies manufacturing as former operations at the Site.

2.5.3 Contaminated Media

Based on the results of IEC's Phase II and AKRF's RI, the COCs in soil include: the CVOCs TCE, PCE, and cis-1,2-dichloroethane; the SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene; and the metals arsenic, barium, cadmium, copper, trivalent chromium, hexavalent chromium, cyanide, lead, and mercury (naturally occurring metals were not considered COCs). The COCs in groundwater include the CVOCs PCE and TCE; the metals arsenic, chromium, and lead (naturally occurring metals were not considered COCs); and PFAS (specifically Perfluorooctanesulfonic acid [PFOS] and Perfluorooctanoic acid [PFOA]). The CVOCs PCE, TCE, cis-1,2-dichloroethylene (cis-1,2-DCE) and trans-1,2-dichloroethene (trans-1,2-DCE) and the petroleum-related VOCs benzene, toluene, ethylbenzene, and xylenes (BTEX) are considered the COCs for soil vapor.

CVOCs, SVOCs and metals were detected across the Site at concentrations above UUSCOs, RRSCOs, and/or PGWSCOs in soil samples collected up to 10.5 feet bg. The pesticides dieldrin, p,p'-DDD, p'p-DDE, and p,p'-DDT were detected in select soil samples at concentrations above their respective UUSCOs, but below their respective RRSCOs. PFOA and PFOS were detected in multiple samples at concentrations above their respective UUGVs, but below their respective RRGVs.

Three CVOCs were detected in groundwater at concentrations above AWQSGVs at individual concentrations up to 19,000 ppb, including: acetone in one sample at an estimated concentration of 74 ppb: PCE in each sample collected at concentrations up to 19,000 ppb; and TCE in five samples at concentrations up to an estimated 30 ppb. Up to five total (undissolved) metals were detected above their respective AWQSGVs in multiple groundwater samples including antimony (max. 6 ppb), arsenic (max. 30 ppb), chromium (max. 167 ppb), lead (max. 77 ppb), and nickel (max. 275 ppb). No dissolved metals other than naturally occurring metals were detected in the dissolved metals analysis.

VOCs associated with petroleum were detected at individual concentrations up to 220 µg/m^3. Elevated concentrations of CVOCs were detected all soil vapor samples, including PCE ranging from 200 µg/m^3 to 980,000 µg/m^3, with the highest concentration at RI-SV-DUP_20221013 (the blind duplicate of RI-SV-05_20221013), and TCE ranging from 23 µg/m^3 to 250,000 µg/m^3, with the highest concentration at RI-SV-11_20221013. Additional CVOCs [including cis-1,2-dichloroethylene (DCE), trans-1,2-DCE, carbon tetrachloride, methylene chloride, and 1,1,1-trichloroethane] were detected in multiple soil vapor samples, but at significantly lower concentrations than PCE and TCE.

The greatest concentrations of CVOCs were located on the northeastern and eastern portions of the Site where floor drains with unknown discharge points were located.

2.5.4 Identification of Standards, Criteria, and Guidance (SCGs)

The following remedial SCGs apply to the project and are the performance criteria used to determine whether the Remedial Action Objectives (RAOs) have been met:

- Soil – 6 NYCRR Part 375, UUSCOs, RRSCOs, and PGWSCOs (December 2006); NYCRR Part 371 - Identification and Listing of Hazardous Wastes; 6 NYCRR Part 376 - Land Disposal Restrictions; and NYCRR Part 360 - Solid Waste Management Facilities; NYSDEC UUGVs and RRGVs for PFOA and PFOS.
- Groundwater – 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998), TOGS 1.1.1 AWQSGV and Groundwater Effluent Limitations; NYSDOH MCLs; and NYSDEC PFAS Screening Levels for PFOA and PFOS.

In addition, the following SCGs are applicable to the remedial program at the Site:

- NYSDEC DER-10 – Technical Guidance for Site Investigation and Remediation (May 2010)
- NYSDEC Draft Brownfield Cleanup Program Guide (May 2004)
- NYSDOH Generic Community Air Monitoring Program (CAMP)
- NYSDEC PFAS guidance document titled Sampling, Analysis, and Assessment of PFAS – Under NYSDECs Part 375 Programs (October 2020, with revisions in January 2021 and June 2021)
- NYSDOH Special Requirements Community Air Monitoring Program (SRCAMP)
- DER-23 (January 2010)
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)
- 6 NYCRR Parts 595-599, 613, 370, 374-2 – Bulk Storage of Petroleum Tanks and Chemicals; Management of Used Oil (October 2015; November 2015)
- 40 CFR Part 280 – Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 – Underground Injection Control Program

Additional regulations and guidance may be applicable, relevant, and appropriate to the remedial alternatives and will be complied with in connection with implementation of the remedial program. However, the list above is intended to represent the principal SCGs that should be considered in evaluating the remedial alternatives for the Site. SCGs for the Site are provided in Appendix A.

2.5.5 Soil Contamination

Based on the results of the Phase II and RI, soil is a media of concern at the Site. VOC concentrations were detected above the UUSCOs, PGWSCOs, and RRSCO. Elevated concentrations of CVOCs were detected were detected in shallow soil across the Site and

are likely related to historical operations at the Site, as the highest concentrations were identified in shallow soil, with trace detections noted extending to the groundwater interface. SVOCs and metals were detected across the Site at concentrations above UUSCOs and/or RRSCOs in shallow samples collected from the 0- to 6-foot depth interval. The pesticides dieldrin, 4,4'-DDD, 4'4-DDE, and 4,4'-DDT were detected in soil samples collected on the eastern portion of the Site at concentrations above the UUSCOs, but below their respective RRSCOs. Total PCBs was detected in one shallow sample location on the southeastern portion of the Site at concentration above the UUSCO but below the RRSCO. The SVOCs, PCBs, metals, and pesticides detected above UUSCOs and/or RRSCOs are likely related to fill material and are not related to historical operations at the Site.

Summary of Soil Data

A summary of soil detections exceeding their respective UUSCOS, PGWSCOs, and/or RRSCOs and UUGVs is shown in In-Text Tables VI through X.

In-Text Table VI

VOC Concentrations in Soil Samples Above UUSCOs, RRSCOs, and/or PGWSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
Acetone	RI-SB-07_2-4_20221004	0.05	100	NA	0.087
	RI-SB-21_0-2_20221005				0.20
	RI-SB-19_4-6_20221006				0.19
	RI-SB-17_4-6_20221006				0.16
Methylene Chloride	RI-SB-05_4-6_20221004	0.05	100	0.05	0.069 J
PCE	RI-SB-02_2-4_20221003	1.3	**19**	1.3	**20**
	RI-SB-02_4-6_20221003				17
	RI-SB-03_2-4_20221003				1.7
	RI-SB-04_0-2_20221004				4.2 JL
	RI-SB-06_0-2_20221004				5.8 J
	RI-SB-DUP-02_20221004				2.8 J
	RI-SB-07_0-2_20221004				4.1
	RI-SB-05_0-2_20221004				**37**
	RI-SB-05_2-4_20221004				18
PCE (continued)	RI-SB-05_4-6_20221004	1.3	**19**	1.3	12
	RI-SB-09_0-2_20221004				**27**
	RI-SB-08_2-4_20221005				4.1
	RI-SB-10_0-2_20221005				4.4
	RI-SB-18_0-2_20221006				2.0
	RI-SB-18_2-4_20221006				1.7
	RI-SB-14_4-6_20221006				1.5
	RI-SB-12_2-4_20221006				2.4
	RI-SB-12_4-6_20221006				1.7

In-Text Table VI

VOC Concentrations in Soil Samples Above UUSCOs, RRSCOs, and/or PGWSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	PGWSCO* (ppm)	Concentration (ppm)
	RI-SB-11_0-2_20221006				7.1 J
	SB-1 (0-2)				**43 D**
	SB-2 (0-2)				16
	SB-4 (0-2)				4.7
	SB-5 (0-2)				**45 D**
	SB-5 (2-4)				**98 D**
	SB-7 (0-2)				11
	SB-DUP-1				8.8
TCE	RI-SB-02_4-6_20221003	0.47	21	0.47	1.6
	RI-SB-05_0-2_20221004				1.1
	RI-SB-05_4-6_20221004				0.55
	RI-SB-10_0-2_20221005				2.8
	RI-SB-14_4-6_20221006				1.3
	RI-SB-12_0-2_20221006				1.3
	RI-SB-12_2-4_20221006				3.4
	RI-SB-12_4-6_20221006				0.96
	RI-SB-11_0-2_20221006				8 J
	SB-1 (0-2)				0.70
	SB-2 (0-2)				0.75
	SB-5 (0-2)				1
	SB-5 (2-4)				1.2
	SB-7 (0-2)				2.6
Cis-1,2-DCE	SB-6 (0-2)	0.25	100	0.25	0.47

Notes:

*PGWSCO comparison performed for CVOCs only.

J – The concentration given is an estimated value.

L – Sample results is estimated and biased low.

D – Sample results identified compound in an analysis that has been diluted.

RI-SB-DUP-02_20221004 is a blind duplicate of sample RI-SB-06_0-2_20221004.

IEC did not indicate the parent sample for SB-DUP-1.

Sample detections that exceed RRSCOs are bolded.

NA = Not applicable.

In-Text Table VII

SVOC Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Benzo(a)anthracene	RI-SB-01_0-2_20221003	1	**1**	**1.8 J**
	RI-SB-05_0-2_20221004			**2.8**
	RI-SB-05_2-4_20221004			**2.3**
	RI-SB-17_0-2_20221006			**15 D**
	RI-SB-16_0-2_20221006			**1.7**
	SB-5 (0-2)			**3.0**
	SB-5 (2-4)			**3.1**
	SB-6 (0-2)			**1.5**
	SB-7 (0-2)			**1.3**
	SB-9 (2-4)			**1.0**

In-Text Table VII

SVOC Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Benzo(a)pyrene	RI-SB-01_0-2_20221003	1	**1**	**1.6 J**
	RI-SB-05_0-2_20221004			**2.3**
	RI-SB-05_2-4_20221004			**1.8**
	RI-SB-17_0-2_20221006			**14 D**
	RI-SB-16_0-2_20221006			**1.9**
	SB-5 (0-2)			**2.6**
	SB-5 (2-4)			**2.6**
	SB-6 (0-2)			**1.8**
	SB-7 (0-2)			**1.6**
Benzo(b)fluoranthene	RI-SB-01_0-2_20221003	1	**1**	**2.4 J**
	RI-SB-05_0-2_20221004			**3.4**
	RI-SB-05_2-4_20221004			**2.4**
	RI-SB-09_0-2_20221004			**1.1**
	RI-SB-17_0-2_20221006			**17 D**
	RI-SB-16_0-2_20221006			**2.3**
	SB-5 (0-2)			**2.8**
	SB-5 (2-4)			**2.9**
	SB-6 (0-2)			**2.1**
	SB-7 (0-2)			**1.5**
Benzo(k)fluoranthene	RI-SB-05_0-2_20221004	0.8	**3.9**	0.98
	RI-SB-17_0-2_20221006			**5.6**
	RI-SB-16_0-2_20221006			0.93
	SB-5 (0-2)			2.2
	SB-5 (2-4)			2.2
	SB-6 (0-2)			1.9
	SB-7 (0-2)			1.3
	SB-9 (2-4)			0.98
Chrysene	RI-SB-01_0-2_20221003	1	**3.9**	1.7 J
	RI-SB-05_0-2_20221004			2.9
	RI-SB-05_2-4_20221004			3.0
	RI-SB-17_0-2_20221006			**14 D**
	RI-SB-16_0-2_20221006			1.8
	SB-5 (0-2)			**3.9**

In-Text Table VII

SVOC Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Chrysene (continued)	SB-5 (2-4)	1	**3.9**	3.8
	SB-6 (0-2)			2.1
	SB-7 (0-2)			1.3
	SB-9 (2-4)			1.1

In-Text Table VII

SVOC Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Dibenz(a,h)anthracene	RI-SB-05_0-2_20221004	0.33	**0.33**	**0.47**
	RI-SB-17_0-2_20221006			**2.0**
	SB-5 (0-2)			**0.41**
	SB-5 (2-4)			**0.44**
	SB-6 (0-2)			**0.49**
Indeno(1,2,3-cd)pyrene	RI-SB-01_0-2_20221003	0.5	**0.5**	**0.98 J**
	RI-SB-05_0-2_20221004			**2.0**
	RI-SB-05_2-4_20221004			**0.95**
	RI-SB-09_0-2_20221004			**0.71**
	RI-SB-17_0-2_20221006			**9.2**
	RI-SB-16_0-2_20221006			**1.4**
	RI-SB-14_0-2_20221006			**0.66**
	SB-5 (0-2)			**1.5**
	SB-5 (2-4)			**1.7**
	SB-6 (0-2)			**1.5**
	SB-7 (0-2)			**1.3**
	SB-9 (2-4)			**0.78**
Naphthalene	RI-SB-04_0-2_20221004	12	100	13 D

Notes:

Sample detections that exceed RRSCOs are bolded.

J – The concentration given is an estimated value.

D – Sample results identified compound in an analysis that has been diluted.

In-Text Table VIII

Pesticide Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Dieldrin	RI-SB-07_0-2_20221004	0.005	0.2	0.015
	RI-SB-05_0-2_20221004			0.0069
	RI-SB-09_0-2_20221004			0.0060
	SB-5 (0-2)			0.033
	SB-DUP-1			0.0053
p,p'-DDD	RI-SB-04_0-2_20221004	0.0033	13	0.024
	RI-SB-06_0-2_20221004			0.0066 J

In-Text Table VIII

Pesticide Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
p,p'-DDD (continued)	RI-SB-07_0-2_20221004	0.0033	13	0.022
	RI-SB-05_0-2_20221004			0.026
	RI-SB-09_0-2_20221004			0.0055 JN
	RI-SB-08_0-2_20221005			0.015 JKN
	SB-5 (0-2)			0.170
	SB-5 (2-4)			0.0056
	SB-9 (2-4)			0.0046
p,p'-DDE	RI-SB-04_0-2_20221004	0.0033	8.9	0.017
	RI-SB-06_0-2_20221004			0.0055 J
	RI-SB-07_0-2_20221004			0.0048 J
	RI-SB-05_0-2_20221004			0.0085
	RI-SB-09_0-2_20221004			0.019
	RI-SB-08_0-2_20221005			0.0088 JKN
	SB-1 (0-2)			0.0034
	SB-4 (0-2)			0.0077
	SB-5 (0-2)			0.040
	SB-DUP-1			0.0056

In-Text Table VIII

Pesticide Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
p,p'-DDT	RI-SB-DUP-01_20221003	0.0033	7.9	0.014 J
	RI-SB-02_0-2_20221003			0.0055 JN
	RI-SB-04_0-2_20221004			0.062
	RI-SB-06_0-2_20221004			0.018
	RI-SB-07_0-2_20221004			0.015
	RI-SB-05_0-2_20221004			0.020
	RI-SB-09_0-2_20221004			0.076
	RI-SB-08_0-2_20221005			0.035 JKN
	SB-1 (0-2)			0.0098
	SB-4 (0-2)			0.033
	SB-5 (0-2)			0.280
	SB-5 (2-4)			0.0081
	SB-8 (0-2)			0.016
	SB-9 (2-4)			0.022
	SB-11 (0-2)			0.0066
	SB-DUP-1			0.031

Notes:

RI-SB-DUP-01_20221003 RI-SB-01_0-2_20221003

IEC did not indicate the parent sample for SB-DUP-1.

J- The concentration given is an estimated value.

K- Reported concentration value is proportional to dilution factor and may be exaggerated.

