REMEDIAL ACTION WORK PLAN

for

Kasser Scrap Metal and Rector Cleaners Site
111 Washington Street
New York, New York
NYSDEC BCP Site No. C231153

Prepared for:

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February 15, 2023
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LANGAN

CERTIFICATION

I, Jason J. Hayes, certify that I am currently a New York State (NYS) registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with 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 a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

JASON HAYES
NYS Professional Engineer #089491

2-15-2023
Date

Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any 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
Alpha	Alpha Analytical Inc.
AOC	Area of Concern
AST	Aboveground Storage Tank
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below grade surface
BIC	Business Integrity Commission
BMP	Best Management Practices
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
CHASP	Construction Health and Safety Plan
CFR	Code of Federal Regulations
COC	Certification of Completion
CP	Commissioner's Policy
CQAP	Construction Quality Assurance Plan
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
C&D	Construction and Demolition
DER	Division of Environmental Remediation
DER-10	DER Technical Guidance for Site Investigation and Remediation
DUSR	Data Usability Summary Report
EC	Engineering Controls
ECL	Environmental Conservation Law
EDD	Electronic Data Deliverable
el.	Elevation
ELAP	Environmental Laboratory Approval Program
En-Zone	Environmental Zone
EQASOP-GW4	Low Flow Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
eV	Electron Volt
FEMA	Federal Emergency Management Agency
FER	Final Engineering Report
FWRIA	Fish and Wildlife Resources Impact Analysis
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan

Acronym	Definition
IC	Institutional Controls
Lakewood	Lakewood Environmental Services Corp.
mg/kg	Milligrams per kilogram
NOVA	NOVA Geophysical Engineering
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYCDPR	New York City Department of Parks and Recreation
NYCTA	New York City Transit Authority
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene/Tetrachloroethylene
PFAS	Per- and Polyfluoroalkyl Substances
PGW	Protection of Groundwater
PID	Photoionization Detector
PM10	particulates less than 10 microns in diameter
PPE	Personal Protective Equipment
ppm	parts per million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCNY	Rules of the City of New York
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RE	Remedial Engineer
RI	Remedial Investigation
RIR	Remedial Investigation Report
RURR	Restricted Use Restricted-Residential
SCL	Soil Cleanup Levels
SCO	Soil Cleanup Objective
SDS	Safety Data Sheet
SGV	Standards and Guidance Values

Acronym	Definition
SEQRA	State Environmental Quality Review Act
SMMP	Soil/Materials Management Plan
SMP	Site Management Plan
SOE	Support of Excavation
SPDES	State Pollutant Discharge Elimination System
STARS	Spills Technology and Remediation Series
SVI	Soil Vapor Intrusion
SVOC	Semivolatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UU	Unrestricted Use
VOC	Volatile Organic Compound
$\mu g/m^3$	Micrograms per cubic meter
6 NYCRR	Title 6 of the New York Code of Rules and Regulations

EXECUTIVE SUMMARY

Carlisle New York Apartments, LLC c/o Grubb Properties is the Volunteer for the Kasser Scrap Metal and Rector Cleaners Brownfield Cleanup program (BCP) Site located at 111 Washington Street in the Financial District of New York, New York (the site). The Volunteer submitted a BCP application to the New York State Department of Environmental Conservation (NYSDEC) on April 8, 2022. The proposed redevelopment project includes the construction of a mixed-use residential and commercial building with affordable housing units and ground floor commercial space. The new building will comprise commercial retail space, residential units, mechanical floors, and a partial cellar in the northern part of the site. The building footprint is about 9,771 square feet in area and the remainder of the lot will be comprised of sidewalk entranceways and a rear yard with a dog run with artificial turf over a concrete slab.

This Remedial Action Work Plan (RAWP) identifies and evaluates remedial action alternatives, and recommends a Track 4 remedy to address semivolatile organic compounds (SVOCs) and metals in non-native soil, creosote- and/or petroleum-impacted soil and groundwater, and localized non-aqueous phase liquid (NAPL) contamination. The proposed remedy was developed based on data gathered during the 2021 Phase II Environmental Site Investigation (ESI) and 2022 Remedial Investigation (RI) performed by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan). The remedy described in this document is consistent with the procedures defined in the NYSDEC Program Policy DER-10: Technical Guidance for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulations, and requirements.

Site Description/Physical Setting/Site History

The site is located at 111 Washington Street in the Financial District of New York, New York and is identified as Block 53, Lot 12 on the Manhattan Borough Tax Map. The site is about 11,255 square feet and is currently a vacant lot with overgrown vegetation and an asphalt-paved driveway in the northwestern part of the property. A closed-in-place 3,000-gallon gasoline underground storage tank (UST) is present in the southern part of the site.[1] A Site Location Map is included as Figure 1. A Site Plan is included as Figure 2.

Based on the draft Topographic, Boundary and Utility Survey, prepared by Langan, dated May 13, 2022, ground elevations at the site range from an elevation (el.) of about el. 6.9 feet[2] in the northwestern part of the site to about el. 9.7 in the eastern part of the site.

[1] The UST is registered under NYSDEC Petroleum Bulk Storage (PBS) No. 2-601410.

[2] Datum refers to the North American Vertical Datum of 1988 (NAVD88) which is approximately 1.1 feet above mean sea level datum at Sandy Hook, New Jersey as defined by the United States Geologic Survey (USGS NGVD 1929).

The site is bound by Carlisle Street followed by a multi-story mixed-use commercial and residential building to the north (Block 53, Lot 7502), three multi-story residential and/or commercial buildings to the east (Block 53, Lots 33, 35, and 36), a multi-story residential building to the south (Block 53, Lot 6), and Washington Street followed by two multi-story residential and/or commercial buildings to the west (Block 55, Lots 14 and 7501). A New York City Transit Authority (NYCTA) subway tunnel structure for the No. 1 line is present under Greenwich Street less than 200 feet east of the site.

Summary of the Remedial Investigation

The findings and conclusions of the 2022 RI are as follows:

1. Stratigraphy: A non-native soil layer was observed from surface grade to depths ranging from about 10 to 22 feet below grade surface (bgs), and consisted primarily of brown to grey, fine- to medium-grained sand with varying amounts of gravel, silt, brick, metal, concrete, coal ash, wood, glass, slag, and coal. The fill layer is underlain by native soils consisting of brown to gray fine- to medium-grained sand with varying amounts of gravel and silt. A 0.5- to 4-foot-thick dark grey to black clay layer was encountered at about 20 to 24 feet bgs in soil borings SB2A, SB15, SB18, SB20, SB25, SB26, and SB30. In one soil boring (SB24), the clay layer was underlain by a gray fine- to medium-grained sand with shell fragments from 24 to 28 feet bgs. Bedrock was not encountered during the RI or previous environmental investigations conducted at the site. Bedrock was encountered on the site during a 2004 geotechnical investigation, conducted by Langan, at about 46 to 53 feet bgs.
2. Hydrogeology: Groundwater was observed at depths between 10.49 to 13.32 feet bgs with elevations ranging from el. -0.52 to -2.85 feet during synoptic groundwater level measurements collected from nine wells during the RI, including three monitoring wells previously installed by others. Groundwater was modeled to generally flow to the north-northeast at the site.
3. Non-Native Soil Quality: Non-native soil contains volatile organic compounds (VOCs), SVOCs (benzo[a]anthracene, benzo[b]fluoranthene, chrysene, and indeno[1,2,3-cd]pyrene), pesticides, and metals (copper, lead, mercury, nickel, and zinc) at concentrations above the Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375 Unrestricted Use (UU), Protection of Groundwater (PGW) and/or Restricted Use Restricted – Residential (RURR) Soil Cleanup Objectives (SCOs). The presence of SVOCs and metals were attributed to the quality of the non-native soil.