N- Indicates presumptive evidence of a compound. This flag is usually used for a tentatively identified compound, where the identification is based on a mass spectral library search.

In-Text Table IX

TAL Metals Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Arsenic	RI-SB-02_2-4_20221003	13	**16**	13.4
	RI-SB-08_8-9_20221005			**18**
	RI-SB-18_2-4_20221006			13.3
	SB-8 (2-4)			13.8
Barium	RI-SB-07_0-2_20221004	350	**400**	**432**
	RI-SB-05_0-2_20221004			**622**

In-Text Table IX

TAL Metals Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Barium (continued)	RI-SB-05_2-4_20221004	350	**400**	**744**
	RI-SB-08_0-2_20221005			**814**
	SB-5 (0-2)			**702**
	SB-6 (0-2)			**685**
Cadmium	RI-SB-DUP-01_20221003	2.5	**4.3**	**4.4 J**
	RI-SB-02_0-2_20221003			**7.6**
	RI-SB-02_2-4_20221003			**11.1**
	RI-SB-05_0-2_20221004			**2.6**
	RI-SB-09_0-2_20221004			**3.6**
	SB-4 (12-14)			**2.73**
	SB-5 (0-2)			3.9
	SB-6 (0-2)			3.11
Trivalent Chromium	SB-5 (0-2)	30	NS	30.7
	SB-8 (0-2)			214
	SB-8 (2-4)			51.1
	SB-9 (0-2)			48.9
	SB-11 (0-2)			181
	SB-11 (2-4)			30.4
Hexavalent Chromium	SB-8 (0-2)	1	**110**	3.72
	SB-8 (2-4)			2.51
	SB-9 (0-2)			2.85
Copper	RI-SB-DUP-01_20221003	50	**270**	159 J
	RI-SB-02_0-2_20221003			**432**
	RI-SB-02_2-4_20221003			**936**
	RI-SB-04_0-2_20221004			54.9 J
	RI-SB-05_0-2_20221004			88.1
	RI-SB-05_2-4_20221004			127
	RI-SB-10_2-4_20221005			52.5
	RI-SB-20_0-2_20221005			**302**
	RI-SB-19_0-2_20221006			**453**
	RI-SB-19_2-4_20221006			166

In-Text Table IX

TAL Metals Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Coppr (continued)	RI-SB-DUP-05_20221006	50	**270**	**428**
	RI-SB-18_2-4_20221006			64.3
	SB-5 (0-2)			149
	SB-6 (0-2)			163
	SB-8 (0-2)			**494**
	SB-8 (2-4)			182
	SB-9 (2-4)			82
	SB-11 (0-2)			268
	SB-DUP-1			105
Cyanide	SB-8 (0-2)	27	**27**	**36.9**
Lead	RI-SB-01_0-2_20221003	63	**400**	247 J
	RI-SB-DUP-01_20221003			**993**
	RI-SB-01_2-4_20221003			67
	RI-SB-02_0-2_20221003			**1,360**
	RI-SB-02_0-2_20221003			**1,310**
	RI-SB-03_0-2_20221003			225
	RI-SB-04_0-2_20221004			179
	RI-SB-07_0-2_20221004			333
	RI-SB-05_0-2_20221004			**741**
	RI-SB-05_2-4_20221004			**1,060**
	RI-SB-09_0-2_20221004			322
	RI-SB-08_0-2_20221005			361
	RI-SB-19_0-2_20221006			65.5 J
	RI-SB-DUP-05_20221006			125 J
	RI-SB-17_0-2_20221006			165
	RI-SB-16_0-2_20221006			372
	RI-SB-14_0-2_20221006			118
	RI-SB-12_0-2_20221006			**617**
	RI-SB-11_0-2_20221006			67.1
	SB-1 (0-2)			366
	SB-5 (0-2)			**830**

In-Text Table IX

TAL Metals Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Lead (continued)	SB-6 (0-2)	63	400	**1,070**
	SB-8 (0-2)			146
	SB-9 (2-4)			**569**
	SB-11 (0-2)			96.5
	SB-DUP-1			226

In-Text Table IX

TAL Metals Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Manganese	SB-4 (12-14)	1,600	**2,000**	**2,140**
Mercury	RI-SB-01_0-2_20221003	0.18	**0.81**	0.71 J
	RI-SB-02_0-2_20221003			**1.1**
	RI-SB-02_2-4_20221003			0.52
	RI-SB-03_0-2_20221003			0.53
	RI-SB-07_0-2_20221004			0.26
	RI-SB-05_0-2_20221004			0.65
	RI-SB-05_2-4_20221004			**2.7**
	RI-SB-08_0-2_20221005			0.30
	SB-4 (0-2)			0.19
	SB-5 (0-2)			**0.88**
	SB-6 (0-2)			**3.71**
	SB-7 (0-2)			0.41
Nickel	RI-SB-DUP-05_20221006	30	**310**	36.4
	RI-SB-18_0-2_20221006			**318**
	RI-SB-18_2-4_20221006			42
	SB-8 (0-2)			109
	SB-11 (0-2)			79.7
Silver	SB-5 (0-2)	2	180	4.55
Zinc	RI-SB-01_0-2_20221003	109	10,000	323 J
	RI-SB-DUP-01_20221003			1,110 J
	RI-SB-01_2-4_20221003			140
	RI-SB-02_0-2_20221003			511
	RI-SB-02_2-4_20221003			747
	RI-SB-03_0-2_20221003			202
	RI-SB-04_0-2_20221004			184 JK
	RI-SB-07_0-2_20221004			212
	RI-SB-05_0-2_20221004			556
	RI-SB-05_2-4_20221004			826
	RI-SB-09_0-2_20221004			376
	RI-SB-08_0-2_20221005			392

In-Text Table IX

TAL Metals Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Zinc (continued)	RI-SB-DUP-05_20221006	109	10,000	139 J
	RI-SB-16_0-2_20221006			124
	RI-SB-12_0-2_20221006			194
	SB-3 (0-2)			171
	SB-5 (0-2)			1,020
	SB-6 (0-2)			749

In-Text Table IX

TAL Metals Concentrations in Soil Samples Above UUSCOs and/or RRSCOs

Analyte	Sample Identification	UUSCO (ppm)	RRSCO (ppm)	Concentration (ppm)
Zinc (continued)	SB-9 (2-4)	109	10,000	191
	SB-11 (0-2)			263
	SB-DUP-1			220

Notes:

RI-SB-DUP-01_20221003 is a blind duplicate of sample RI-SB-01_0-2_20221003

RI-SB-DUP-05_20221006 is a blind duplicate of sample RI-SB-19_0-2_20221006.

IEC did not indicate the parent sample for SB-DUP-1.

Sample detections that exceed RRSCOs are bolded.

J- The concentration given is an estimated value.

K- Reported concentration value is proportional to dilution factor and may be exaggerated.

In-Text Table X

PFOA and PFOS Concentrations in Soil Samples Above UUGVs

Analyte	Sample Identification	UUGV (ppb)	RRGV (ppb)	Concentration (ppb)
PFOS	RI-SB-01_0-2_20221003	0.88	44	10.8 J
	RI-DUP-01_20221003			3.74 J
	RI-SB-02_0-2_20221003			1.92
	RI-SB-03_0-2_20221003			1.25
	RI-SB-09_0-2_20221004			1.7
	SB-1 (0-2)			1.18
	SB-1 (2-4)			3.72

In-Text Table X

PFOA and PFOS Concentrations in Soil Samples Above UUGVs

Analyte	Sample Identification	UUGV (ppb)	RRGV (ppb)	Concentration (ppb)
PFOS (continued)	SB-5 (0-2)	0.88	44	2.11
	SB-5 (2-4)			1.97
	SB-DUP-1			1.8
	SB-9 (0-2)			11.4
	SB-9 (2-4)			8.05
	SB-11 (0-2)			3.87
PFOA	RI-SB-01_0-2_20221003	0.66	33	0.84 J
	RI-SB-02_0-2_20221004			3.08
	RI-SB-08_0-2_20221005			0.71

Notes:

RI-SB-DUP-01_20221003 is a blind duplicate of sample RI-SB-01_0-2_20221003

IEC did not indicate the parent sample for SB-DUP-1.

J- The concentration given is an estimated value.

Comparison of Soil with SCGs

The results of the laboratory data presented in the RIR indicated that soil is a media of concern. The following COCs were detected above the 6 NYCRR Part 375 UUSCOs in soil: acetone, TCE, PCE, methylene chloride, cis-1,2-DCE, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, arsenic, barium, cadmium, trivalent chromium, hexavalent chromium, copper, cyanide, lead, manganese, mercury, nickel, silver, zinc, total PCBs, dieldrin, p,p'-DDD, p'p-DDE, and p,p'-DDT.

The following COCs were detected above the 6 NYCRR Part 375 RRSCOs (in addition to UUSCOs) in soil: TCE, PCE, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, arsenic, barium, cadmium, hexavalent chromium, copper, cyanide, lead, manganese, mercury, and nickel.

The following COCs were detected above the 6 NYCRR Part 375 PGWSCOs (in addition to RRSCOs) in soil: TCE, PCE, methylene chloride, and cis-1,2-DCE. PGWSCO comparison was performed for CVOCs only.

The soil sample locations are shown on Figure 2. A concentration map showing analytes detected above UUSCOs, PGWSCOs, and/or RRSCOs is included as Figures 4A and B. The complete analytical results for soil are presented in Tables 2A through 2F and 3A through 3F.

2.5.6 Groundwater Contamination

Based on the results of the Phase II and RI, groundwater is a media of concern at the Site. The VOCs PCE, TCE, chloroform, and acetone and metals were detected at concentrations above AWQSGVs. Additionally, PFOA and PFOS were detected at concentrations above the NYSDEC Screening Levels. The elevated concentrations of CVOCs (PCE and TCE)

in groundwater are likely related to historical operations at the Site and the higher concentrations appear to be located on the northeastern and eastern portions of the Site where floor drains with unknown discharge points were located. The concentrations of metals detected in groundwater are consistent with regional background conditions typical of groundwater quality in Brooklyn and are not related to historic operations at the Site. As PFAS concentrations across the Site were relatively consistent (including at the upgradient wells), the PFAS contamination in groundwater is more likely attributable to an upgradient source and/or consistent with regional groundwater quality for the area; however, it's unknown whether any products containing PFAS were used at the Site.

Summary of Groundwater Data

A summary of groundwater detections exceeding their respective AWQSGVs and NYSDEC Screening Levels is shown in In-Text Table XI.

In-Text Table XI
Concentrations in Groundwater Samples Above AWQSGVs

Analyte	Sample	AWQSGV (ppb)	Concentration (ppb)
Acetone	RI-MW-02_20221019	50	74 JK
PCE	RI-MW-01_20221019	5	2,300
	RI-MW-02_20221019		3,800
	RI-MW-03_20221019		17,000
	RI-MW-DUP_20221019		19,000
	RI-MW-04_20221020		400
	RI-MW-05_20221020		470
	RI-MW-06_20221020		500
	P2-MW-2		1,700 D
	P2-MW-3		2,000 D
	P2-MW-5		840 D
	P2-MW-DUP		2,200 D
TCE	RI-MW-01_20221019	5	12
	RI-MW-02_20221019		14
	RI-MW-03_20221019		30 J
	RI-MW-DUP_20221019		29 J
	RI-MW-05_20221020		5.2
	RI-MW-06_20221020		6.0
	P2-MW-2		8.8
	P2-MW-3		7.7
	P2-MW-5		5
Chloroform	RI-MW-03_20221019	7	18 J
	RI-MW-DUP_20221019		16 J
Antimony	P2-MW-2	0.003	0.005
Arsenic	P2-MW-2	0.025	0.03
Chromium	P2-MW-2	0.05	0.167
	P2-MW-3		0.099
	P2-MW-5		0.076
	P2-MW-DUP		0.076
Iron	RI-MW-01_20221019	300	1,250

In-Text Table XI
Concentrations in Groundwater Samples Above AWQSGVs

Analyte	Sample	AWQSGV (ppb)	Concentration (ppb)
Iron (continued)	RI-MW-02_20221019	300	850
	RI-MW-03_20221019		1,700 J
	RI-MW-DUP_20221019		1,090 J
	RI-MW-05_20221020		314
	RI-MW-06_20221020		619
Lead	P2-MW-2	0.025	0.077
Manganese	RI-MW-01_20221019	300	1,810
	RI-MW-02_20221019		1,570
	RI-MW-03_20221019		2,000
	RI-MW-DUP_20221019		1,630
	RI-MW-04_20221020		1,360
	RI-MW-05_20221020		1,530
	RI-MW-06_20221020		1,220
Nickel	P2-MW-2	0.1	0.275
Sodium	RI-MW-01_20221019	20,000	50,100
	RI-MW-02_20221019		84,500
	RI-MW-03_20221019		66,800
	RI-MW-DUP_20221019		75,300
	RI-MW-04_20221020		88,900
	RI-MW-05_20221020		75,200
	RI-MW-06_20221020		81,500
PFOS	RI-MW-01_20221019	NYSDEC Screening Level: 10 ppt	13 J
	P2-MW-2		20.4
	P2-MW-Dup		16.8
	P2-MW-5		23.8
PFOA	RI-MW-01_20221019	NYSDEC Screening Level: 10 ppt	89.5
	RI-MW-03_20221019		35.9
	RI-MW-DUP_20221019		35.5
	P2-MW-2		79.8
	P2-MW-Dup		83
	P2-MW-5		105

Notes:
RI-MW-DUP_20221019 is a blind duplicate of RI-MW-03_20221019.
MW-DUP is a blind duplicate of P2-MW-5.
J – The concentration given is an estimated value.
D – Sample results identified compound in an analysis that has been diluted.
K- Reported concentration value is proportional to dilution factor and may be exaggerated.
ppt – parts per trillion

Comparison of Groundwater with SCGs

The results of the laboratory data presented in the RIR indicated that groundwater is a media of concern. The following COCs were detected above NYSDEC TOGS Class GA AWQSGVs in groundwater: PCE, TCE, and chloroform. Additionally, PFOA and PFOS were detected at concentrations above the NYSDEC Screening Levels. The dissolved metals detected in groundwater are consistent with regional background conditions typical of groundwater quality in Brooklyn and are not COCs. PFAS concentrations are relatively consistent across the Site and do not appear to be a source; however, it's unknown whether any products containing PFAS were used at the Site.

The groundwater sampling locations are shown on Figure 2. A concentration map showing analytes detected above AWQSGVs is shown on Figure 7. The complete analytical results for groundwater are presented in Tables 4A through 4G and 5A through 5G.

2.5.7 Soil Vapor Contamination

Based on the results of the Phase II and RI, soil vapor is a media of concern at the Site. VOCs associated with petroleum were detected at individual concentrations up to 220 µg/m^3. Elevated concentrations of CVOCs were detected all soil vapor samples, including PCE ranging from 200 µg/m^3 to 980,000 µg/m^3, with the highest concentration at RI-SV-DUP_20221013 (the blind duplicate of RI-SV-05_20221013), and TCE ranging from 23 µg/m^3 to 250,000 µg/m^3, with the highest concentration at RI-SV-11_20221013. Additional CVOCs [including cis-1,2-DCE, trans-1,2-DCE, carbon tetrachloride, methylene chloride, and 1,1,1-trichloroethane] were detected in multiple soil vapor samples, but at significantly lower concentrations than PCE and TCE

Summary of Soil Vapor Data

A summary of TCE and PCE detections in soil vapor is shown in In-Text Table XII.

Table XII
TCE and PCE Concentrations in Soil Vapor

Analyte	Soil Vapor Sample Identification	Concentration ($\mu g/m^3$)
Trichloroethylene (TCE)	RI-SV-01_20221013	40
	RI-SV-02_20221013	23
	RI-SV-03_20221013	570 D
	RI-SV-04_20221013	1,100 D
	RI-SV-05_20221013	17,000 J
	RI-SV-DUP_20221013	24,000 J
	RI-SV-06_20221013	16,000
	RI-SV-07_20221013	29,000 D
	RI-SV-08_20221013	2,700 D
	RI-SV-09_20221013	340 D
	RI-SV-10_20221013	610 D
	RI-SV-11_20221013	250,000 D
	RI-SV-12_20221013	9,500
	P2-SV-1	14,200 J
	P2-SV-2	3,960 J
	P2-SV-Dup	3,440 J
	P2-SV-3	7,460 J
	P2-SV-4	1,350 J
	P2-SV-5	9,020 J
	P2-SV-6	41,900 J
	P2-SV-7	19,000 J
	P2-SV-8	13,100 J
Tetrachloroethylene (PCE)	RI-SV-01_20221013	610 D
	RI-SV-02_20221013	200
	RI-SV-03_20221013	16,000 D
	RI-SV-04_20221013	300,000 D
	RI-SV-05_20221013	590,000 JD
	RI-SV-DUP_20221013	980,000 JD
	RI-SV-06_20221013	30,000 D
	RI-SV-07_20221013	49,000 D
	RI-SV-08_20221013	3,400 D
	RI-SV-09_20221013	870 D
	RI-SV-10_20221013	630 D
	RI-SV-11_20221013	150,000
	RI-SV-12_20221013	290,000 D
	P2-SV-1	519,000 J
	P2-SV-2	388,000
	P2-SV-Dup	363,000
	P2-SV-3	458,000 J
	P2-SV-4	55,200 J
	P2-SV-5	187,000 J

Table XII
TCE and PCE Concentrations in Soil Vapor

Analyte	Soil Vapor Sample Identification	Concentration ($\mu g/m^3$)
Tetrachloroethylene (PCE) (continued)	P2-SV-6	215,000
	P2-SV-7	37,000 J
	P2-SV-8	65,200 J
Notes: D: Analyte concentration is from a diluted analysis. $\mu g/m^3$ = micrograms per cubic meter		

The soil vapor sampling locations are shown on Figure 2. A concentration map showing analytes detected in soil vapor is included as Figures 9A and 9B. The complete analytical results for soil vapor are presented in Tables 6 and 7.

2.6 Environmental and Public Health Assessment

2.6.1 Qualitative Human Health Exposure Assessment (QHHEA)

The objective of the QHHEA is to identify potential receptors and pathways for human exposure to the COCs that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

The findings of the Phase II Investigation and the RI, as described in the RIR, are sufficient to complete a QHHEA. The QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI was evaluated to determine whether there is a health risk by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. The QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation. The full QHHEA, which describes the COCs, potential routes of exposure, potential receptors, and existence of human health exposure pathways, is included in Section 6.0 of the RIR, which is provided in Appendix C of this RAWP.

2.6.2 Overall Human Health Exposure Assessment (OHHEA)

Currently, there is a potential exposure pathway from soil vapor intrusion into the existing building; however, as the building is currently vacant it is not expected that the exposure pathway would become complete. There is also a potential exposure pathway from soil vapor intrusion into the adjacent structures. Once redevelopment activities begin, there will be a potential exposure pathway from contaminated surface soil/fill to construction workers as these workers could potentially ingest, inhale, or have dermal contact with any exposed contaminated fill/soil. If future redevelopment plans require dewatering (although unlikely), there will be an additional potential exposure pathway as workers could potentially inhale or have dermal contact with the contaminated groundwater. Without remediation, once redevelopment of the Site has been completed, there will be a potential exposure pathway from the potential off-gassing of residual organic vapors in the soil, groundwater, and/or soil vapor to adult and child residents, medical personnel, building support staff, building maintenance staff, and visitors, through cracks or openings in the foundation of the new building and surrounding buildings. In addition, there will be a potential exposure pathway from direct contact to soil and any particulates emanating from open areas (courtyard) at the Site to off-site pedestrians, visitors, cyclists, and adult and child residents.

Based on the results of the QHHEA, a NYSDEC-approved Interim Remedial Measures Work Plan (IRMWP) and RAWP, which includes a health and safety plan to protect on-site workers, will be implemented to ensure that the potential exposure pathways identified do not become complete. This RAWP addresses contaminated soil, groundwater, and soil vapor at the Site, and outlines the Engineering Controls (ECs) and Institutional Controls (ICs) that will be used to address residually contaminated soil, groundwater, and soil vapor. Community air monitoring will be conducted during all ground-intrusive Site activities in compliance with the NYSDOH Generic CAMP and the Site-Specific CAMP. Additionally, a SRCAMP will be implemented during all ground-intrusive Site activities within 20 feet of occupied structures and/or potentially exposed populations.

2.7 Remedial Action Objectives (RAOs)

Based on the results of the RI, the following RAOs have been identified for the Site.

2.7.1 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Restore groundwater aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of groundwater contamination.

2.7.2 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater contamination.

2.7.3 Soil Vapor

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the Site.
- Prevent the off-site migration of contaminants.

3.0 WASTE CLASSIFICATION

All work in this section will be in accordance with the QAPP, provided as Appendix F, the Site-specific HASP, provided in Appendix G, and the Site-specific Community Air Monitoring Plan (CAMP) is provided in Appendix H.

3.1 Waste Classification Sampling

The ongoing source areas of soil contamination will be addressed through implementation of the IRM. If contaminated soil exceeding PGWSCOs for CVOCs remains after completion of the IRM, it will be removed as part of the remedy. To gain acceptance from disposal facilities in advance of excavation, in-situ soil sampling is required. Sampling will be conducted to achieve an approximate frequency of one sample per 800 cubic yards at a minimum, and equal spatial representation across the Site. Waste classification samples consisting of one grab and one five-point composite sample each will be collected from the Site. Since a receiving facility for excavated soil has not been selected, the proposed testing will include sampling and laboratory analyses intended to satisfy the analytical requirements of many soil disposal/receiving facilities. However, it is possible that once a specific facility is selected, additional testing and/or chemical analysis may be required.

The grab soil samples will be analyzed for VOCs plus 10 tentatively identified compounds (TICs) by Environmental Protection Agency (EPA) Method 8260. The five-point composite samples will be analyzed for: SVOCs plus 20 TICs by EPA Method 8270; Target Analyte List (TAL) metals, Toxicity Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) 8 metals (plus copper, nickel, and zinc), hexavalent chromium, and trivalent chromium by EPA Method 6000/7000 series; PCBs by EPA Method 8082; pesticides by EPA 8081; total cyanide by EPA Method 9012; total petroleum hydrocarbons (TPH) by EPA Method 8015 for diesel range organics (DRO) and gasoline range organics (GRO); extractable petroleum hydrocarbon (EPH); and ignitability, corrosivity, and reactivity. One sample for paint filter by EPA Method 9095 will also be collected. TerraCore® or Encore® sampling devices will be used to collect the grab samples.

3.2 Waste Classification Report

A waste classification report will be prepared following completion of the waste classification sampling and receipt of the laboratory data. The report will provide a summary of the sample methodology and analytical results, and include analytical data tables for all reported constituent compounds, a sample location map, and an interpretation of the data. The waste classification report will be submitted to potential waste disposal facilities with a waste disposal profile form so that the material can be approved for disposal prior to the start of excavation.

4.0 INTERIM REMEDIAL MEASURES

The Phase II and RI data indicated the soil contamination is an active, ongoing source of contamination to multiple environmental media. As such, an Interim Remedial Measures (IRM) Work Plan was prepared in December 2022 as a proactive measure to address the ongoing source of solvent contamination in soil prior to completing the remedy phase of the BCP. It is anticipated that the IRM will include: excavation and off-site disposal of contaminated soil (CVOC source material) to 2 feet below grade across the entire site, with deeper excavation to approximately 6 to 9 feet below grade in several hot spot areas identified during the Phase II and RI and to approximately 15 feet below grade within the partial cellar footprint of the proposed new building. To complete the IRM, a Preliminary Design Investigation (PDI) was proposed in the IRMWP, to be completed prior to the excavation efforts, to define the limits of the IRM excavation, identify the soil handling requirements, and collect the data needed to properly design the groundwater and soil vapor treatment programs of the full site remedy. The IRMWP is included as Appendix C.

5.0 DESCRIPTION OF REMEDIAL ACTION PLAN (RAP)

5.1 Evaluation Of Remedial Alternatives

This section includes a review of remediation alternatives that were considered for the remedy phase of the BCP. The purpose of completing the alternatives analysis is to identify, evaluate, and select a remedy to address the contamination identified during the Phase II Investigation and RI. The RAOs for soil and groundwater include source removal to prevent the potential for exposure and contaminant migration. The RAOs for soil vapor include preventing soil vapor from entering the proposed new Site building and/or off-site buildings. The following performance measures were used to complete the evaluation of remedial alternatives:

- Protection of human health and the environment;
- Compliance with standards, criteria, and guidance (SCGs);
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community acceptance; and
- Land use.

The following remedial SCGs apply to the project, and are the performance criteria used to determine if the RAOs have been met.

- 6 NYCRR Part 375-6 Soil Cleanup Objectives
- New York State Groundwater Quality Standards – 6 NYCRR Part 703
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation – December 2002 (or later version if available)
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004
- NYSDEC Guidelines for Sampling and Analysis of PFAS – January 2020
- NYSDOH Generic Community Air Monitoring Program (CAMP)
- NYSDOH Special Requirements Community Air Monitoring Program (SRCAMP)
- NYSDOH Public Health Law, Subpart 5-1 – Maximum Contaminant Levels – July 2020
- NYS Waste Transporter Permits – 6 NYCRR Part 364
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364
- DER-23 (January 2010)
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 – Environmental Remediation Programs (December 2006)
- 6 NYCRR Part 612 – Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 – Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 – Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 40 CFR Part 280 – Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- 29 CFR Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 – Underground Injection Control Program

- NYSDOH Soil Vapor Intrusion Matrix – NYSDOH Sub-Slab Vapor Concentration which may require monitoring or mitigation as presented in the Matrix A, Matrix B, and Matrix C tables of the Final Guidance in the State of New York, dated October 2006 ("NYSDOH Vapor Intrusion Guidance Document"), updated May 2017.

Additional regulations and guidance may be applicable, relevant, and appropriate to the remedial alternatives and will be complied in connection with implementation of the remedial program. However, the list above is intended to represent the principal SCGs, which should be considered in evaluating the remedial alternatives for the Site.

Remedial Alternative 1 – No Further Action

This alternative consists of allowing the Site to remain in its current condition. No remedial activities would occur under this remedy.

1. Protection of Human Health and the Environment – Not satisfied, as the potential for vapor intrusion into the on-site building and adjacent off-site buildings would still exist.
2. Compliance with SCGs – Not satisfied, as contaminants would remain in soil at concentrations that exceed NYSDEC Part 375 UUSCOs, PGWSCOs, and/or RRSCOs, and in groundwater that exceed NYSDEC AWQSGVs.
3. Short-term Effectiveness and Impacts – Not satisfied, as there would be no measures in place to protect workers or the surrounding community from potential exposure to existing contaminated soil or vapors if redevelopment were to occur; or at existing or future adjacent off-site buildings.
4. Long-term Effectiveness and Permanence – Not satisfied, as potential exposure pathways identified in the QHHEA would remain once redevelopment activities began.
5. Reduction of Toxicity, Mobility, or Volume of Contaminated Material – Not satisfied, as the contaminated material in soil, groundwater, and soil vapor would remain in place.
6. Implementability – Very feasible, as no personnel or regulatory approvals would be needed, and natural attenuation would be the only remedial plan utilized.
7. Cost Effectiveness – Very cost effective to proceed with no further action; however, this criterion is not satisfied, as it requires a comparison of cost to long/short term effectiveness and toxicity reduction, which would not be achieved.
8. Community Acceptance – Not satisfied, as this alternative will allow the contamination to remain in place.
9. Land Use – Not satisfied, as implementation would be incompatible with the anticipated future use of Restricted Residential with a site cap under a Track 4 Cleanup.

Remedial Alternative 2 – Track 1 Unrestricted Use Soil Cleanup Objectives (UUSCOs)

Remedial Alternative 2 would include removal and/or treatment of all contaminated soil to comply with UUSCOs and treatment of groundwater to comply with the AWQSGVs. This would include, but would not be limited to, excavation of all soil at the Site exceeding UUSCOs and soil affected by elevated CVOCs in soil vapor. To achieve this, the removal work would include, but would not be limited to, the following: excavation and off-site disposal of all soil across the Site exceeding UUSCOs and PGWSCOs (CVOCs only) and soil containing elevated CVOC soil vapor concentrations; groundwater treatment to comply with AWQSGVs; and removal of any USTs, if encountered.

1. Protection of Human Health and the Environment – Satisfied; all soil above UUSCOs and PGWSCOs (CVOCs only) and soil with elevated CVOCs in soil vapor would be removed, and groundwater concentrations would be reduced to comply with AWQSGVs, thus removing the source of CVOCs in soil vapor.

2. Compliance with SCGs – Satisfied; all soil above UUSCOs and PGWSCOs (CVOCs only) and soil with elevated CVOCs in soil vapor would be removed, and groundwater would comply with AWQSGVs.

3. Short-term Effectiveness and Impacts – Satisfied; this alternative would be effective in reducing soil contamination in the short-term since all contaminated soil will be removed from the Site. There is, however, a risk of short-term impacts to Site workers and the community, as the process of excavating contaminated soil may cause the release of particulates and organic vapors. This risk can be controlled by employing health and safety procedures during remediation and construction.

4. Long-term Effectiveness and Permanence – Satisfied; as removal of all soil above UUSCOs and PGWSCOs (CVOCs only), remediation of VOCs in groundwater to comply with AWQSGVs, and remediationof VOCs in soil vapor would allow for unrestricted use of the Site.

5. Reduction of Toxicity, Mobility, or Volume of Contaminated Material – Satisfied; all the soil exceeding UUSCOs and PGWSCOs (CVOCs only) and soil with elevated CVOCs in soil vapor at the Site would be removed and all contaminated groundwater would be treated, the toxicity, mobility, and volume of residual contaminants would be greatly reduced. Additionally, removing the soil/soil vapor source would likely significantly reduce soil vapor contamination or remove it entirely.

6. Implementability – Not satisfied, as the cost, time, and structural engineering requirements to complete an excavation to a minimum depth of 42 feet bg across the Site is not feasible. The site-wide excavation would present wide-ranging difficulties for access, use of machinery, fluids management, dewatering, and methods for supporting the excavation based on the overall depth of excavation and the west-adjacent elevated NYC MTA train tracks. Due to the proximity and condition of the structure located on the northern Site boundary and the proximity and condition of the structure located on Lot 36 (the indent of the project site not included as part of the Site), significant underpinning of the adjacent structures would be required to complete the full excavation of the Site down to depths of at least 42 feet bg. Additionally, this alternative may require excavation into the groundwater table (estimated in previous environmental investigations between 40 and 42 feet below surface grade) across the Site, which would require dewatering and treatment of dewatering effluent. Excavation would be completed through the groundwater table to clean soil where endpoint samples would be collected to confirm attainment of PGWSCOs (CVOCs only) and UUSCOs. Significant Support of Excavation (SOE) and underpinning of adjacent structures would be required to excavate the entire Site down to the approximate 40 feet below surface grade depth. Additionally, the significant volume of dewatering could induce settlement on the adjacent structures (including the roadway), which would require significant support and/or shoring. The remedy would be difficult to implement due to the extent of excavation, complications associated with support of adjacent structures, and extensive dewatering associated with achieving an unrestricted designation.