4. Petroleum- and/or Creosote-Impacted Soil and Groundwater:

    a. Soil - Residual petroleum contamination (as evidenced by photoionization detector [PID] readings above background, odors, staining, and/or analytical data) were observed in ten soil borings (SB2A, SB17, SB18, SB20, SB24, SB24_DB01, SB24_DB02, SB24_DB03, SB25, and SB30) from 9 to 24 feet bgs in the southern part of the site encompassing an area of about 1,300 square feet. Petroleum impacts were delineated horizontally and vertically (as evidenced by the field observations and analytical data). NAPL, identified as coal tar/creosote by laboratory hydrocarbon analysis, was observed in soil boring SB24 from 20 to 24 feet bgs. NAPL-impacted soil in SB24 exhibited SVOCs above the PGW and/or RURR SCOs at depths of 20 to 22 feet bgs.

    b. Groundwater – During the installation of MW06, coal tar/creosote NAPL was observed within the monitoring well; however, NAPL was not encountered during the sampling of MW06. Creosote- and/or petroleum-related VOCs were identified above the NYSDEC Title 6 NYCRR Part 703.5 and the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA water (collectively referred to as NYSDEC SGVs) in groundwater samples collected from the southern part of the site.

    c. The source of petroleum impacts at the site is likely related to a historical release from the UST, its lines, and the former fuel dispenser.

    d. No discrete on-site source of the coal tar/creosote NAPL was found during the RI. Wood fragments were identified in many borings at the groundwater table across the site and may be remnants of treated/preserved wood products that may have been used for structural piles or other timber-based structures. The NAPL appears isolated to a single boring and is highly localized. Historical site uses are not consistent with those commonly associated with coal tar waste (i.e., manufactured gas plants). Therefore, the most plausible conclusion may be that the NAPL is a result of weathering of buried treated/preserved wood products that induced leaching of creosote, a commonly-used wood preservative.

5. Soil Vapor Impacts: Creosote- and/or petroleum-related VOCs and chlorinated VOCs (CVOCs) were identified in soil vapor samples at the site. No CVOCs exceeded the minimum concentrations for which mitigation is recommended by the New York State Department of Health (NYSDOH) Decision Matrices in the seven soil vapor samples collected during the RI. No CVOCs exceeded applicable criteria in soil and groundwater samples collected during the Phase II ESI or the RI. The analytical data does not support a vapor intrusion risk at the site based on the NYSDOH matrices.

Sufficient analytical data were gathered during the 2022 RI to establish site-specific soil cleanup levels and to develop a remedy for the site. The remedy described and evaluated in this RAWP was prepared in accordance with New York State BCP guidelines. The remedy will address the SVOCs and metals in non-native soil, creosote- and/or petroleum-impacted soil and groundwater, and highly localized NAPL contamination described in the Remedial Investigation Report (RIR).

Qualitative Human Health Exposure Assessment

Based on the conceptual site model (CSM) and review of environmental data, complete on-site and off-site exposure pathways to both on- and off-site receptors:

- Do not exist under current use conditions
- Would be avoided under investigation/construction/remediation use conditions through implementation of a Construction Health and Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) and other construction measures (dust suppression, soil/erosion sediment control plan, etc.); and
- Would be mitigated through the use of planned engineering controls (EC) and institutional controls (IC) under future use conditions as part of a Track 4 remedy.

A discussion of the pathway as they pertain to the site is provided below.

Current Conditions

The site footprint is currently covered in part with impervious surfaces, including an asphalt-paved driveway in the northwestern part of the property; however, the remainder of the site includes vegetated areas with exposed soil/fill. Because of site access restrictions, including a locked construction gate, human exposure to contaminated soil through ingestion or direct contact is limited. Groundwater in this area of New York City is not used as a potable water source.

There is a potential exposure pathway to contaminated soil/fill, groundwater and soil vapor during site investigation through dermal absorption, inhalation, and/or ingestion. Activity is limited to trained investigation personnel and is performed under a site-specific CHASP and CAMP with provisions to minimize exposure risk, including vapor and dust suppression techniques.

Construction/Remediation Activities

Construction and remediation may result in potential exposures to contaminated soil, groundwater or soil vapor. The implementation of a CHASP and CAMP, as well as vapor and dust suppression techniques, will limit the exposure pathways presented by potential dermal absorption, ingestion, and inhalation.

Proposed Future Use Conditions

The proposed development will encompass the entire site footprint and include residential and commercial use. Upon completion of the new development, non-native soil and contaminated soil will be excavated to accommodate the partial cellar level and as required for at-grade concrete foundations. The foundation for the partial cellar level will include a waterproofing/vapor barrier membrane system. The site cover system, including impervious surfaces, 2 feet of clean soil/fill, and/or the waterproofing/vapor barrier membrane, will prevent direct human exposure to residual impacted media that may be left in place or may migrate to the site from an off-site location and will remove the potential exposure pathways for future users. In addition, there is no reasonable exposure pathway for ingesting groundwater since the site and surrounding areas obtain their drinking water supply from surface water reservoirs located upstate. There is no or limited potential for accumulation of contaminated vapors below the new building at the site based on the RI data. In addition, deed restrictions on use of groundwater, allowable uses of the site, and vegetable farming will be placed on the property as part of remediation; these institutional controls will also render incomplete exposure pathways.

Summary of the Remedy

It is anticipated that the site will be remediated to a Restricted-Residential Track 4 cleanup and that the remedy will address open Spill No. 2107485. The proposed Track 4 remedy consists of the following actions:

1. As a pre-requisite to site remediation, removal of existing asphalt and concrete cover systems by the contractor as hazardous waste or construction and demolition (C&D) debris in accordance with Part 360 and 361 regulations - Review and certification of hazardous building materials and C&D and refuse transport and disposal methodologies is not a requirement of the Remediation Engineer (RE); however, documentation of proper disposal will be provided in the Final Engineering Report (FER). The RE is responsible for documenting that C&D debris and refuse is not comingled with contaminated site soil and fill
2. Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation activities
3. Establish Track 4 SCOs that include NYSDEC Part 375-list RURR SCOs
4. Screening of soil for indications of contamination source areas, by visual, olfactory, or instrumental methods, during any intrusive site work - During surface cover and foundation component demolition in contact with site soil, segregation of C&D debris and site soil will be observed to document that site soil was not commingled with the C&D debris.

5. Design and construction of a secant pile support of excavation (SOE) system to facilitate remedial excavations within the partial cellar footprint and construction of lagging and/or sloping SOE to facilitate remedial excavations at the elevator pit and removal of the closed-in-place UST and its appurtenances in the southern part of the site
6. Design, installation and operation of a construction dewatering system inside of the secant pile SOE system with an associated pre-treatment system to facilitate development-related excavation. The dewatering system may require a Water Withdrawal Permit from the NYSDEC and will require a permit from the New York City Department of Environmental Protection (NYCDEP) to allow the discharge of treated effluent to the municipal sewer system.
7. Excavation, stockpiling, off-site transport, and disposal of non-native soil and soil to achieve a Track 4 cleanup in accordance with federal, state, and local rules and regulations for handling, transport, and disposal. Soil exceeding the following criteria will be removed to achieve a Track 4 cleanup:
    a) Soil exceeding the RURR SCOs to at least 2 feet bgs and deeper (as necessary for source removal) across the remainder of the site
    b) Soil exceeding the 6 NYCRR Part 371 hazardous criteria
    c) Soil containing total SVOCs exceeding 500 parts per million (ppm)
    d) Soil exceeding the RURR SCOs with evidence of petroleum or chemical-like impacts (visual, olfactory, and/or PID above background) encountered during excavation of deeper, development-related excavation(cellar, pile caps, and/or elevator pits) or during the removal of the closed-in-place UST and its appurtenances
8. Localized in-situ stabilization (ISS) of coal tar/creosote NAPL contamination in on-site soil using a cementitious grout mixture
9. Implementation of a limited, one-time in-situ groundwater treatment program to address residual creosote and/or petroleum impacts to groundwater
10. Installation of two permanent groundwater monitoring wells in the southern part of the site after the completion of in-situ groundwater treatment program, and at least one round of post-remediation groundwater sampling to evaluate potential residual impacts to groundwater quality resulting from residual creosote and/or petroleum impacts to groundwater and assess the effectiveness of the remedy
11. Decommissioning and removal of the closed-in-place 3,000-gallon UST in the southern part of the site and any additional discovered USTs in accordance with 6 NYCRR Part 613.9 and NYSDEC DER-10 Section 5.5

12. Collection and analysis of documentation soil samples in accordance with DER-10 at the completion of the general 2-foot remedial excavation, final remediation depths across the site, and/or development-related excavation depths across the site to document post-remediation soil quality in comparison to the RURR SCOs
13. Demarcation of residual (existing) soil and non-native soil outside of the proposed building footprint by survey and a high-visibility demarcation barrier for visual reference
14. Import of soil and fill for composite cover and backfill, where required, in compliance with: a) RURR SCOs or NYSDEC Part 375-6.8(b) Protection of Groundwater (PGW) SCOs, whichever is more stringent; b) 6 NYCRR Part 360 regulations; c) federal, state, and local rules and regulations for handling and transport of soil and fill; and d) Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs (June 2022) - Imported soil and fill are subject to approval by the NYSDEC project manager and may require sampling as listed in DER-10 Section 5.4
15. Construction of a composite cover system consisting of concrete foundation slabs and other exterior slabs or, a minimum of 2 feet of soil that meets the lower of the RURR and PGW SCOs or virgin quarry stone.
16. Installation of a concrete foundation with a waterproofing/vapor barrier membrane below the groundwater table - The continuous waterproofing membrane will extend from beneath the partial cellar to surface grade level along the walls of the cellar. A vapor barrier membrane will tie into the waterproofing membrane and extend beneath the at-grade foundations slabs. The waterproofing/vapor barrier membrane will be compatible with the vapor barrier membrane will be compatible with creosote- and petroleum-related VOCs and CVOCs, have a minimum thickness of 20 mils and be installed as a continuous sub-slab membrane.
17. Recording of ICs in an Environmental Easement.
18. Preparation and submission of a Site Management Plan (SMP) that describes management of the ECs and ICs – Implementation of the SMP, following completion of the remedy, will be required by the Environmental Easement.
19. Preparation and submission of an FER to NYSDEC following implementation of the Remedial Action defined in this RAWP (see Section 8.0).
20. Overall performance of the remedial action including permitting requirements, in accordance with applicable federal, state, and local rules and regulations with NYSDEC approval.

1.0 INTRODUCTION

Carlisle New York Apartments, LLC c/o Grubb Properties are the Volunteer for the Kasser Scrap Metal and Rector Cleaners Brownfield Cleanup Program (BCP) Site located at 111 Washington Street in the Financial District of New York, New York (the site). The Volunteer submitted a BCP application to the New York State Department of Environmental Conservation (NYSDEC) on April 8, 2022. The proposed redevelopment project includes construction of a mixed-use residential and commercial building with affordable housing units and ground floor commercial space. The new building will comprise commercial retail space, residential units, mechanical floors, and a partial cellar in the northern part of the site. The building footprint is about 9,771 square feet in area and the remainder of the lot will be comprised of sidewalk entranceways and a rear yard with a dog run with artificial turf over a concrete slab.

This Remedial Action Work Plan (RAWP) identifies and evaluates remedial action alternatives, and recommends a Track 4 remedy to address semi-volatile organic compounds (SVOCs) and metals in non-native soil, creosote- and/or petroleum-impacted soil and groundwater, and localized non-aqueous phase liquid (NAPL) contamination. The proposed remedy was developed based on data gathered during the 2021 Phase II Environmental Site Investigation (ESI) and 2022 Remedial Investigation (RI) performed by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan). The remedy described in this document is consistent with the procedures defined in the NYSDEC Program Policy DER-10: Technical Guidance for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulations, and requirements.

1.1 Site Location and Description

The site is located at 111 Washington Street in the Financial District of New York, New York and is identified as Block 53, Lot 12 on the Manhattan Borough Tax Map. The site is about 11,255 square feet and is currently a vacant lot with overgrown vegetation and an asphalt-paved driveway in the northwestern part of the property. A closed-in-place 3,000-gallon gasoline underground storage tank (UST) is present in the southern part of the site[3]. A Site Location Map is included as Figure 1. A Site Plan is included as Figure 2.

According to the 2014 United States Geological Survey (USGS) 7.5-minute series topographic quadrangle map for Jersey City, the elevation of the site is approximately 8 feet above mean sea level. Based on the draft Topographic, Boundary and Utility Survey, prepared by Langan, dated

[3] The UST is registered under NYSDEC Petroleum Bulk Storage (PBS) No. 2-601410.

May 13, 2022, ground elevations at the site range from an elevation (el.) of about el. 6.9 feet[4] in the northwestern part of the site to about el. 9.7 in the eastern part of the site.