7. Cost Effectiveness – Not cost-effective; this alternative would require extensive structural support to excavate to depths of at least 40 ft bg and potentially below the groundwater table down and to protect the adjacent property structures and roadway. To achieve UUSCOs and PGWSCOs (CVOCs only) and remove the sources of soil vapor, it is assumed that all soil Site-wide (approximately 56,000 cubic yards or 84,000 tons of soil) would need to be excavated from the Site to a depth of 40-42 feet for off-site disposal. The unit rate for excavation and loading of non-hazardous contaminated soil is estimated as $50 per cubic yard, with the calculated excavation and loading costs being $2,800,000. Using a conversion factor of 1.5 per ton, $100 per ton for disposal of non-hazardous soil and $500 per ton for disposal of hazardous soil, assuming 25% of the soil will need to be disposed of as hazardous, this equals approximately 21,000 tons of soil requiring hazardous off-site disposal and 63,000 tons of soil

requiring non-hazardous off-site disposal. Using the unit rates, the disposal cost for this amount of contaminated soil would be on the order of $16,800,00. Approximately 56,000 cubic yards of clean fill would then need to be imported, placed, and backfilled to establish pre-existing Site grades. Using a market rate of $50 per cubic yard, this equals approximately $2,800,000. The costs for dewatering the deeper localized excavation area to facilitate the excavation of soil/fill below the water table and treatment of the groundwater to comply with AWQSGVs would be approximately $200,000. To perform an excavation of this magnitude, extensive shoring, sheeting, and underpinning would have to be installed for the existing roadway and neighboring properties, with SOE costs estimated at $1,700,000. In addition to soil removal/remediation, groundwater treatment would be implemented to achieve the groundwater SCGs. The estimated groundwater treatment costs are $2,000,000. Engineering, inspection, oversight, and reporting associated with this alternative are estimated at a rate of 10% of the total costs ($26,300,000) or approximately $2,630,000. The cost for this alternative was estimated by combining these figures for an approximate total of $28,900,000. This assumes that the remedial work would be performed concurrent with the planned Site development and is not inclusive of demolition or abatement costs.

8. Community Acceptance – Satisfied; this alternative would be protective of human health and the environment.
9. Land Use – Satisfied; this alternative would result in the cleanup of the Site for unrestricted use, which would allow for redevelopment of the Site.

Remedial Alternative 3 – Dual Track 2/Track 4 Restricted Residential Use Soil Cleanup Objectives (RRSCOs)

Remedial Alternative 3 would include: excavation and off-site disposal of all soil above the RRSCOs to a maximum depth of 15 feet within the proposed partial cellar footprint (Track 2 area) in accordance with applicable federal, state, and local laws and regulations, as defined by 6 NYCRR Part 375-6.8, collection of post-remedial excavation documentation samples, and removal of any USTs, fill ports, vent pipes, and other associated piping (if encountered). Final excavation depths will be determined based upon the results of endpoint soil samples collected site-wide. In areas where a Track 2 cleanup cannot be achieved, a Track 4 cleanup would be achieved by excavation and off-site disposal of soil/fill above the RRSCOs to a maximum depth of 9 feet (Track 4 area); collection of post-remedial excavation documentation samples; implementation of a groundwater treatment program; and the installation and/or operation of ECs and ICs, including a sub-slab depressurization system (SSDS) beneath the lowest building slabs where feasible; installation of a soil vapor extraction (SVE) system (SVES) across the full footprint of the Site to treat residual contaminated soil vapor and prevent off-site migration of soil vapor; and installation and maintenance of a cover system.

The dual BCP Track 2/Track 4 remedy would allow for ECs and ICs to be implemented for long-term management of the Site and to prevent future exposure to residual contamination. As such, an Environmental Easement (EE) would be recorded for the Site to implement appropriate ECs and ICs, and a Site-specific Site Management Plan (SMP) would be prepared to specify future soil handling requirements, include provisions for evaluation of potential soil vapor intrusion for any buildings developed on the Site, management and inspection of the ECs that may be necessary, maintenance of Site access controls, Department notification, and land use restrictions. Periodic inspection and reporting would be required to verify that the restrictions and requirements included in the EE remain in place and continue to be effective.

1. Protection of Human Health and the Environment – Satisfied; as the source of contamination would be removed, and any residual contamination would be covered by a Site cover system. Any tanks and associated piping would also be removed. Additionally, ECs and ICs would be implemented to prevent future exposure to any residual contamination.

2. Compliance with SCGs – Satisfied; as RAOs would be achieved by removing or preventing the potential for human and environmental exposures to chemical constituents above Track 2/4 RRSCOs and/or PGWSCOs.

3. Short-term Effectiveness and Impacts – Satisfied; as this alternative would be effective in reducing soil contaminant levels in the short term, since the source of contamination, including any encountered tanks, fill ports, and/or vent lines, would be removed from the Site. Mitigation measures, including a HASP and CAMP, would protect and limit theexposure of workers and the surrounding community to contaminated soil, particulates, groundwater, and/or vapors during soil removal.

4. Long-term Effectiveness and Permanence – Satisfied; as source material would be permanently removed from the Site, and the implementation of ECs (including an SSDS, SVE system, cover system, and groundwater treatment) and the implementation of ICs would address residual contamination and limit the exposure of future occupants to contaminated soil, groundwater, and/or soil vapor in the long term, thus achieving the RAOs.

5. Reduction of Toxicity, Mobility, or Volume of Contaminated Material – Satisfied; as the volume of contaminants at the Site would be greatly reduced. Removal of source material from the Site would also reduce residual contaminant mobility into groundwater and soil vapor. Operation of an SVE system at the Site, which would reduce contaminant mass and mobility in soil and soil vapor, mitigate potential future off-site migration of soil vapor into nearby structures, as well as to further reduce the contaminant source affecting groundwater. In addition, operation of an SSDS, which would protect future building occupants from soil vapor intrusion, would also reduce the mobility of residual soil vapor contaminants on-site.

6. Implementability – Satisfied, contaminated soil removal could be completed in a relatively short timeframe and the equipment and personnel needed to perform the proposed remedial actions are readily available. The equipment and materials necessary to install the SSDS and SVES and to implement the groundwater treatment program are readily available, and each would be installed concurrent with development.

7. Cost Effectiveness – Satisfied; this alternative is the most cost-effective while being implementable. Under this alternative, approximately 7,600 cubic yards, or 11,000 tons, of contaminated soil would be excavated and disposed of off-site. The unit rate for excavation and loading of contaminated soil is estimated as $50 per cubic yard, with the calculated excavation and loading costs being $400,000. The average market rate for the transportation and disposal of non-hazardous soil is estimated at $100 per ton and hazardous soil is estimated at $500 per ton. Using this unit rate and assuming 5,000 tons would be disposed of as hazardous, the disposal cost for this amount of contaminated soil would be on the order of $2,810,000. Approximately 7,600 cubic yards of clean fill would then need to be imported, placed, and backfilled to establish pre-existing Site grades. Using a market rate of $50 per cubic yard, this equals approximately $400,000. The estimated cost for the shoring/sheeting to complete the remedial excavation is estimated at $400,000. The cost to install the SSDS and SVES would be approximately $150,000 and $450,000, respectively. Long-term maintenance and monitoring of the SSDS and SVES is anticipated to be approximately $500,000. In addition to soil removal/remediation, groundwater treatment would be implemented to achieve the groundwater SCGs. The estimated groundwater treatments costs are $2,000,000. Engineering, inspection, oversight, and reporting associated with this alternative are estimated at a rate of 10% of the total costs ($6,500,000) or approximately $650,000. The cost for this alternative was estimated by combining these figures for an approximate total of $7,150,000. This assumes the remedial work would be performed concurrent with the planned Site development.

8. Community Acceptance – Satisfied; this alternative would be protective of human health and the environment.

9. Land use – Satisfied; this alternative would result in the cleanup of the Site for restricted-residential use, which would allow for redevelopment of the Site.

5.2 Selection of the Preferred Remedy

Remedial Alternative 1 (no action) allows the Site to remain in its current condition. This remedial alternative was reviewed and found to be unacceptable, since it would not achieve the RAOs. Therefore, this remedial alternative is not considered a feasible solution.

Remedial Alternative 2 (Track 1) was reviewed and found to be unacceptable, since it is not cost-effective and extremely difficult to implement or may not be implementable. Therefore, this remedial alternative is not considered a feasible solution.

Remedial Alternative 3 (Dual Track 2/Track 4) achieves the RAOs while being cost-effective. After careful consideration with respect to the evaluation criteria listed, Remedial Alternative 3 is determined to be the preferred remedy, since it adequately addresses the subsurface contamination with the most cost-effective approach.

5.2.1 Zoning

The Site is currently zoned M1-4, which is light manufacturing. The proposed residential use is consistent with the existing zoning.

5.2.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The proposed development includes construction of a new 5-story, 62,700 SF community shelter facility on the eastern half of the Site. The western half of the Site will contain common spaces, landscaping, and parking. The entire facility will be American Disability Act (ADA)-compliant and provide smaller dormitory-style rooms, with a mix of 2-5 person suites. The building will include 64 residential/shelter units. Residents will have access to an array of on-site social service and medical staff, a full-service commercial kitchen and dining hall, a client lounge, laundry, a landscaped courtyard located adjacent to the ground floor and rooftop terraces. The building will include a partial cellar to accommodate mechanical, maintenance, and storage for the facility. The building will be designed to meet/exceed Enterprise Green Communities' energy performance and sustainability standards, including 100% electric-powered mechanical systems, an energy efficient HVAC system, increased stormwater retention capacity and landscaped outdoor passive recreation areas. Redevelopment of the Site in accordance with this RAWP will provide community resources as a replacement for location for the current Women's shelter in the neighborhood. The proposed development is identified as a priority for the New York City Department of Homeless Services (DHS) for replacement of an existing shelter to follow ADA requirements and provide consistent shelter housing opportunities to the Brooklyn region of NYC prior to the proposed decommissioning of the existing shelter nearby in 2025. The location was identified as an ideal location for the replacement shelter based on its proximity to the previous Women's Intake and Assessment Shelter and public transportation.

5.2.3 Surrounding Property Uses

The surrounding area is mixed-use and includes predominantly commercial and industrial uses with sparse residential development. One sensitive receptor (Brooklyn Children Learning Academy) is located at 91 Junius Street, approximately 262 feet to the west. No other sensitive receptors, such as schools, day care facilities, or hospitals, located within a 500-foot radius of the Site.

5.2.4 Citizen Participation Plan (CPP)

A CPP will be submitted to the NYSDEC following execution of the Brownfield Cleanup Agreement (BCA). The contemplated remedy will align with the CPP.

5.2.5 Environmental Justice (EJ) Concerns

The Site is located in an EJ area. EJ efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities. The proposed development plan will alleviate concerns in connection with the Site's current vacant condition while providing community resources in the form of a ADA-compliant community shelter. EJ concerns will also be addressed through the requirements of the CPP.

5.2.6 Land Use Designations

The proposed development complies with the current land use designation.

5.2.7 Population Growth Patterns

The population requiring homeless services and housing in New York City is a serious issue. This project will help provide necessary homeless services and will provide additional capacity to shelter the homeless.

5.2.8 Accessibility to Existing Infrastructure

The Site is located within: 0.19 miles of the L subway line at the Atlantic Avenue station to the north; 0.22 miles of the East New York station for the Long Island Rail Road (LIRR) to the north; within 0.20 miles of the B12 bus line; within 0.3 miles of the B14 bus line; and 0.34 miles of the B20 bus line. The area is supplied with municipal water and sewer, electric, telephone, natural gas, and fiber-optic lines.

5.2.9 Proximity to Cultural Resources

Cultural resources, easily accessed from the Site via public transportation, include various parks, historic sites, museums, and landmarks.

5.2.10 Proximity to Natural Resources

The Site is located in an area of Brooklyn that does not contain a significant source of natural resources. However, natural resources such as parks are easily accessible from the Site via public transportation, and include Highland Park, Betsy Head Park, Lincoln Terrace/Arthur S. Somers Park, Shirley Chisholm State Park, Fresh Creek Nature Preserve, and Prospect Park.

5.2.11 Off-Site Groundwater Impacts

Based on Site-specific groundwater measurements, groundwater beneath the Site ranges from approximately elevation 8.73 to elevation 8.91 feet above North American Vertical Datum 1988 (NAVD88), or approximately 40.95 to 42.76 feet below ground surface across the Site and flows in a generally south-southeasterly direction as shown on a groundwater elevation contour map provided as Figure 3. CVOCs, metals, and PFAS were detected in groundwater above AWQSGVs/screening levels including PCE and TCE at maximum concentrations of 19,000 ppb and 30 ppb, respectively. The metals detected in groundwater are consistent with regional background conditions typical of groundwater quality in Brooklyn and are not COCs. PFOA or PFOS groundwater concentrations were reported in excess of the NYSDEC guidance levels with maximum concentrations of 105 ng/L and 23.8 ng/L, respectively. PFAS concentrations appear to be relatively consistent across the Site, indicating that the concentrations observed may be indicative of the surrounding area and not of an on-site source; however, it's unknown whether any products containing PFAS were used at the Site. PCE and TCE in groundwater could be migrating off-site to the southeast; however, the Applicant for this project is a Volunteer in the BCP and is, therefore, not required to remediate off-site groundwater impacts. The proposed remedy is

intended to remove the source of groundwater contamination for CVOCS, thereby preventing any (further) off-site migration of contaminated groundwater.

5.2.12 Proximity to Floodplains

The Site is not located within a floodplain.

5.2.13 Geography and Geology of the Site

Surface topography at the Site is generally flat, with the surrounding area topography sloping gently down to the south-southwest, toward Jamaica Bay. Based on the U.S. Geological Survey (Brooklyn, NY Quadrangle), the Site lies at an elevation of approximately 50 feet above the North American Vertical Datum of 1988 (NAVD 1988), an approximation of mean sea level. Based on field observations during the RI, the stratigraphy of the Site, from the surface down, generally consisted of fill comprising sand, silt, clay, gravel, brick, concrete, metal, and plastic to varying depths down to approximately 10.5 feet bgs, underlain by sand and silt with varying amounts of gravel and cobbles down to the maximum boring terminus of 50 feet below grade. Based on Site-specific groundwater measurements, groundwater beneath the Site ranges from approximately 40.95 feet to 42.76 feet bgs and flows in a generally south-southeasterly direction.

5.2.14 Current Institutional Controls (ICs) and Engineering Controls (ECs)

Currently, there are no ICs or ECs at the Site.

5.3 Summary of Selected Remedial Actions (RAs)

Remedial activities will be performed at the Site in accordance with this RAWP and the Department-issued Decision Document (DD). All deviations from this RAWP and/or the DD will be promptly reported to NYSDEC for approval and will be fully explained in the Final Engineering Report (FER). The selected remedial actions include:

1. Demolition and abatement (e.g., asbestos, lead based paint, universal waste, etc.) of the existing building if any remains after completion of the IRM.
2. Excavation of soil above RRSCOs and PGWSCOs within the upper 15 feet below grade in the eastern portion of the Site and to 2 feet below grade across the remainder of the Site with targeted deeper excavation of soil exceeding PGWSCOs for chlorinated VOCs (CVOCs) in source areas defined by 6 NYCRR Part 375-6.8 if any contaminated soil remains after completion of the IRM. In addition, any tanks and associated piping, other structures associated with a source of contamination, and/or grossly contaminated soil, if encountered, will be removed in accordance with applicable regulations.
3. Installation of support of excavation (SOE) necessary to enable excavation of soil. SOE installation will comply with applicable local and state-controlled inspections.
4. A Site-specific health and safety plan (HASP) and associated community air monitoring plan (CAMP) will be implemented during all ground-intrusive Site activities, which includes soil disturbance and loading activities, to monitor levels of VOCs and airborne particulates within the active work zones and around the perimeter of the Site.
5. A Special Requirements Community Air Monitoring Program (SRCAMP) will be implemented during all ground-intrusive Site activities within 20 feet of occupied structures and/or potentially exposed populations to monitor levels of VOCs and airborne particulates.
6. Screening for indications of contamination (by visual means, odor, and monitoring with a photoionization detector [PID]) of soil during all ground-intrusive Site work, including soil disturbance and loading activities.