The site is bound by Carlisle Street followed by a multi-story mixed use commercial and residential building to the north (Block 53, Lot 7502), three multi-story residential and/or commercial buildings to the east (Block 53, Lots 33, 35, and 36), a multi-story residential building to the south (Block 53, Lot 6), and Washington Street followed by two multi-story residential and/or commercial buildings to the west (Block 55, Lots 14 and 7501). A New York City Transit Authority (NYCTA) subway tunnel structure for the No. 1 line is present under Greenwich Street less than 200 feet east of the site.

1.2 Redevelopment Plan

The proposed remedy is intended to render the site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use are described here to provide the basis for this assessment; however, the contemplated remedy may be implemented independent of the proposed redevelopment plan in the event that it changes.

The proposed redevelopment project includes the construction of one mixed-use residential and commercial building with affordable housing units and ground floor commercial space. The new building will comprise commercial retail space, residential units, mechanical floors, and a partial cellar in the northern part of the site. The building footprint is about 9,771 square feet in area and the remainder of the lot will be comprised of sidewalk entranceways and a rear yard with a dog run with artificial turf over a concrete slab. Design development plans are included as Appendix A.

The site will be excavated to depths down to 18 feet below grade surface (bgs) (about el. -10 feet) in the area of the partial cellar in the northern part of the site and up to 2 feet bgs throughout the remainder of the site. Further excavation up to 7.5 feet bgs (about el. 1 foot) for deep foundation components (i.e., elevator pits) will be required for redevelopment. Additional soil in these areas may require excavation and segregation in accordance with Section 4.2.7. Certain excavated areas will be backfilled with fill material (meeting the lower of NYSDEC Part 375-6.8(b) Protection of Groundwater [PGW]) and NYSDEC Part 375-6.8(b) Restricted Use Restricted-Residential [RURR] Soil Cleanup Objectives [SCOs]) and the site will be capped with a composite cover system. Through these means and the elements further described herein, the intended future use will be protective of human health and the environment.

[4] Datum refers to the North American Vertical Datum of 1988 (NAVD88) which is approximately 1.1 feet above mean sea level datum at Sandy Hook, New Jersey as defined by the United States Geologic Survey (USGS NGVD 1929).

1.3 Description of Surrounding Property

Based on visual observations of the surrounding area, the site is located within an urban area characterized by mixed-use residential and commercial buildings, institutional buildings, and public open space.

Direction	Adjoining and Adjacent Properties			Surrounding Properties
	Block No.	Lot No.	Description	
North	Carlisle Street			Albany Street followed by commercial and institutional properties
	53	7502	Multi-story mixed use commercial and residential building	
East	53	33	Multi-story, multi-family residential building	Greenwich Street followed by commercial and institutional properties
		35	Seven-story commercial building	
		36	Multi-story, multi-family residential building	
South	53	6	Multi-story, multi-family residential building	Institutional, mixed use commercial and residential, and commercial buildings
West	55	14	Multi-story, multi-family residential building	West Street followed by the Hudson River Park and mixed-use commercial and residential properties
		7501	Multi-story commercial building	

Land use within a half-mile radius includes multi-story residential buildings, multi-story mixed use commercial and residential buildings, institutional and commercial buildings, and park land owned and operated by the New York City Department of Parks and Recreation (NYCDPR). The Hudson River is the closest ecological receptor, located about 1,300 feet west of the site.

No schools or day care facilities are on the site. Sensitive receptors, as defined in NYSDEC DER-10, within a half mile of the site include those listed below:

Number	Name (Approximate distance from site)	Address
1	Metropolitan College of New York (approximately 0.04 miles southwest of the site)	60 West Street, New York, NY 10006
2	Leadership and Public Service High School (approximately 0.06 miles northeast of the site)	90 Trinity Place, New York, NY 10006

Number	Name (Approximate distance from site)	Address
3	High School of Economics and Finance (approximately 0.07 miles northeast of the site)	100 Trinity Place, New York, NY 10006
4	Little Minds Montessori (approximately 0.08 miles south of the site)	40 Washington Street, New York, NY 10006
5	Metrokids Preschool – Battery Park City School (approximately 0.15 miles southwest of the site)	2 South End Ave, New York, NY 10280
6	Battery Park City School – PS IS276 (approximately 0.16 miles west of the site)	55 Battery Place, New York, NY 10004
8	The Learning Experience – Manhattan (approximately 0.18 miles southwest of the site)	28 Washington Street, New York, NY 10004
9	Leman Manhattan Preparatory School – Morris Street Campus (approximately 0.18 miles southeast of the site)	1 Morris Street, New York, NY 10004
10	District 2 Pre-K Center (approximately 0.20 miles southwest of the site)	26 Washington Street, New York, NY 10004
11	Nyack College (approximately 0.22 miles southwest of the site)	2 Washington Street, New York, NY 10004
12	Pine Street School (approximately 0.22 miles east of the site)	25 Pine Street, New York, NY 10005
13	Bright Horizons at 20 Pine (approximately 0.22 miles southeast)	20 Pine Street, New York, NY 10005
14	The Lang School (approximately 0.22 miles southeast of the site)	26 Broadway Suite 900, New York, NY 10004
15	Leman Manhattan Preparatory School – Broad Street Campus (approximately 0.24 miles southeast of the site)	41 Broad Street, New York, NY 10004
16	New York City Charter School of Arts (approximately 0.24 miles southeast of the site)	26 Broadway, New York, NY 10004
17	The School for Young Performers (approximately 0.31 miles northeast of the site)	222 Broadway, 21st Floor, New York, NY 10038
18	Millennium High School (approximately 0.31 miles southeast of the site)	75 Broad Street, 13th Floor, New York, NY 10004
19	The Quad Preparatory School – Upper School (approximately 0.34 miles east of the site)	80 Maiden Lane, New York, NY 10038
20	The Downtown Little School (approximately 0.35 miles northeast of the site)	15 Dutch Street #A, New York, NY 10038

Number	Name (Approximate distance from site)	Address
21	Richard R. Green High School of Teaching (approximately 0.35 miles southeast of the site)	7 beaver Street, New York, NY 10004
22	KinderCare FiDi NYC (approximately 0.39 miles east of the site)	101 John Street, New York, NY 10038
23	Blue School – Upper Primary and Middle School (approximately 0.43 miles northeast of the site)	156 Williams Street, New York, NY 10038
24	Hawthorne Country Day School (approximately 0.45 miles northeast of the site)	156 William Street, New York, NY 10038
25	Spruce Street School (approximately 0.47 miles northeast of the site)	12 Spruce Street, New York, NY 10038

1.3.1 Topography

According to the 2014 USGS 7.5-minute series topographic quadrangle map for Jersey City, the elevation of the site is approximately 8 feet above mean sea level. Based on the draft Topographic, Boundary and Utility Survey, prepared by Langan, dated May 13, 2022, ground elevations at the site range from an elevation of about el. 6.9 feet[5] in the northwestern part of the site to about el. 9.7 in the eastern part of the site.

1.3.2 Wetlands and Floodplain

Wetlands on and near the site were evaluated by reviewing the National Wetlands Inventory and NYSDEC regulated wetlands map. There are no wetlands on the site. The nearest wetland is the Hudson River, located approximately 1,300 feet west of the site.

According to the Effective National Flood Insurance Rate map for the City of New York published by the Federal Emergency Management Agency (FEMA) (Preliminary Map Panel No. 3604970184G, dated December 5, 2013), the site falls within Zone AE, which is subject to inundation by the 1% annual chance flood.

[5] Datum refers to the North American Vertical Datum of 1988 (NAVD88) which is approximately 1.1 feet above mean sea level datum at Sandy Hook, New Jersey as defined by the United States Geologic Survey (USGS NGVD 1929).

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The RI was completed between January 25 and February 18, 2022 to further investigate preliminary areas of concern (PAOCs) and to determine, to the extent practical, the nature and extent of contamination in soil, groundwater, and soil vapor. The RI included the advancement of soil borings; installation of groundwater monitoring wells and soil vapor probes; and collection of soil, groundwater, and soil vapor samples. Sample locations are presented on Figure 3.

The RI consisted of the following:

- Geophysical survey to identify subsurface anomalies consistent with utilities, substructures, physical obstructions, and USTs), and to pre-clear soil boring locations;
- Advancement of 10 soil borings (SB14 through SB23) and collection of 30 soil samples plus quality assurance/quality control (QA/QC) samples;
- Advancement of 12 delineation soil borings (SB2A, SB24 through SB31, SB24_DB01, SB24_DB02, and SB24_DB03) and collection of 17 soil samples;
- Installation of six groundwater monitoring wells and collection of seven groundwater samples; including one sample from each of the six newly installed monitoring wells and one sample from an existing monitoring well (installed by others), plus QA/QC samples;
- Installation of six soil vapor points and collection of six soil vapor samples plus QA/QC samples; and
- Survey and synoptic groundwater gauging of newly installed and three existing monitoring wells at the site to evaluate the elevation and flow of site groundwater.

The RI was conducted in accordance with Title 6 of the New York Code of Rules and Regulations (6 NYCRR) Part 375-3.8, NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010), the NYSDEC Draft Brownfield Cleanup Program Guide (May 2004), and the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006) with updates (SVI Guidance).

2.1 Site History

The site was developed with residential dwellings from about 1894 to 1931 and operated as a scrap metal dealer in 1934, a warehouse in 1950, a six-story parking garage from 1977 to 2006, a rental car facility with on-site refueling of vehicles from 1978 to 1983, a drycleaner from 2001 to 2006, and a maintenance support yard in 2012.

2.2 Previous Environmental Reports

Previous environmental reports were reviewed as part of this RAWP and are summarized in chronological order below. Previous environmental reports include the following:

1. *Phase I Environmental Site Assessment for 105 – 121 Washington Street, prepared by Merritt Environmental Consulting Corp. (Merritt), dated October 29, 2010*
2. *Phase I Environmental Site Assessment for 105 – 107 Washington Street (Lot 4) and 111 – 121 Washington Street (Lot 12), prepared by Langan, dated January 13, 2012*
3. *Supplemental Geotechnical Recommendations for Proposed 111 Washington Street Development, prepared by Langan, dated January 13, 2012*
4. *Limited Phase II Environmental Site Investigation, prepared by Langan, dated January 30, 2012*
5. *Phase I Environmental Site Assessment, prepared by Langan, dated September 9, 2021*
6. *Phase II Environmental Site Investigation, prepared by Langan, dated November 23, 2021*

Reports are summarized below and are included in Appendix B.

Previous Phase I Environmental Site Assessments (ESAs) completed between 2010 and 2012 were conducted for the site and the southern-adjoining property and surrounding properties. The site was historically used by residential occupants (1894 to 1950), a warehouse (1950), a six-story parking garage (1977 to 2006), a rental car facility with on-site refueling of vehicles (1978 to 1983), a dry cleaners (2006), and a maintenance support yard (2012).

Previous Phase I ESA reports identified the following Recognized Environmental Conditions (RECs) and Business Environmental Risks (BERs) in relation to the site:

- Based on available New York City Department of Building (NYCDOB) records and regulatory database information, an approximately 3,000-gallon gasoline UST was closed-in-place at the site in 1997; however, documentation related to the UST closure was not available for review.
- The site was previously occupied by Kasser Scrap Metal, a scrap metal dealer, and Rector Cleaners, a drycleaner.
- The potential of presence of heating oil USTs beneath the site or adjacent sidewalks associated with the historical residential structures at the site
- Non-native soil, including construction and demolition debris, associated with reclaiming the eastern shoreline of the Hudson River in the late 1800s
- Potential impacts from current and historical operations at adjoining and nearby properties

related to aboveground storage tanks (ASTs), USTs, and spills.

Limited Phase II ESI, prepared by Langan, dated January 30, 2012

Langan conducted a limited environmental investigation in 2011 consisting of the completion of a test pit in the area of the closed-in-place UST. According to the report, the UST reportedly had an associated fuel pump island located directly adjacent to the east of the tank and a remote fill port line that extended west to the curb line of Washington Street.

The test pit uncovered a 3,000-gallon UST encased in an approximately 1-foot thick concrete vault that was located approximately 3 feet bgs. During excavation, soil exhibiting petroleum-like staining and odors was observed at the base of the tank vault in the southwestern corner of the vault. The petroleum-like staining was observed from about 9 feet bgs to the bottom of the test pit at about 12 feet bgs.

During the completion of the test pit, soil directly underlying surface cover was reported as brown sand from surface grade to about 9 feet bgs; this material was suspected to be fill sand from the vault installation. An about 1-foot-thick layer of non-native soil, primarily consisting of brick demolition debris, was observed underlying the surficial brown sand layer and was underlain by a 1-foot-thick layer of gravel and red-brown silty sand.

Two soil samples were collected along the western side of the vault within the test pit and were analyzed for volatile organic compounds (VOCs) and SVOCs. In addition, a groundwater sample was collected from a piezometer located on the northern-adjoining sidewalk along Carlisle Street. Analytical results are summarized below.

- Soil:
    - Six VOCs, including 1,2,4-trimethylbenzene, ethylbenzene, isopropylbenzene, naphthalene, n-propylbenzene, and xylenes, were detected at concentrations exceeding the Commissioner's Policy (CP)-51 Soil Cleanup Levels (SCL) for gasoline contaminated soils.
    - The following VOCs were also detected at concentrations above the 6 NYCRR Part 375 Unrestricted Use (UU) SCOs and/or the 6 NYCRR RURR SCOs:
        - 1,2,4-trimethylbenzene was detected at a concentration (86.3 milligrams per kilogram [mg/kg]) exceeding the UU SCO (3.6 mg/kg) and RURR SCO (52 mg/kg) in one soil sample
        - Ethylbenzene was detected at a concentration (10.4 mg/kg) exceeding the UU SCO (1 mg/kg) in one soil sample
        - Naphthalene was detected at a concentration (14.8 mg/kg) exceeding the UU SCO (12 mg/kg) in one soil sample

- N-propylene was detected at a concentration (12.9 mg/kg) exceeding the UU SCO (3.9 mg/kg) in one soil sample
- Xylene (mixed) was detected at a concentration (14.6 mg/kg) exceeding the UU SCO (0.26 mg/kg) in one soil sample

- Groundwater:
  - VOCs and SVOCs were detected at concentrations below the NYSDEC Title 6 NYCRR Part 703.5 and the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA water (collectively referred to as NYSDEC SGVs) in the groundwater sample collected.