7. Characterization and off-site disposal of all materials removed from the Site in accordance with all federal, state, and local rules and regulations for handling, transport, and disposal. Waste disposal facilities will be selected based on the data collected to date and the results of the planned waste classification sampling.

8. Importation of clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) to replace the excavated soil/fill and/or establish the design grades as necessary. On-site soil/fill that does not exceed RRSCOs for any compound and PGWSCOs for CVOCs may be used on-site to backfill the excavation areas or re-grade the Site. Soil exceeding the UUSCO for 1,4-Dx will not be imported, per DER-10: Appendix 5 - Allowable Constituent Levels for Imported Fill or Soil, Subdivision 5.4(e). If PFOA or PFOS are detected in any sample at or above 1 part per billion (ppb), it will also be tested by the Synthetic Precipitation Leaching Procedure (SPLP). If the SPLP results exceed 10 parts per thousand (ppt) for the combined analysis, the soil will not be reused or imported. Analytical results will be compared to Table 375-6.8(b) of 6 NYCRR Part 375 and submitted to NYSDEC via a *Request to Import/Reuse Soil or Fill* form for review and approval prior to importation and placement on-site.

9. Collection and analysis of confirmatory and documentation endpoint samples across the additional remedial excavation area(s), if any, to document remaining concentrations of contaminants in soil/fill after excavation is complete. Endpoint sampling will occur around hotspots and any additional areas of concern (AOCs) identified during the remedial action based on the sampling frequency outlined in Section 5.4 of DER-10.

10. Implementation of a groundwater treatment program to address elevated concentrations of CVOCs in groundwater. The groundwater treatment program will include in-situ chemical oxidation, reductive dechlorination, and/or enhanced bioremediation. Details of the groundwater treatment program will be presented in a groundwater treatment design report.

11. Installation and operation of an active sub-slab depressurization system (SSDS) below the proposed new building foundation to prevent vapor intrusion into the proposed building.

12. Installation of a soil vapor extraction system (SVES) across the Site to treat residual soil vapor and prevent the off-site migration of soil vapor.

13. Recording of an Environmental Easement (EE) with the New York City Register to prevent future exposure to any residual contamination remaining at the Site. The EE will: require the remedial parties/Site owners to complete and submit a periodic certification of ECs and ICs to the Department in accordance with Part 375-1.8 (h)(3); allow the use and development of the controlled property for restricted residential use as defined by Part 375-1.8(g), although land use is subject to local zoning laws; restrict the use of groundwater as a source of potable or process water without necessary water quality treatment, as determined by NYSDOH; and require compliance with a Site-specific NYSDEC-approved Site Management Plan (SMP).

14. Preparation of a SMP for long term management of residual contamination as required by the EE including plans for: (1) Engineering Controls and Institutional Controls, (2) monitoring, (3) operation and maintenance, and (4) reporting.

15. In areas where a Track 2 restricted residential use cleanup is not achieved, the remedy will include construction and maintenance of a cover system to prevent human exposure to residual contaminants in soil/fill remaining under the Site, which will consist of: (1) a minimum two-foot clean fill buffer with demarcation barrier in all landscaped and non-covered areas, (2) concrete building foundations underlain by a minimum 20-mil vapor barrier membrane, which doubles as a demarcation barrier, in areas within the building footprint; and/or (3) paved surfaces underlain by a demarcation barrier in parking lot, pathways, and sidewalk areas. Any fill material brought to the Site will meet the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d).

6.0 REMEDIAL ACTION PROGRAM (RAP)

6.1 Governing Documents

6.1.1 Site-Specific Health & Safety Plan (HASP)

A Site-specific HASP and associated CAMP have been prepared for the Site and are included as Appendix G and H, respectively. All remedial work performed under this RAWP will be in compliance with governmental requirements, including Site and worker safety requirements mandated by the federal Occupational Health and Safety Administration (OSHA). Community air monitoring will be conducted during all intrusive Site activities in compliance with the NYSDOH Generic CAMP, SRCAMP, and the Site-Specific CAMP. Work zone monitoring will be performed for the health and safety of workers in accordance with action levels and guidance outlined in the Site-specific HASP.

The requirements of this RAWP and its appendices pertain to all remediation work performed at the Site until the issuance of a Certificate of Completion (CoC). The Volunteers and associated parties preparing the remedial documents submitted to the state and those performing the construction work, are completely responsible for the preparation of an appropriate HASP and for the appropriate performance of work according to that plan and applicable laws.

Confined space entry is not anticipated for this project. If confined space entry becomes necessary, work will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gases.

6.1.2 Quality Assurance Project Plan (QAPP)

Sampling associated with the Site will be conducted in accordance with the QAPP included as Appendix F, which details field screening and sampling methodologies, sample submittal to the laboratory, and reporting requirements. The QAPP includes the project team responsible for implementing the remediation requirements and provisions set forth in this RAWP. All samples will be reported with Category B deliverables and Environmental Quality Information System (EQuIS)™ electronic data deliverables (EDDs), with the exception of disposal sampling.

6.1.3 Construction Quality Assurance Plan (CQAP)

The CQAP, provided as Appendix I, provides a detailed description of the observation and testing activities that will be used to monitor construction quality and confirm that remedial construction is in conformance with the remediation objectives and specifications.

6.1.4 Soil/Materials Management Plan (SMMP)

An SMMP is included in Section 6.4 of this document. The SMMP includes detailed plans for managing all soils/materials that are disturbed at the Site, including excavation, handling, storage, transport, and disposal. It also includes all of the procedures that will be applied to assure effective, nuisance-free performance in compliance with all applicable federal, state, and local laws and regulations.

6.1.5 Stormwater Pollution Prevention Plan (SWPPP)

A draft SWPPP has been prepared for the Site and incorporates drainage and infiltration practices. Erosion and sediment controls implemented at the Site will conform to requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control Erosion. Sediment control measures will be installed at the Site prior to conducting any ground-intrusive work. These measures will be installed according to all applicable or relevant and appropriate federal, state, and local laws. The measures will provide for abatement and control of environmental pollution arising from proposed remediation and

construction activities. The control measures will include procedures for perimeter Site controls, stabilized construction pads at each construction entrance, equipment decontamination, drainage inlet protection, and dust suppression. The Remedial Engineer (RE), or her representative, will conduct routine inspections, any repairs and/or maintenance of control measures will be completed in a timely fashion to maintain the controls in proper working order. All vehicles will be inspected to ensure that no soil adheres to their wheels or undercarriage prior to leaving the Site. Any situations involving material spilled in transit or mud and dust tracked off-site will be remedied. The access routes will be inspected for road conditions, overhead clearance, and weight restrictions.

6.1.6 Community Air Monitoring Plan (CAMP)

The CAMP is provided in Appendix H. Community air monitoring will be performed via two fixed stations at the perimeter of the Site during all intrusive work. In addition to community air monitoring on the perimeter of the work zone, air monitoring will be performed periodically (at a minimum once per hour) on a roving basis with hand-held equipment based upon wind direction and the location of the intrusive work.

SRCAMP will be implemented during all ground-intrusive Site activities within 20 feet of occupied structures and/or potentially exposed populations. SRCAMP will be performed via fixed stations placed at the location of the nearest potentially exposed individuals (e.g., public walkway, building wall, etc.) and/or ventilation system intakes of the occupied structures. Further information is provided in Appendix H. The location and number of fixed stations will be determined in consultation with NYSDEC and NYSDOH prior to the start of work.

6.1.7 Contractors Site Operations Plan (SOP)

The RE or her designated representative will review all plans and submittals for the remedial project (including those previously listed and contractor and subcontractor document submittals) and confirm that they are in compliance with this RAWP. The RE is responsible to ensure that all later document submittals for this remedial project, including contractor and subcontractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

6.1.8 Citizen Participation Plan (CPP)

A CPP will be prepared and submitted to NYSDEC upon acceptance of the Site into the BCP. A Project Fact Sheet describing the approved plan for remedial action will be forwarded to persons on the project contact list in accordance with the NYSDEC- and NYSDOH-approved CPP.

A certification of mailing will be sent by the Volunteers to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed; (2) the date they were mailed; (3) a copy of the Fact Sheet; and (4) a list of recipients (contact list).

No changes will be made to the approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailings.

6.1.9 Document Repositories

The document repositories that have been established for this Site and will contain all applicable project documents are presented in Table XIII.

Table XIII

Document Repository

Document Repository	Contact Information	Hours of Operation
Brooklyn Public Library, Brownsville Library	61 Glenmore Avenue Brooklyn, New York (718) 498-9721	Monday, Wednesday, and Friday: 10 AM – 6 PM Tuesday: 1 PM – 8 PM Thursday: 10 AM – 8 PM Saturday: 10 AM – 5 PM

6.2 General Remedial Construction Information

6.2.1 Project Organization

A list of the personnel responsible for implementation of the RAWP is presented in Table XIV.

Table XIV
Project Organization

Organization	Responsibility	Name
NYSDEC	Project Manager	TBD
Glenmore Owner LLC	Applicant Representative	Aaron Buchanan
AKRF	Remedial Engineer	Rebecca Kinal, P.E.
	QA/QC Officer	Deborah Shapiro, QEP
	Project Manager	Bryan Zieroff, LEP
	Project Manager Alternate	Mark Jepsen

Resumes of key personnel responsible for implementation of the RAWP are included in Attachment A of Appendix F.

6.2.2 Remedial Engineer (RE)

The RE for this project will be Rebecca Kinal, P.E. The RE is a registered PE licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program for the 114 Snediker Avenue Site (NYSDEC BCA Index No. CXXXXX-XX-XX; BCP Site No. TBD). The RE will certify in the FER that the remedial activities were observed by AKRF environmental engineers and/or environmental scientists under her supervision and that the remediation requirements set forth in this RAWP and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with the RAWP. Other RE certification requirements are listed later in this RAWP.

The RE or her designated representative will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil/fill excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of backfill material, and management of waste transport and disposal. The RE and her designated representatives will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The RE will review all pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER. The RE will provide the certifications listed in Section 12.1 of this RAWP in the FER. Ms. Kinal's resume is included in Attachment A of Appendix F.

6.2.3 Remedial Action Construction Schedule

A schedule for performance of the remedial work RAWP is presented in Table XV.

Table XV
Proposed Project Schedule

Activity	Time To Complete
Submittal of Brownfield Cleanup Program (BCP) Application, Draft Remedial Investigation Report (RIR), Draft Interim Remedial Measures Work Plan (IRMWP) and Draft Remedial Action Work Plan (RAWP) to NYSDEC	December 2022
Distribute Fact Sheet/45-day Public Comment Period for BCP Application, IRMWP, and RAWP	February - March 2023
NYSDEC issues BCA and comments on RIR, IRMWP, and RAWP	April 2023
Submittal of Community Participation Plan (CPP)	April 2023
NYSDEC Approval of RIR and IRMWP	May 2023
Issue IRM Start Fact Sheet	May - June 2023
Begin Implementation of the IRMWP	June 2023
Pre-Design Investigation and Submittal of Remedial Design Documents	June - October 2023
Submit Revised RAWP to NYSDEC	November 2023
NYSDEC Approval of RAWP, Issuance of Decision Document	January 2024
Issue Remedial Start Fact Sheet and Approval of Remedial Design Documents	February 2024
Begin Implementation of RAWP	February 2024
Submittal of Draft Environmental Easement	June 2024
Draft SMP Submitted to NYSDEC	August 2024
Execution of Environmental Easement	September 2022
Draft Final Engineering Report Submitted to NYSDEC	October 2024
Certificate of Completion and Fact Sheet	December 2024
Completion of Building	May 2025

Notes:
NYSDEC – New York State Department of Environmental Conservation
RAWP – Remedial Action Work Plan
SMP – Site Management Plan

6.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings (NYCDOB) construction code requirements, or according to construction permits and/or specific variances issued by NYCDOB. NYSDEC will be notified by the Volunteers of any unusual variances issued by the NYCDOB. NYSDEC reserves the right to deny alternate remedial construction hours.

6.2.5 Site Security and Traffic Control

The Site will be completely closed from public access by using secured construction fencing. No unauthorized personnel will be able to access the Site. During off hours, the Site will be locked.

It is not anticipated that traffic will be disrupted beyond normal contractor vehicle traffic going to and from the Site during construction. Any sidewalk closures that are required during the course of construction/remediation activities will be conducted in accordance with New York City Department of Transportation (NYCDOT) permits.

6.2.6 Contingency Plan

A contingency plan has been developed to describe the procedures to be followed upon discovery of an unknown source of contamination or AOC that may require remediation (USTs, stained soil, drums, etc.). The identification of a previously unknown source structure or unexpected contaminated media discovered by screening during invasive Site work will be promptly communicated by phone to the NYSDEC project manager. The findings will also be included in daily and monthly progress reports. If USTs or other previously unidentified contaminant sources are found during on-site remedial excavation or development related construction, sampling will be performed on product, sediment, and/or surrounding soil/fill, etc., as applicable. Chemical analytical work will be for full scan parameters [Target Compound List (TCL) VOCs, SVOCs, pesticides, and PCBs; and TAL metals]. The analyses will not be limited to CP-51 parameters where tanks are identified without prior approval by the NYSDEC project manager.

6.2.7 Worker Training and Monitoring

All those who enter the work area while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All construction personnel upon entering the Site must attend a brief training meeting, its purpose being to:

- Make workers aware of the potential hazards they may encounter;
- Instruct workers on how to identify potential hazards;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make workers aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Construction personnel will be responsible for identifying potential hazards in the work zone. The AKRF project manager will be responsible for ensuring that the training is conducted by the AKRF field team leader in accordance with the Site-specific HASP, which is included in Appendix G. Others who enter the Site must be accompanied by a suitably-trained construction worker. In addition, any Site workers within the "work zone" must have received the OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and will be under a medical monitoring program.

6.2.8 Agency Approvals

The Volunteers will comply with all City and State Environmental Quality Review (CEQR/SEQRA) requirements for the Site. All permits and/or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction. A complete list of all permits, certificates, or other approvals or authorizations required to perform the remedial and development work will be included in the FER.

6.2.9 NYSDEC BCP Signage

Signs are optional for BCP sites and will be discussed with the NYSDEC project manager. If a sign is displayed, it will follow NYSDEC specifications for design and content, provided by the NYSDEC project manager.

6.2.10 Pre-Construction Meeting with NYSDEC and NYSDOH

A pre-construction meeting with members of the NYSDEC, NYSDOH, Volunteers, General Contractor, and AKRF project team will be conducted prior to the start of work under this RAWP.

6.2.11 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the Site-specific HASP provided in Appendix G. The emergency contact sheet is for use by NYSDEC and NYSDOH in the case of an emergency.

6.3 Site Preparation

Prior to conducting any intrusive activities, the work zone(s), designated entry points, soil/fill staging areas, decontamination zones, and truck routes will be established, as applicable. The Site plan will be updated as necessary to reflect any changes in operations during the course of the intrusive work. Airborne particulate and VOC control measures, if necessary, will be implemented. Additional details of Site preparation activities are provided in the following sections.

6.3.1 Mobilization

Site mobilization involving security setup, equipment mobilization, utility mark outs, and marking and staking excavation areas will be performed prior to undertaking any Site remediation activities.

6.3.2 Building Demolition and Asbestos Abatement

The selected contractor will complete abatement of the building prior to demolition. Abatement will include, but is not limited to: asbestos, lead based paint, and universal waste. Demolition and abatement will be completed in accordance with local, state, and federal regulations. Construction and demolition (C&D) debris will not be utilized on-Site for fill, but will be disposed of at an appropriate C&D facility.

6.3.3 Groundwater Monitoring Well Decommissioning

Existing groundwater monitoring wells will be protected and maintained to the extent practicable. Any wells needing to be removed will be properly decommissioned in accordance with NYSDEC policy CP-43. NYSDEC approval will be sought prior to decommissioning of any monitoring wells.

6.3.4 Erosion and Sediment Controls

Erosion and sediment control measures will be installed at the Site prior to conducting any ground-intrusive work. These measures will be installed according to all applicable federal, state, and/or local laws. The measures will provide for abatement and control of environmental pollution arising from proposed remediation and construction activities. The control measures will include procedures for perimeter Site controls, stabilized construction pads at each construction entrance/exit, equipment decontamination, drainage inlet protection, and particulate suppression. The RE, or her representative, will conduct routine inspections, any repairs and/or maintenance of control measures will be completed in a timely fashion to maintain the controls in proper working order. All vehicles leaving the project Site will be inspected to ensure that no soil/fill adheres to the wheels or undercarriage prior to leaving the Site. Any situations involving material spilled in transit, mud, and dust tracked off-site will be remedied. The access routes will be inspected for road conditions, overhead clearance, and weight restrictions.

6.3.5 Stabilized Construction Entrance(s)

A crushed stone path will be constructed at all truck entrances and exits. All trucks will drive over the path prior to leaving so that they do not get re-contaminated prior to departure from the Site. A laborer will check the trucks as they leave, and will use a hose, shovel, and/or broom to clean the truck tires and body as it leaves the Site, as necessary.

6.3.6 Utility Mark Outs and Easements Layout

The Applicant and their contractors are solely responsible for the identification of utilities that might be affected by work and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Applicant and their contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Applicant and their contractors must obtain any local, state, or federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by 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 RAWP is posed by utilities or easements on the Site.

6.3.7 Sheeting and Shoring

Appropriate management of structural stability of on- and/or off-site structures is the sole responsibility of the Applicant and their contractors. The Applicant and their contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Applicant and their contractors must obtain any local, state, or federal permits or approvals that may be required to perform work under this RAWP. Further, the Volunteer and their contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP.

6.3.8 Equipment and Material Staging

Staging and storage of equipment and materials will be contained within the secured Site or within a secured area on the street/sidewalk in accordance with a NYCDOT permit. By the nature of the work involved in this project, equipment and materials will be moved to different areas within the secured Site as work progresses.

6.3.9 Decontamination Area

A decontamination area will be established adjacent to the work areas, as required. The base of the decontamination area will be covered with 6-millimeter plastic sheeting as necessary and bermed to prevent spreading of decontamination fluids or potential discharge to the ground surface.

All equipment in direct contact with known or potentially contaminated material will be either dedicated or decontaminated prior to handling less contaminated material or removal from the Site. All liquids used in the decontamination procedure will be collected, stored and disposed of in accordance with federal, state, and local regulations. Personnel performing this task will wear the proper personal protective equipment (PPE) as prescribed in the Site-specific HASP, provided in Appendix G.

6.3.10 Site Fencing

The Site will be secured with a locking fence that will be placed around the entire perimeter. The fence will be adequately constructed of plywood and/or chain-link fencing with a mesh fabric fence screen as an engineering control to help contain dust and debris

during remedial activities. Additional controls (e.g., supplemental water application for dust suppression, upgraded mesh fabric, etc.) may be required to avoid dust and debris migration off-site and will be implemented, if necessary. During all remedial activities access to the Site will be limited and all persons entering the Site will be required to sign a log book and meet all applicable health and safety requirements. The Site will be secured during non-working hours.

6.3.11 Demobilization

Restoration of the excavation work will include backfilling and general earthwork to prepare for construction of the proposed foundation elements, exterior landscaped areas, and roadways/pathways/sidewalks. Upon completion of the remedial excavation work, any waste materials (i.e., plastic sheet, absorbent pads, etc.) and the decontamination pad will be removed from the Site for proper disposal.

6.4 Reporting

All daily and monthly reports will be included in the FER.

6.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH project managers by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported to and exported from the Site;
- References to an alphanumeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP/SRCAMP findings, including any exceedances; and
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to NYSDEC and NYSDOH of emergencies (e.g., accident, spill, etc.), requests for changes to this RAWP, or other sensitive or time critical information. However, such conditions will also be included in the daily and monthly progress reports. Emergency conditions and changes to this RAWP will be addressed directly to NYSDEC and NYSDOH project managers via personal communication.

Daily reports will include a description of daily activities keyed to an alphanumeric map for the Site that identifies work areas. The reports will include a summary of air sampling results, odors, and/or CAMP or SRCAMP exceedance(s), if any, and corrective actions; and any complaints received from the public. NYSDEC and NYSDOH project managers will be notified within 24 hours of any CAMP or SRCAMP exceedances and the associated corrective actions taken. The NYSDEC-assigned project number will appear on all Daily Reports. NYSDEC exceedance notifications will also occur independently of the Daily Reports.

6.4.2 Monthly Progress Reports (MPRs)

MPRs prepared in accordance with DER-10 Section 5.7(b) will be submitted to NYSDEC and NYSDOH project managers by the tenth day of the month following the reporting period and will include, at a minimum:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e., tons of material exported and imported, etc.);

- Description of any approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and
- An update of the remedial schedule, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

6.4.3 Other Reporting

Photographs will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any RAs will also be submitted in the FER. Representative photographs will be provided of each contaminant source, source area, and Site structures before, during, and after remediation. Photographs will be included in the daily reports as needed, and a comprehensive collection of photographs will be included as an appendix to the FER. All photographs will have date and time stamps.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

6.4.4 Complaint Management Plan

A log of all complaints from the public regarding nuisance or other Site conditions will be compiled by the project manager for submission to NYSDEC and NYSDOH, as appropriate. All complaints will be reported in the daily reports and in the FER.

6.4.5 Deviations from this RAWP

All deviations from this RAWP will require prior approval from NYSDEC. These deviations will be recorded in both the monthly progress reports and in the FER. At a minimum, the report of the deviation will include the following:

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

7.0 REMEDIAL ACTION (RA): CONTINGENCY MATERIAL REMOVAL FROM SITE

The removal of contaminated soil exceeding the SCOs from the Site will be performed during the IRM phase. Any additional soil requiring removal after completing the IRM (based on the analytical results of the endpoint sampling or if additional unknown contamination is encountered during the Remedial Action phase) may be removed as part of the remedial excavation. All contaminated soil will be removed from the Site and disposed of at a facility(ies) licensed to accept the material. Proposed disposal facilities will be selected after completing the waste characterization sampling. The proposed disposal facilities will be submitted to NYSDEC for review and approval prior to off-site disposal.

7.1 Soil Cleanup Objectives (SCOs)

The applicable SCOs for this Site are PGWSCOs for CVOCs, and Track 2/4 RRSCOs for VOCs, SVOCs, PCBs, pesticides, and metals. Soil and materials management on-site and off-site will be conducted in accordance with the SMMP as described below. Any petroleum storage tank closures will, at a minimum, conform to the criteria defined in DER-10.

A concentration map showing compounds detected above UUSCOs, RRSCOs, and/or PGWSCOs is included as Figures 4A and 4B. Table VI in Section 2.5.5 summarizes known soil/fill concentrations above UUSCOs, RRSCOs, and/or PGWSCOs.

7.2 Post-Excavation Endpoint Sampling

It is not anticipated that any excavation endpoint samples will be collected as part of the RA; however, if additional excavation is required after completion of the IRM, additional post-excavation soil samples will be collected. In addition, post-excavation soil samples will be collected around any USTs and/or other hotspots encountered on the Site. Excavation endpoint samples collected as part of the IRM as illustrated on Figure 12 in the IRMWP included in Appendix C.

7.2.1 Endpoint Sampling Frequency

Based on the sampling frequency outlined in Section 5.4 of DER-10, endpoint sampling for remedial excavation will include one bottom soil sample for every 900 square feet and one sidewall sample for every 30 linear feet around the perimeter of the excavation. An additional five endpoint samples consisting of four sidewalls and one bottom sample will be collected for every 10 feet of excavation at the location of any tank, hotspot, or other AOC encountered during remediation. Additional endpoint samples may also be collected if additional excavation is required to achieve RAOs based on the initial endpoint sampling results.

7.2.2 Endpoint Sampling and Laboratory Methodology

The endpoint samples will be collected using a decontaminated stainless steel sampling trowel, hand auger, or a dedicated wooden tongue depressor and placed directly into pre-sterilized laboratory-issued containers. The sample containers will be properly labeled and immediately placed on ice within a cooler. Sample time, date, and location will be recorded on a chain of custody.

The samples will be submitted to an Environmental Laboratory Approval Program (ELAP)-certified laboratory for analysis of VOCs by EPA Method 8260, SVOCs by EPA Method 8270, PCBs by EPA Method 8082, pesticides by EPA Method 8081, and TAL metals by EPA Method 6000/7000 series, 1,4-dioxane by EPA 8270D Selective Ion Monitoring (SIM), and PFAS by EPA Method 1633. In accordance with NYSDEC requirements, QA/QC sampling will be performed; the laboratory will follow the NYSDEC Analytical Services Protocol (ASP) dated 1995; and Category B deliverables and EQuIS™ EDDs will be issued. Further details regarding the specific sampling methodology and analytical procedures are presented in the QAPP, included as Appendix F.

7.2.3 Reporting of Results

The analytical results of the endpoint samples will be tabulated and compared to the UUSCOs, RRSCOs, and PGWSCOs (for CVOCs only). The tabulated data as well as the laboratory reports will be included in the FER. All analytical data will be submitted to the NYSDEC database in EDD format via EQuIS™.

7.2.4 Quality Assurance/Quality Control (QA/QC)

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision, and completeness requirements will be addressed by the laboratory for all data. Collected samples will be appropriately packaged, placed in coolers, and either shipped or delivered directly to the analytical laboratory via a courier. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved to maintain a temperature of 4 °C. Decontamination of non-dedicated sampling equipment will consist of the following: gently tap or scrape to remove adhered soil; rinse with tap water; scrub/wash with tap water/Alconox® detergent solution and bristle brush; and rinse with tap water.

One trip blank, one field blank, one blind duplicate sample, and one matrix spike/matrix spike duplicate (MS/MSD) will be collected per every 20 samples and submitted for laboratory analysis with the accompanying field samples. The field blank(s), blind duplicate(s), and MS/MSD(s) will be analyzed for the same parameters as the field sample(s); the trip blank(s) will be analyzed for VOCs only. Additional QA/QC information is provided in the QAPP, provided as Appendix F.

7.2.5 Data Usability Summary Report (DUSRs)

Ms. Lori Beyer of L.A.B. Validation Corporation, a third-party data validator will review the laboratory reports and prepare DUSRs. The validated data will be submitted to the NYSDEC database in EDD format via EQuIS™. Ms. Beyer's resume is included in Appendix F. DUSRs and validated data will be included in the FER.

7.2.6 Reporting of Endpoint Data in Final Engineering Report (FER)

The FER will include a detailed description of endpoint sampling activities, data summary tables, concentration figures showing endpoint sample locations and concentrations compared to applicable standards, DUSRs, and laboratory reports. The analytical laboratory used for endpoint sample analyses and contingency sampling (if any) will be NYSDOH ELAP-certified. Endpoint sampling will be performed in accordance with the sampling frequency requirements outlined in Section 5.4 of DER-10.

7.3 Estimated Material Removal Quantities

The removal of materials from the Site will include: (1) excavation and off-site disposal of any remaining contaminated soil above PGWSCOs after completion of the IRM to achieve the RAOs; (2) removal of any USTs, fill ports, and vent lines, if encountered; and (3) removal of building debris and/or foundation elements associated with former Site buildings, if encountered. Additional soil/fill may be removed as part of the remedial excavation based on the analytical results of the endpoint sampling or if additional unknown contamination is encountered.

The amount of construction and demolition (C&D) material cannot be estimated at this time, but will include, at a minimum, building debris and/or foundation elements associated with former Site buildings. The exact quantities disposed of will be included in the FER.

Fill meeting the requirements of 6 NYCRR Part 375-6.7(d) may be imported to the Site to replace the excavated soil and establish the grade at the Site. On-site soil which does not exceed the previously noted excavation criteria [RRSCOs and PGWSCOs (for CVOCs)] for any constituent

may be used anywhere on-site without pre-approval by the NYSDEC project manager. It is noted that soil may be reused as backfill on-site to prepare for the new building foundation after sampling and approval by NYSDEC.

7.4 Soil/Materials Management Plan (SMMP)

The SMMP describes the procedures to be performed during the handling of soil/fill materials on-site during all intrusive work.

7.4.1 Soil Screening Methods

During all ground-intrusive work, visual, olfactory, and PID soil screening and assessment will be performed by a QEP or an experienced environmental consultant under the direction of the RE. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the CoC.

All primary contaminant sources (including, but not limited to, tanks and hotspots) identified during previous investigations and unknown AOCs identified during the RA will be surveyed by a surveyor licensed to practice in the State of New York. The survey will be included in the FER.

Screening will be performed by QEPs or qualified individuals under the guidance of QEPs and/or the RE. Resumes for personnel responsible for field screening (i.e., those representing the RE) during invasive work for unknown contaminant sources during remediation and development work have been provided in Attachment A of Appendix F.

7.4.2 Staged Soil/Fill

Staged soil/fill will be inspected at a minimum of once each week and after every storm event. Results of inspections will be recorded in a logbook maintained at the Site and will be available for inspection by NYSDEC and NYSDOH. Stockpiles will be kept covered at all times with appropriately anchored tarps. Damaged tarp covers will be promptly replaced. Hay bales may be used as needed near catch basins, surface waters, and other discharge points.

7.4.3 Materials Excavation and Load Out

The RE or an experienced person under her supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The Volunteers and their contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP.

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 RAWP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate federal, state, local, and NYSDOT requirements. Vehicles leaving the Site will not be overloaded. The RE's representative will make reasonable efforts to ensure that vehicles are not loaded beyond their NYSDOT weight rating and that all material is secured beneath the truck bed cover.

A truck wash will be operated on-site. The RE's representative will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete, as applicable.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site sediment tracking.

The RE's representative will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Volunteers and associated parties preparing the remedial documents submitted to the state, and parties performing the work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The RE will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

All contaminated materials and structures to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and endpoint remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of soil/fill on-site is prohibited.

The locations and elevations of all primary contaminant sources (including but not limited to tanks and hotspots) identified during previous investigations and during the RA will be surveyed by a NYS-licensed surveyor. The survey will be included in the FER.

7.4.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, state, and federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

All trucks loaded with Site materials will exit the vicinity of the Site using only approved truck routes. The most appropriate route(s) will be submitted prior to finalization of this RAWP and will take into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the destination facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development. Queuing of trucks will be performed on-site to minimize off-site disturbance. Off-site queuing will be prohibited.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used. Trucks will be washed prior to leaving the Site as deemed necessary by the on-site environmental professional under the RE.

7.4.5 Materials Disposal Off-Site

Following completion of the waste characterization sampling, properly permitted waste disposal facilities will be selected for off-site disposal. The proposed disposal facilities

information including their location will be reported to the NYSDEC project manager prior to commencing the disposal activities.