The presence of VOCs above applicable criteria, staining, and petroleum-like odors in soil located in the southern part of the site was identified as a REC.

Supplemental Geotechnical Recommendations for Proposed 111 Washington Street Development, prepared by Langan, dated January 13, 2012

In November 2004, Langan advanced one boring along the Carlisle Street sidewalk as part of a preliminary subsurface investigation at the site with results of the boring documented in a January 2005 Geotechnical Report. Three additional borings were advanced in June 2005 and were summarized in this report.

Surficial non-native soil, primarily comprised of sand with varying amounts of silt, clay, gravel, brick, concrete, lumber/wood, glass, and root fibers, was observed to depths ranging from approximately 19 to 25 feet bgs. Native material, identified as former river bottom deposits and consisting of successive layers of silt or clay, fine- to coarse-grained sand, and peat, was observed underlying the non-native soil to depths of 36 to 41 feet bgs. Underlying the river bottom deposits, a mixture of sand, silt, clay, gravel, and cobbles/boulders was observed to depths of 43 to 50 feet bgs. Bedrock consisting of mica schist was observed underlying the native material at depths of 46 to 53 feet bgs.

Groundwater was encountered at the site at about 10.5 to 14.5 feet bgs.

Phase I Environmental Site Assessment, prepared by Langan, dated September 7, 2021

The 2021 Phase I ESA was conducted for the site and identified the following RECs and BERs in relation to the site:

- A 2011 Limited Phase II Environmental Site Investigation identified petroleum-impacted soil, including staining, petroleum-like odors, and concentrations of VOCs above the CP-51 SCLs for gasoline contaminated soils and the UU and/or RURR SCOs. The documented

presence of VOCs above applicable criteria, staining, and petroleum-like odors in soil located in the southern part of the site was considered a REC.

- Historical use of the site, including a scrap metal dealer in 1934, a rental car facility with on-site refueling of vehicles from 1978 to 1983, and a drycleaner from 2001 to 2006, may have resulted in spills and/or releases of petroleum products and/or hazardous substances. Prior studies also indicate the potential for heating oil USTs to be present on the site. The potential for undocumented impacts to soil, groundwater, and/or soil vapor from historical operations of potential buried USTs at the site was considered a REC.
- The historical use and operations at adjoining and surrounding properties, including a laundromat a drycleaner, a gasoline service station, an auto a coal yard, an auto export, an iron and steel works, a chemicals facility, and a metals facility, may have resulted in spills and/or releases of petroleum products and/or hazardous substances and were considered a REC.
- Non-native soil documented at the site was considered a BER.
- The presence of the site within a FEMA flood zone was considered a BER.
- Groundwater monitoring wells observed at the site during the site reconnaissance were considered a BER.

Phase II Environmental Site Investigation, prepared by Langan, dated November 23, 2021

The Phase II ESI was conducted at the site in October 2021. The Phase II ESI made the following conclusions:

- Geophysical Survey: The geophysical survey identified various scattered anomalies throughout the site and an anomaly consistent with a UST in the southern part of the site.
- Stratigraphy: A non-native soil layer was observed from surface grade to between 16 and 20 feet bgs (boring termination depth) throughout the site and generally consisted of tan to brown, fine- to medium-grained sand with varying amounts of gravel, silt, brick, wood, coal ash, slag, glass, metal, and organics. The non-native soil layer is underlain by native soil consisting of dark brown to gray silt with varying amounts of fine-grained sand and shell fragments. Bedrock was not encountered during the Phase II ESI; however, bedrock was encountered at depths ranging from 46 to 53 feet bgs during previous geotechnical investigations.
- Hydrogeology: Depth to groundwater ranges from 11.63 feet bgs in the south-central part of the site to 12.19 feet in the southeastern part of the site based on groundwater measurements collected before well purging and sampling. Groundwater flow at the site was not evaluated during the Phase II ESI, but likely flows to the west and/or the

southwest in the direction of the Hudson River/Upper New York Bay based on hydrogeological principles.

- Soil Sample Analytical Results:
    - Non-native soil contains contaminants including VOCs, SVOCs, pesticides, and metals exceeding the UU and/or RURR SCOs. The presence of SVOCs, pesticides, and metals was attributed to the quality of the non-native soil. The presence of VOCs was attributed to historical site use, including refueling operations and the use of a UST.
- Groundwater Sample Analytical Results:
    - Groundwater contains iron, magnesium, and sodium at total and dissolved concentrations exceeding the NYSDEC SGVs. These metals are commonly detected in groundwater above the NYSDEC SGVs and their presence in groundwater at the site is representative of naturally-occurring and/or regional groundwater conditions.
- Soil Vapor Sample Analytical Results:
    - 1,1,1-trichloroethane, methylene chloride, and tetrachloroethene (PCE) were detected in soil vapor samples at concentrations for which the NYSDOH Decision Matrices recommendations range from no further action to identify the source(s) and resample or mitigate. The presence of these VOCs within soil vapor at the site are attributed to an unidentified source.
- Petroleum Contamination:
    - Evidence of petroleum impacts, including odors, photoionization detector (PID) readings above background, and/or concentrations of petroleum-related VOCs exceeding regulatory standards, were observed in nine of thirteen borings (SB01, SB03, SB04, SB05, SB06, SB08, SB09, SB12, and SB13). Analytical soil data identified the presence of petroleum-related VOCs and SVOCs in soil. The residual contamination is attributed to historical site use, including refueling operations and the use of a UST.
    - Based on observations of a petroleum release at the site, a spill was reported to the NYSDEC on November 12, 2021. Spill No. 2107485 was assigned to the release.

2.3 Potential Areas of Concern (PAOCs - Pre-RI)

The PAOCs identified for the site and investigated under the RI are listed below.

PAOC 1: Non-native soil

Non-native soil was identified from below surface grade to depths ranging from about 10 to 22 feet bgs throughout the site. This is a site-wide PAOC and investigation locations included all borings and monitoring wells. Contaminants of concern associated with non-native soil include VOCs, SVOCs, pesticides, and metals exceeding the UU and/or RURR SCOs. The presence of SVOCs and metals was attributed to the quality of the non-native soil.