The total quantity of material expected to be disposed off-site as part of the remedy is approximately 2,600 cubic yards. It is noted that additional material may require excavation and off-site disposal as part of the remedy.

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, state (including 6 NYCRR Part 360), and federal regulations. If disposal of soil/fill from the Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from the Site is prohibited without formal NYSDEC approval. Material that does not meet Track 1 UUSCOs is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the RE for each selected disposal facility to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the RE or BCP Volunteers to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and that the facility is approved to accept the material. These documents will be included in the FER.

Non-hazardous soil/fill taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6 NYCRR Part 360.

Soil/fill are prohibited from being disposed at Part 360-366 and 369 Registration Facilities (also known as Soil Recycling Facilities).

Soil/fill that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be C&D materials with contamination not typical of virgin soils and may be sent to a permitted Part 360 landfill. It may be sent to a permitted C&D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DMM. The material is prohibited from being sent or redirected to a Part 360-366 and 369 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C&D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the material is contaminated, and that it must not be redirected to on- or off-site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of all chemical data for the material being transported.

The FER will include an accounting of the destination of all material removed from the Site during this RA, including excavated soil, contaminated soil, historical fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabulated form in the FER.

Bill of lading system or equivalent will be used for off-site movement of non-hazardous wastes and contaminated soil/fill. This information will be reported in the FER.

Any hazardous wastes derived from the Site will be stored, transported, and disposed of in full compliance with applicable local, state, and federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, state, and federal regulations.

Waste characterization will be performed for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits (See Section 3.0). Sampling and analytical methods, sampling frequency, analytical results, and QA/QC will be reported in the FER. All data available for soil/fill and other material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

7.4.6 Materials Reuse On-Site

Chemical criteria for on-site reuse of material have been established by NYSDEC. Materials planned for reuse (if any) will be segregated and stockpiled from materials slated for off-site disposal. Stockpiles will be placed on and covered with polyethylene sheeting. The stockpiled material will be sampled and analyzed in accordance with Table 5.4(e)10 on page 161 of DER-10 Technical Guidance for Investigation and Remediation and in accordance with the *Sampling, Analysis and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs* (issued in January 2021, revised in June 2022). The analytical results will be submitted to NYSDEC via a *Request to Import/Reuse Soil or Fill* form for review and approval prior to placement on-site. All of the materials to be reused on the Site will comply with RRSCOs and PGWSCOs (for CVOCs). The RE will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-site.

Demolition material will not be reused on-site. Concrete crushing or processing on-site is prohibited. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-site.

Contaminated on-site material removed for grading or other purposes will not be reused within a cover soil layer (if any), within landscaping berms, or as backfill for subsurface utility lines. This will be expressed in the final SMP.

7.4.7 Fluids Management

All liquids to be removed from the Site, including any dewatering fluids, will be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by the New York City Department of Environmental Protection (NYCDEP). Dewatered fluids will not be discharged back to the land surface or subsurface of the Site, and will be managed off-site. Discharge of water generated during remedial construction to surface waters (i.e., a local pond, stream, or river) is prohibited without a State Pollutant Discharge Elimination System (SPDES) permit.

7.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils (if any). A physical demarcation layer, consisting of orange snow fencing material or equivalent material, will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in the SMP. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. The survey and the demarcation layer placed on grade surface will constitute the physical and written record

of the upper surface of the 'Residuals Management Zone' in the SMP. A map showing the survey results will be included in the FER and the SMP.

7.4.9 Backfill from Off-Site Sources

The importation of clean fill from off-site source(s) will be needed to backfill over-excavated areas as part of the RA and as part of the two-foot clean soil cap (to be placed over all non-covered, landscaped areas). Further, a highly visible demarcation barrier (orange snow fencing or equivalent) will be installed beneath the two feet of clean fill/top soil cap. All materials proposed for import onto the Site will be approved by the RE and will be in compliance with provisions in this RAWP prior to receipt at the Site. Material proposed for import shall either be from a NYSDEC registered certified clean fill facility or other permitted facility. Any facility proposed for import shall undergo a facility history review and background check by the RE. Material from industrial sites, spill sites, other environmental remediation sites, or other potentially contaminated sites will not be imported to the Site. Solid waste will not be imported to the Site.

Prior to import, soil will be segregated and tested at the source facility for analysis of VOCs, SVOCs, PCBs, pesticides, TAL metals, 1,4-Dx, and PFAS at the frequency outlined in Table 5.4(e)10 on page 161 of DER-10 Technical Guidance for Investigation and Remediation. Soil exceeding the UUSCO for 1,4-Dx will not be imported, per DER 10: Appendix 5 - Allowable Constituent Levels for Imported Fill or Soil, Subdivision 5.4(e). In accordance with the January 2020 NYSDEC Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs, if PFOA or PFOS are detected in any sample at or above 1 ppb, the sample will also be tested by SPLP. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually), the soil will not be imported. Analytical results will be compared to Table 375-6.8(b) of 6 NYCRR Part 375 and submitted to NYSDEC via a *Request to Import/Reuse Soil or Fill* form for review and approval prior to importation and placement on-site.

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for the Site. The NYSDEC approved backfill or cover soil quality objectives are the lower of the protection of groundwater or the protection of public health SCOs for Restricted Residential Use as set forth in Table 375-6.8(b) of 6 NYCRR Part 375. Non-compliant soils will not be imported to the Site without prior approval by NYSDEC. Nothing in this approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose.

Soil that meets 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for the Site, will not be imported without prior approval by NYSDEC. Nothing in this RAWP should be construed as an approval for this purpose.

The FER will include the following certification by the RE: "I certify that all import of soils from off-site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

7.4.10 Stormwater Pollution Prevention

The erosion and sediment controls employed at the Site will be in conformance with the requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control Erosion and sediment control measures. The measures will be installed prior to conducting any ground-intrusive work. These measures will be installed according to all applicable or relevant and appropriate federal, state, and local laws.

All barriers and/or hay bale checks installed will be inspected at least once a week and after every storm event. Results of these inspections will be recorded in a logbook maintained at the Site and will be available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and/or hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in this RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

7.4.11 Contingency Plan

If USTs or other previously unidentified contaminant sources are identified, sampling will be performed on product, sediment, and surrounding soils, etc. Chemical analytical work will be for full scan parameters (TCL VOCs, TCL SVOCs, TCL pesticides, PCBs, and TAL metals). These analyses will not be limited to CP-51 parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to the NYSDEC project manager. The findings will be also included in daily and monthly progress reports.

7.4.12 Community Air Monitoring Plan (CAMP)

A Site-specific CAMP has been prepared for the Site and is included in Appendix H. Community and roving air monitoring at the perimeter of the exclusion zone will be conducted during all intrusive Site activities in accordance with the NYSDOH Generic and Site-specific CAMPs. SRCAMP will be implemented during all ground intrusive Site activities within 20 feet of occupied structures and/or potentially exposed populations.

All readings will be recorded and available for NYSDEC and NYSDOH project manager review. Any exceedances will be reported to NYSDEC and NYSDOH project managers, and will be included in the daily and monthly progress reports, and in the FER. Response actions for any exceedances will also be included in each report.

7.4.13 Odor, Particulate, and Nuisance Control Plan

The FER will include the following certification by the RE: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with particulate and odor suppression methodology defined in the Remedial Action Work Plan."

Odor Control Plan

The following odor control plan should be implemented to control emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include the use of a PID to screen for VOCs and olfactory observations by a field technician. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. The NYSDEC and NYSDOH project managers will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the RE, who is responsible for certifying the FER.

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

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

Particulate Control Plan

A particulate control plan that addresses particulate management during invasive on-site work will include, at a minimum, the items listed below and is further detailed in the Site-specific CAMP, included in Appendix H:

- Site fencing will be adequately constructed of plywood and/or chain-link fencing with a mesh fabric fence screen as an engineering control to help contain dust and debris during remedial activities.
- Particulate suppression will be achieved through the use of a dedicated hose connected to a fire hydrant. The hose will be equipped with a nozzle capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of the Sites will be done in stages to limit the area of exposed, non-vegetated soils vulnerable to airborne particulate production.
- Crushed stone will be used on on-site roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water spraying.

Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work.

A plan for noise control will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

8.0 REMEDIAL ACTION: GROUNDWATER TREATMENT

Based on the analytical results of the Phase II Investigation and RI, groundwater and soil beneath the Site is contaminated with chlorinated solvent-related VOCs likely attributable to former manufacturing operations at the Site. To enhance attenuation and/or prevent groundwater contamination from migrating off-site, an in-situ groundwater treatment program will be implemented to address the elevated concentrations of chlorinated solvent-related contamination in the groundwater throughout the Site.

As described in Section 6.0, chlorinated solvent-contaminated soil will be excavated as part of the IRM and remediation of the Site. It is anticipated that the Site will be excavated between approximately 2 and 15 feet bgs and will be excavated to the lateral and vertical extent of CVOC contamination, which will be determined in the field.

The proposed groundwater treatment program, as shown on Figure 12, will include the source area located in the northeast portion of the Site, along with a series of transects to treat areas downgradient of the source area (inclusive of the southeastern and southwestern boundaries of the Site). The program will include permanent injection wells and any necessary manifolds and associated underground tubing to facilitate one or more injection events to be conducted prior to, during, and potentially following building construction.

The treatment technologies to be implemented will include, but may not be limited to, surfactants, in-situ chemical oxidation, reductive dechlorination, and/or enhanced bioremediation. Details of the groundwater treatment program will be presented in a groundwater treatment design report submitted to NYSDEC for review and approval following completion of the PDI (to be conducted as part of the IRM).

Following groundwater treatment, existing monitoring wells will be sampled to monitor CVOC concentrations throughout the Site. Existing monitoring wells damaged during excavation and construction activities will be replaced within or adjacent to the former well location, to the extent possible. Four rounds of groundwater sample collection will be implemented at the Site, one round per quarter within the first year following remediation (including at least one prior to receipt of the Certification of Completion and one or more under Site Management).

9.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil, groundwater, and soil vapor will exist beneath the Site after the remedy is complete, ECs and ICs will be required to protect public health and the environment by appropriately managing residual contamination. These ECs and ICs are described in this section and Sections 10.0 through 13.0. Long-term management of ECs and ICs, and of any residual contamination will be executed under a Site-specific NYSDEC-approved SMP that will be developed and included as an appendix of the FER. The Site will have three (3) primary ECs, including: (1) a Site cover system; (2) an SVE system; and (3) a SSDS system, as described in the following sections.

The FER will report any residual contamination after implementation of the RAWP in tabular and map form with comparisons to UUSCOs, RRSCOs, and/or PGWSCOs (for CVOCs only), as applicable.

10.0 ENGINEERING CONTROL (EC): SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

10.1 Sub-Slab Depressurization System (SSDS)

An active SSDS will be installed under the entire building slab to mitigate the potential for sub-slab vapor intrusion into the proposed new building. The SSDS will induce a negative pressure (i.e., vacuum) beneath the proposed building slabs. Slotted piping will extend horizontally throughout the treatment area and will be connected, via solid aboveground piping, to a roof-mounted blower(s) and ultimately the effluent vapors will be exhausted to the atmosphere via discharge stacks.

The conceptual SSDS layout is shown on Figure 13. The SSDS layout is subject to change depending on the final building plans. The SSDS layout and final design details will be submitted to NYSDEC and NYSDOH for review once the building design and construction plans are finalized. Conceptual layout and standard design details are further discussed below.

10.1.1 SSDS Components

The proposed SSDS to be installed as part of the Site remedy consists of, but is not limited to:

1. 0.02-inch slotted and solid, 4-inch diameter Schedule 40 PVC pipe lengths beneath the building slab;
2. A pipe manifold, which combines the PVC pipe sections into a 4- or 6-inch galvanized steel riser pipe;
3. A riser pipe, which extends from the manifold to the roof of the building;
4. A roof-mounted blower with a shut-off alarm connected to the building management system (BMS);
5. One 10-foot tall, 4- or 6-inch diameter galvanized steel rooftop exhaust stack fitted with a rain cap;
6. Communication and pipe sleeves through concrete foundation elements;
7. A minimum 6-inch thick gas-permeable aggregate stratum underlain by a non-woven geotextile fabric beneath the entire SSDS treatment area;
8. Condensate drains, as necessary;
9. Vacuum monitoring points (VMPs) installed beneath the building slab;
10. Accessories, including: cleanouts, sample ports, vacuum indicators/pressure gauges, flow meters, butterfly valves, and differential pressure switches; and
11. A control panel equipped with a telemetry system to notify select personnel of alarm conditions.

During construction, non-woven geotextile fabric overlain by a minimum 6-inch layer of ¾-inch gas permeable aggregate (GPA) stone bedding will be installed below the entire building slab, and under, around, and above all SSDS piping to promote favorable conditions for ventilation of vapors. VMPs will be installed as necessary to monitor and confirm the presence of induced vacuum across the building slab.

A blower will be selected and installed on the building roof, subject to the final building design plans. The SSDS effluent vapors will exit the blower via a discharge stack terminating at least 10 feet above the main roof and at least 25 feet away from any air intakes or windows, in accordance with local and state building codes.

The installation of a minimum 20-mil Drago® Wrap vapor barrier, or engineer-approved equal, as a green remediation principle, under the building slab is expected to enhance vacuum capabilities beneath the proposed building slabs and further assist in the prevention of sub-slab vapor infiltration into indoor air.

10.1.2 SSDS Confirmatory Testing

SSDS startup, including balancing the system and the collection of vacuum readings at the VMPs, will be conducted to assess induced vacuum conditions under the building slab and determine the efficacy of the SSDS. Adequate sub-slab vacuum will be determined via VMP vacuum readings of 0.004 inH_2O of higher. If sub-slab vacuum readings indicate minimum vacuum readings less than the target operating conditions, the SSDS will be rebalanced by adjusting the applied vacuum and air flow rate conditions at the individual SSDS lines until acceptable induced vacuum conditions are observed at each of the VMPs.

10.1.3 SSDS Operations and Maintenance (O&M)

After successful SSDS startup and balancing, monthly checks will be performed during the first quarter of operation. After the first quarter of operation, the SSDS will be inspected at a minimum of once per month during the first year of operation and then quarterly to ensure proper operation. Monthly and quarterly checks will consist of individual SSDS riser pipe gauge readings, suction fan inspections, and alarm checks. More detailed system maintenance instructions will be included in the SMP.

Effluent concentration from the SSDS will be monitored by collecting vapor samples for laboratory analysis of VOCs by EPA Method TO-15 after completion of the remedial action described in this RAWP. Additional post-remedial monitoring details will be provided in the SMP.

SSDS operations and maintenance requirements will be outlined in the SMP. As-built drawings, diagrams, calculations, manufacturer documentation for the SSDS will be presented in the FER.

11.0 ENGINEERING CONTROL (EC): SOIL VAPOR EXTRACTION SYSTEM (SVES)

11.1 Soil Vapor Extraction (SVE) System (SVES)

An SVES will be installed to remove and treat contaminant mass in soil vapor (and potential sorbed to soil) throughout the Site. Operation of the SVE system is also designed to help prevent off-site migration of contaminated soil vapor. The contaminated vapor extracted from the SVE system wells will be treated using granular activated carbon (GAC) and the treated vapor will be discharged to the atmosphere in accordance with the emission requirements set forth in 6 NYCRR Part 212.

A preliminary SVE system design, presented in the following sections, has been developed based on subsurface conditions at the Site and proposed development plans. Final design will be presented to NYSDEC and NYSDOH for review and approval in a design report prior to installation.

The conceptual SVES layout is shown on Figure 14.

11.1.1 SVES Treatment Area

The target areas for the SVES are the source area, downgradient on-site areas, and the Site boundary vadose zone soils where prior soil and soil vapor sampling identified elevated concentrations of PCE and TCE. The proposed SVE wells (estimated 17 wells) will be installed at the approximate locations shown on Figure 14. The SVE wells will be installed to provide overlapping radii of influence (ROIs). Each SVE well is projected to have an ROI of approximately 35 feet; however, the final quantity and placement of SVE wells will be subject to the SVES pilot test and to be confirmed in the forthcoming design report.

The SVE wells will be connected through a network of underground piping to a SVE blower located in dedicated SVES equipment room in the partial cellar of the proposed building, which will apply a vacuum to draw contaminated vapors from the treatment area through a GAC vapor treatment system prior to discharging the treated vapor to the atmosphere.

11.1.2 SVES Pilot Test

11.1.2.1. Pilot Test SVE Well Installation

To conduct the pilot test, two SVE wells will be installed at two of the proposed SVE well locations shown on Figure 13. The SVE wells will be installed with 4-inch diameter Schedule 40 PVC pipe, with a 30-foot length of 0.020-inch slotted screen from 15 feet to 30 feet below grade in the portions of the Site with a proposed cellar, and 10 feet to 40 feet below grade in the remainder of the Site (with the screen intervals subject to change based on results of vertical soil vapor profiling to be conducted via nested SVE wells as part the PDI). A No. 2 sand filter pack will be installed around, and 2 feet above, the top of the well screen. Approximately 2 feet of hydrated bentonite will be installed above the sand filter pack and a non-shrinking bentonite-cement grout will be used to fill the annular space to approximately 1 foot below surface grade.

11.1.2.2. Temporary Vapor Monitoring Point Installation

Approximately 4 to 6 temporary vapor monitoring points will be installed using a Geoprobe® DPP drill rig at locations surrounding the two SVE well locations selected for the pilot test. Each vapor monitoring point will be installed with a probe set at the approximate depth of the screened interval of the corresponding pilot test well. The vapor monitoring points will be generally installed 20 and 40

feet north, east, and west of each SVE well to the extent practicable, based on Site constraints and the proposed SVE wells' proximity to the Site boundaries.

At each monitoring point, a 6-inch stainless steel screen implant will be connected to Teflon™-lined tubing and installed to the target depth within the screened intervals of the SVE wells. The sampling tubing will extend from the end of the screen to above surface grade. The annular space around the point and tubing will be backfilled with clean silica sand to between approximately 3 and 6 inches above the screen. Hydrated bentonite will be used to fill the remaining void around the sampling tubing to approximately 1 foot below surface grade and a non-shrinking cement-grout mixture will fill the void to surface grade. Dependent on the final building design, the temporary vapor monitoring points may be utilized as permanent vapor monitoring points completed with flush-mounted 6-inch diameter watertight locking well covers.

11.1.2.3. Pilot Test Baseline Monitoring

Baseline monitoring will be conducted to provide data for static conditions prior to initiating the SVE pilot test. The measurements from each SVE well and vapor monitoring point will include the following:

- Vacuum/pressure of well headspace using a magnehelic gauge;
- Organic vapors at the well headspace using a PID; and
- Oxygen (O_2) at the well headspace using an O_2 meter.

Each temporary vapor monitoring point will be fitted with an expandable well cap that will be pre-drilled with a hose fitting and connected to a section of sampling hose to allow for headspace readings (vacuum/pressure, organic vapors, O_2) within the well. Magnehelic gauges measuring a range of 0 to 5 inches of water will be utilized during the baseline monitoring to measure vacuum and/or pressure at the monitoring points.

11.1.2.4. Blower Calibration

A skid-mounted regenerative blower with a capacity of at least 100 cubic feet per minute (cfm) at a vacuum of 50 inches of water (in H_2O), will be utilized for the pilot test. The system will be equipped with a variable frequency drive (VFD), flow meter, and vacuum gauge. The blower specifications and blower curve for the blower that will be used during the pilot test will depend on availability at the time of the pilot test.

Following installation of the SVE pilot test blower assembly, the blowers, gauges, and monitoring equipment will be checked for functionality. The SVE pilot test blower will be operated initially to determine the maximum flow rate and applied vacuum. The system will then be shut off prior to implementation of the pilot test described in the following section.

11.1.2.5. Pilot Test Implementation

In order to specify design details for the proposed SVE system, a pilot test will be performed to confirm the ROI around each SVE well and to evaluate the appropriate blower sizing. Effluent vapor sampling will also be conducted during the testing to help determine the change out schedule and sizing of the proposed GAC vapor treatment prior to discharge into the atmosphere.

The pilot test will be performed at both of the SVE pilot test wells in step tests utilizing three increasing air flow rates as a percentage (25%, 50%, and 100%) of

the maximum blower capacity without inducing significant upwelling and/or water entrainment. During each step test, vacuum/pressure measurements will be collected at each monitoring point to assess the ROI for the SVE pilot test wells.

11.1.3 SVES Components

The sizing and configuration of final SVES components are subject to the results of the pilot test; however, they are likely to include the following:

1. Approximately 17 4-inch diameter SVE wells constructed with 25 to 30 feet of screen, extending the SVE well screens to within approximately 5 feet of the observed groundwater interface, pending results of the pilot test and the PDI.
2. 4-inch and 6-inch diameter solid PVC piping connecting the SVE wells from the subsurface to equipment installed in a dedicated SVES room in the new building.
3. Accessories on the individual SVE lines, including throttling valves, sample ports, vacuum/pressure gauges, air flow rate gauges, temperature sensors, reducers, unions, etc., to be confirmed during final design and installation.
4. One SVE blower, with a variable-frequency drive (VFD) to throttle blower operation to appropriate conditions (vacuum and air flow rate) and a dilution valve with fresh air intake.
5. A control panel equipped with a telemetry system to notify select personnel of alarm conditions.
6. Two GAC vapor treatment units connected in series.
7. A 8-inch diameter cast iron riser leading to a galvanized steel exhaust stack fitted with a rain cap.
8. Pipe sleeves through concrete foundation elements.
9. Condensate sump(s), if necessary.
10. A network of approximately 8 soil vapor monitoring points (SVMPs, comprising 1 inch diameter PVC pipes, installed to approximately 25 feet below grade) to measure vacuum induced by the SVES
11. An exterior equipment enclosure with a grounding rod to or separately ventilated equipment room in the new building cellar to house all mechanical equipment, including a knockout (i.e., moisture) drum and pump.

The piping runs originating from each of the slotted SVE wells will be constructed of solid 4-inch-diameter PVC piping, which will penetrate the cover system at the location of the dedicated SVE system room in the new building. The 4-inch-diameter PVC piping lines will be manifolded into a solid 8-inch-diameter PVC header, which will be connected inside the equipment room to the SVE systemequipment. The system equipment includes a high-vacuum blower, moisture separator tank with associated transfer pump and a 55-gallon drum with a high-level alarm, a particulate filter, and dilution valve with fresh air intake. The blower will be equipped with a VFD, used to throttle the blower to optimal performance/electrical consumption conditions. Pre- and post-blower pressure gauges will be installed to monitor strain acrossthe blower. The proposed SVE system will also include a remote telemetry system and automated shutdown conditions to prevent equipment breakdown.

The outlet of the SVE blower will lead directly to the influent port of the carbon treatment system, also located within the SVE system equipment room. The carbon treatment system will include two GAC units connected in series. Influent, intermediate, and effluent sample ports and pressure gauges will be installed on the carbon system for routine monitoring purposes. The GAC effluent piping will transition to 8-inch diameter cast iron piping and penetrate through the equipment room ceiling or wall, and extend vertically above the roof of the building where the vapors will exit the SVES via a discharge stack terminating at least 10 feet above the roof. The equipment enclosure will be situated such the exhaust

stack will be at least 25 feet away from any nearby (including off-site) intakes and windows, in accordance with local and state building codes.

Any horizontal portions of solid subsurface or above-grade SVES piping will be pitched down towards the SVES wells a minimum of 1% to minimize accumulation of moisture within the SVES piping. In areas where solid horizontal piping cannot maintain this pitch, an in-line condensate sump will be installed at any low points, with pipe pitching towards the condensate sump from both sides.

The operational capabilities of the blower will be confirmed during start up testing after installation of the SVES piping and substantial completion of the new building envelope. The blower make, model, and operating conditions will be reassessed after system installation, startup, and balancing and reported to NYSDEC and NYSDOH.

11.1.4 SVES Confirmatory Testing

SVES startup testing, including balancing the system, will be conducted to assess induced vacuum conditions throughout the Site. If subsurface vacuum and air flow rate conditions are not adequately induced in the treatment area (as determined by individual line vacuum and air flow rate readings, induced vacuum readings at adjacent SVE wells, and vacuum field extension readings at monitoring points), the SVES will be rebalanced by adjusting the applied vacuum and air flow rate conditions at the individual SVE wells until acceptable conditions are observed. Effluent GAC sampling will be conducted periodically to determine the carbon change out schedule.

11.1.5 SVES Operations and Maintenance (O&M)

After successful SVES startup, daily checks will be performed during the first week of operation and weekly checks will be performed during the first month of operation. After the initial month of operation, the SVES will be inspected at a minimum of once a month to ensure proper operation. Monthly checks will consist of individual SVES riser pipe gauge readings, suction fan inspections, and alarm checks. More detailed system maintenance instructions will be included in the SMP.

A proposal to discontinue the SVES may be submitted by the property owner based on confirmatory SVES operations and effluent vapor sample data that justifies such a request. The SVES will continue to be maintained and operational until permission to discontinue operation is granted in writing by NYSDEC and NYSDOH.

All as-built drawings, diagrams, design calculations, and manufacturer documentation for treatment systems will be included in the FER.

12.0 ENGINEERING CONTROL (EC): SITE COVER SYSTEM

To prevent direct contact with any residual contaminated soil, a site cover system will be installed and/or maintained at the Site. The proposed site cover system will be composed of: (1) minimum 6-inch-thick concrete building slab underlain by a minimum 20-mil vapor barrier membrane, which doubles as a demarcation barrier, in areas within the building footprint, (2) paved surfaces for parking lots, roadways, sidewalks, and walkways; and (3) a minimum of two-foot clean fill buffer with demarcation barrier in all landscaped and non-covered areas. The site cover system is a permanent control, and the quality and integrity of the system will be inspected at defined, regular intervals. Inspections of the site cover system will be detailed in the SMP. The proposed site cover system plan is provided as Figure 15.

A Soil Management Plan will be included in the SMP and will outline the procedures to be followed in the event that the composite cover system and any underlying residual contamination are disturbed after the RA is complete. Maintenance of the site cover system will be described in the SMP in the FER.

13.0 INSTITUTIONAL CONTROLS (ICS)

After the remedy is complete, the Site may have residual contamination remaining in place. ECs for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an EE and an SMP.

All as-built drawings, diagrams, calculations, and manufacturer documentation for ECs will be presented in the FER. A Site-specific EE will be recorded with the New York City Register to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the EE and the grantor's successors and assigns adhere to all ECs and ICs placed on the Site by the NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate O&M and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the EE. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the EE and grantor's successors and assigns.

13.1 Environmental Easement (EE)

An EE, as defined in Article 71 Title 36 of the ECL, is required when residual contamination is left on-site after the RA is complete. As part of this remedy, an EE approved by NYSDEC will be filed and recorded with the New York City Register. The EE will be submitted as an appendix to the FER.

The EE renders the Site a Controlled Property. The EE must be recorded with the New York City Register before the CoC can be issued by NYSDEC. A series of ICs are required under this remedy to implement, maintain and monitor the ECs, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil, and restricting the use of the Site to restricted residential, commercial, or industrial use(s) only. These ICs are requirements or restrictions placed on the Site that are listed in, and required by, the EE. ICs can, generally, be subdivided between controls that support ECs, and those that place general restrictions on Site usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The ICs that support the ECs are:

- Compliance with the EE by the Grantee and/or the Grantee's successors and adherence of all elements of the SMP is required;
- All ECs must be operated and maintained as specified in the SMP;
- All ECs on the Site must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site management must be reported at the frequency and in a manner defined in the SMP;
- On-site environmental monitoring devices, including but not limited to, soil vapor extraction wells and vapor monitoring points, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP; and
- ECs may not be discontinued without an amendment or extinguishment of the EE.

Adherence to the ICs for the Site will be mandated by the EE and will be implemented under the SMP. The Site will also have a series of ICs in the form of Site restrictions and requirements. The Site restrictions that apply to the Site include:

- In-ground vegetable gardening and farming on the Site are prohibited;
- The use of groundwater underlying the Site is prohibited without treatment rendering it safe for intended purpose;

- All future activities on the Site that will disturb the residual management zone are prohibited unless they are conducted in accordance with the soil management provisions in the SMP;
- The Site may be used for restricted residential, commercial, or industrial use(s) only, provided the long-term ECs and ICs included in the SMP are employed;
- The Site may not be used for a higher level of use, such as residential or unrestricted use, without an amendment or extinguishment of the EE; and
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access the Site at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This statement must be certified by an expert that the NYSDEC finds acceptable.

13.2 Site Management Plan (SMP)

Site management is the last phase of remediation and begins with the approval of the FER and issuance of the CoC for the RA. The SMP is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site management responsibilities defined in the EE and the SMP are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the RA in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all ECs and ICs; (2) development and implementation of monitoring systems and an SMP; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems [including, where appropriate, preparation of an Operation and Maintenance Manual (O&MM)]; (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an EC and IC Plan for implementation and management of ECs and ICs; (2) a Monitoring Plan for implementation of Site monitoring; (3) an O&M Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The SMP will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated material will be subject to provisions contained in the SMP.

14.0 FINAL ENGINEERING REPORT (FER)

An FER will be submitted to NYSDEC following implementation of the RA defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, calculations, and manufacturer documentation for treatment systems, certifications, manifests, bills of lading as well as the complete SMP. The FER will provide a description of the changes in the RA from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the RA. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance, and monitoring tasks defined in the SMP and EE. This determination will be made by NYSDEC in the context of the FER review.

The FER will include written and photographic documentation of all remedial work performed under this RAWP.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 UUSCOs in 6 NYCRR Part 375-6. A table that shows exceedances of Track 1 UUSCOs for all soil/fill remaining at the Site after the RA and a map that shows the location and summarizes exceedances of Track 1 UUSCOs for all soil/fill remaining at the Site after the RA will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in this RAWP, if any, and will provide an explanation for why the material was not removed as part of the RA, as necessary. A table and a map that show residual contamination in excess of AWQSGVs will be included in the FER.

The FER will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a CoC, all project reports must be submitted in digital form on electronic media (PDF) to NYSDEC.

14.1 Certifications

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the RE, Ms. Rebecca Kinal, P.E., who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Rebecca Kinal, P.E., am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 114 Snediker Avenue Site (NYSDEC BCA Index No. CXXXXX-XX-XX; BCP Site No. TBD).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for 114 Snediker Avenue [and related amendments].

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Interim Remedial Measures Work Plan and Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan has been submitted by the Volunteers for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Interim Remedial Measures Work Plan and Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all federal, state, and local laws.

I certify that all import of soils from off-site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

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

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

TABLES

FIGURES

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STANDARDS, CRITERIA, AND GUIDANCE

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APPENDIX D
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APPENDIX E
SANBORN MAPS

APPENDIX F
QUALITY ASSURANCE PROJECT PLAN (QAPP)

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COMMUNITY AIR MONITORING PLAN (CAMP)

APPENDIX I
CONSTRUCTION QUALITY ASSURANCE PLAN (CQAP)