PAOC 2: Residual Petroleum and Petroleum-Impacted Soil and Groundwater

A 3,000-gallon UST was closed in place in the southern part of the site in 1997. The 2011 Limited Environmental Investigation and November 2021 Phase II Investigation identified evidence of petroleum impacts, including odors, PID readings above background, and/or concentrations of petroleum-related VOCs exceeding UU and/or RURR in soil samples collected in the vicinity of the closed-in-place gasoline UST and former fuel dispenser in the southern part of the site. Contaminants of concern associated with PAOC 2 include petroleum-related VOCs and SVOCs.

PAOC 3: CVOCs in Soil Vapor

The November 2021 Phase II ESI identified chlorinated VOCs (CVOCs) including 1,1,1-trichloroethane, methylene chloride, and PCE, in soil vapor at the site.

2.4 Summary of the Remedial Investigation

The following sections summarize the 2022 RI. This RI is documented in the Remedial Investigation Report (RIR), dated May 3, 2022 and prepared by Langan. Soil boring, monitoring well, and soil vapor probe locations are shown on Figure 3.

2.4.1 Geophysical Survey

On January 25, 2022, prior to ground-intrusive field activities, NOVA Geophysical Engineering (NOVA) of Douglaston, New York conducted a geophysical survey. The survey used ground-penetrating radar (GPR) to identify potential USTs and locate buried utilities and subsurface structures in the vicinity of each boring location. Borings were relocated as necessary to avoid subsurface utilities and other subsurface impediments.

NOVA identified two anomalies consistent with USTs in the southern part of the site. NOVA also identified a scattered, unknown anomaly in the northern part of the site, electric utilities through the central part of the site, and former utilities along the northern and western boundary of the site.

2.4.2 Soil, Groundwater and Soil Vapor Investigation

Langan field personnel documented the advancement of 10 soil borings and 12 delineation soil borings by Lakewood Environmental Services Corp. (Lakewood) of Smithtown, New York. Boring locations were selected to provide sufficient site coverage, to evaluate the PAOCs, and to delineate petroleum impacts observed in soil borings. Geoprobe® 54LT and Geoprobe® 6610 drilling rigs were used to advance borings to depths ranging from 20 to 28 feet bgs.

Three permanent groundwater monitoring wells were installed at locations sampled during the 2021 Phase II ESI and three RI borings were converted into permanent groundwater monitoring wells. The wells were installed with 10-foot long, 2-inch-diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing and 0.010-inch-slot well screens set to straddle the groundwater table. The screens were set between 20 to 24 feet bgs; solid PVC risers were installed above the screens to extend the well to grade. The annulus of each well was filled with No. 2 sand to about 2 feet above the top of the screen. Hydrated bentonite well seals were installed above the filter sand, and the wells were finished with flush-mounted access covers.

The wells were developed and the top of casing for each monitoring well was surveyed by Langan on February 10, 2022.

Langan field personnel documented the installation of six soil vapor points with Geoprobe® 54LT and Geoprobe® 6610 drilling rigs to about 5 feet bgs in accordance with the NYSDOH's Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

2.4.3 Samples Collected

A total of 49 soil samples (plus QA/QC samples) were collected from the soil borings for laboratory analysis. Soil samples were collected based on the following:

- One to two representative non-native soil samples were collected above the groundwater table in 13 soil borings.
- One to two soil samples were collected from native soil in 8 soil borings.
- One sample was collected from the interval exhibiting the greatest degree of petroleum contamination, where observed (based on the presence of staining, odor, and/or PID readings above background) in 4 soil borings.
- In 3 soil borings, one sample was collected from clean soil below the interval exhibiting the greatest degree of contamination in petroleum-impacted soil borings (based on lack of staining, odor, and/or PID readings above background).

Groundwater samples were collected from each newly installed well and one existing 4-inch monitoring well previously installed by others in accordance with NYSDEC DER-10, United States Environmental Protection Agency's (USEPA) Low Flow Purging and Sampling Procedures for the

Collection of Groundwater Samples from Monitoring Wells (EQASOP-GW4 Revised Sep. 2017) and NYSDEC's January 2020 Guidelines for Sampling and Analysis of per- and polyfluoroalkyl substances (PFAS). Seven groundwater samples (plus QA/QC samples) were collected during the RI.

Six soil vapor samples (plus one duplicate sample) were collected in accordance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

One outdoor ambient air sample was collected concurrently with the soil vapor samples. Soil vapor and ambient air samples were collected using laboratory-provided, 2.7-liter and 6-liter air canisters equipped with 8-hour sample interval flow controllers.

2.4.4 Chemical Analysis

The laboratory analyses performed on the soil, groundwater, and soil vapor samples collected during RI are summarized below by media.

Soil samples collected from all borings were analyzed for one or more of the following parameters using USEPA methods:

- Target Compound List (TCL) VOCs by USEPA methods 8260C
- TCL SVOCs by USEPA method 8270D
- Pesticides by USEPA method 8081B
- Herbicides by USEPA method 8151A
- Polychlorinated biphenyls (PCBs) by USEPA method 8082A
- Target Analyte List (TAL) metals by USEPA methods 6010D/7471B
- Hexavalent/trivalent chromium by USEPA method 7196A
- Total cyanide by USEPA method 9010C
- PFAS (21-compound list) by USEPA method 537 Rev. 1.15
- 1,4-dioxane by USEPA method 8270 with SIM isotope dilution

Grab samples submitted for VOC analysis were collected directly from the acetate sleeves into Terra Core® soil sample kits. The remaining sample volume was homogenized and placed into laboratory-supplied glassware. The sample containers were labeled, placed in a laboratory-supplied cooler, and packed with ice to attempt to maintain a temperature of 4°C. The samples were relinquished, under standard chain-of-custody protocol, to a courier for delivery to Alpha Analytical Inc. (Alpha), a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory (ELAP ID #11148) located in Westborough, Massachusetts.

Groundwater samples were collected into laboratory-supplied glassware and delivered via courier service to Alpha for analysis of one or more of the following USEPA methods for NYSDEC Part 375 list and USEPA TCL/TAL:

- TCL VOCs by USEPA method 8260C
- TCL SVOCs (lab-filtered in MW07) by USEPA method 8270D
- PCBs by USEPA method 8082A
- TAL Metals (field-filtered and unfiltered) by USEPA method 6010C/7470
- Pesticides by USEPA method 8081B
- Herbicides by USEPA method 8151A
- PFAS (21-compound list) by USEPA method 537 Rev. 1.15
- 1,4-dioxane by USEPA method 8270 with SIM isotope dilution

Soil vapor samples were analyzed for VOCs via USEPA Method TO-15 and delivered via courier service to Alpha and York Analytical Laboratories, Inc. (York), a NYSDOH ELAP laboratory (ELAP ID #10854) located in Stratford, Connecticut.

2.4.5 Summary of Remedial Investigation Findings

The findings and conclusions of the RI are as follows:

1. Stratigraphy: A non-native soil layer was observed from surface grade to depths ranging from about 10 to 22 feet bgs, and consisted primarily of brown to grey, fine- to medium-grained sand with varying amounts of gravel, silt, brick, metal, concrete, coal ash, wood, glass, slag, and coal. The fill layer is underlain by native soils consisting of brown to gray fine- to medium-grained sand with varying amounts of gravel and silt. A 0.5 to 4 foot thick dark grey to black clay layer was encountered at about 20 to 24 feet bgs in soil borings SB2A, SB15, SB18, SB20, SB25, SB26, and SB30. In one soil boring (SB24), the clay layer was underlain by a gray fine- to medium-grained sand with shell fragments from 24 to 28 feet bgs. Bedrock was not encountered during the RI or previous environmental investigation conducted at the site. Bedrock was encountered on the site during a 2004 geotechnical investigation, conducted by Langan, at about 46 to 53 feet bgs.
2. Hydrogeology: Groundwater was observed at depths between 10.49 to 13.32 feet bgs with elevations ranging from el. -0.52 to -2.85 feet during synoptic groundwater level measurements collected from nine wells during the RI, including three monitoring wells previously installed by others. Groundwater was modeled to generally flow to the north-northeast at the site.
3. Non-Native Soil Quality: Non-native soil contains volatile organic compounds (VOCs), SVOCs (benzo[a]anthracene, benzo[b]fluoranthene, chrysene, and indeno[1,2,3-cd]pyrene), pesticides, and metals (copper, lead, mercury, nickel, and zinc) at concentrations above the 6 NYCRR Part 375 UU, Protection of Groundwater (PGW) and/or RURR SCOs.

a. One VOC (1,2,4-trimethylbenzene), three SVOCs (benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene, and one metal (mercury) were detected in isolated soil samples above the RURR SCOs.

b. Eight VOCs (including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, acetone, benzene, ethylbenzene, n-butylbenzene, n-propylbenzene, and total xylenes) two SVOCs (including benzo(a)anthracene and chrysene), and one metal (mercury) were detected in isolated soil samples above the PGW SCOs.

c. The presence of SVOCs and metals were attributed to the quality of the non-native soil.

4. Petroleum-and/or Creosote-Impacted Soil and Groundwater:

a. Soil - Residual petroleum contamination (as evidenced by PID readings above background, odors, staining, and/or analytical data) were observed in ten soil borings (SB2A, SB17, SB18, SB20, SB24, SB24_DB01, SB24_DB02, SB24_DB03, SB25, and SB30) from 9 to 24 feet bgs in the southern part of the site encompassing an area of about 1,300 square feet. Petroleum impacts were delineated horizontally and vertically (as evidenced by the field observations and analytical data). NAPL, identified as coal tar/creosote by laboratory hydrocarbon analysis, was observed in soil boring SB24 from 20 to 24 feet bgs. NAPL-impacted soil in SB24 exhibited SVOCs above the PGW and RURR SCOs at depths of 20 to 22 feet bgs.

b. Groundwater – During the installation of MW06, NAPL was observed within the monitoring well; however, NAPL was not encountered during the sampling of MW06. Petroleum-related VOCs were identified above the NYSDEC SGVs in groundwater samples collected from the southern part of the site.

c. The source of petroleum impacts at the site is likely related to a historical release from the UST, its lines, or the former fuel dispenser.

d. No discrete on-site source of the NAPL (identified as coal tar/creosote) was found during the RI. Wood fragments were identified in many borings at the groundwater table across the site and may be remnants of treated/preserved wood products that may have been used for structural piles or other timber-based structures. The NAPL appears isolated to a single boring and is highly localized. Historical site uses are not consistent with those commonly associated with coal tar waste (i.e., manufactured gas plants). Therefore, the most plausible conclusion may be that the NAPL is a result of weathering of buried treated/preserved wood products that induced leaching of creosote, a commonly-used wood preservative.

5. Soil Vapor Impacts: Creosote, petroleum-related and chlorinated VOCs were identified in soil vapor samples across the site; however, VOCs were not identified above minimum concentrations requiring at which mitigation is recommended. No CVOCs exceeded the minimum concentrations for which mitigation is recommended by the NYSDOH Decision Matrices in the seven soil vapor samples collected during the RI. No CVOCs exceeded applicable criteria in soil and groundwater samples collected during the RI. The analytical data does not support a vapor intrusion risk at the site based on the NYSDOH matrices.

2.4.6 Modifications to Areas of Concern (Post-RI)

Following implementation of the RI, one additional area of concern (AOC) (Localized NAPL Contamination in Soil) was identified. The AOCs supported by the findings of the RI include AOC 1: Non-Native Soil, AOC 2: Residual Petroleum-Impacted Soil and Groundwater, and AOC 3: NAPL Contamination in Soil. The AOCs supported by the findings of the RI are described below and presented in Figure 3B.

AOC 1: Non-native soil

Non-native soil was identified from below surface grade to depths ranging from about 10 to 22 feet bgs throughout the site. This is a site-wide AOC and investigation locations included all borings and monitoring wells.

Field observations of brick, metal, concrete, coal ash, wood, glass, slag, and coal are consistent with non-native soil identified in the New York City urban environment. SVOCs and metals above the UU, PGW and/or RURR SCOs were identified within the non-native soil layer.

Detections of the four SVOCs (benzo[a]anthracene, benzo[b]fluoranthene, chrysene, and indeno[1,2,3-cd]pyrene) in groundwater samples at concentrations above the NYSDEC SGVs is attributed to the presence of suspended solids derived from non-native soil within the groundwater samples collected.

AOC 2: Residual Petroleum-Impacted Soil and Groundwater

A 3,000-gallon gallon gasoline UST was closed in place in the southern part of the site in 1997. The 2011 Limited Environmental Investigation and November 2021 Phase II Investigation identified evidence of petroleum impacts, including odors, PID readings above background, and/or concentrations of petroleum-related VOCs exceeding UU and/or RURR in soil samples collected in the vicinity of the closed-in-place gasoline UST and former fuel dispenser.

Based on the analytical results and field observations, subsurface, residual petroleum impacts encompass an about 1,300-square-foot area in the southern part of the site and were present from 9 to 24 feet bgs. Petroleum impacts, as evidenced by staining, odors, PID readings above background, and/or analytical data were identified in borings SB2A, SB17, SB18, SB20, SB24, SB24_DB01, SB24_DB02, SB24_DB03, SB25, and SB30. The vertical endpoint of petroleum

impacts were identified in each soil boring where petroleum impacts were observed. The horizontal extent of petroleum impacts was delineated by the absence of petroleum impacts in soil borings SB16, SB19, SB26, SB27, SB28, and SB31.

The source of petroleum impacts at the site is likely related to a historical release from the UST, its lines, and the former fuel dispenser. Based on analytical results, and the presence of petroleum-related VOCs in soil and groundwater above the NYSDEC SGVs, residual petroleum impacts are impacting groundwater quality at the site.

AOC 3: Localized NAPL Contamination in Soil

NAPL, identified as coal tar/creosote by laboratory hydrocarbon identification analysis, sorbed to soil was found in a highly localized area in the southern-central part of the site.

Based on the analytical results and field observations, NAPL and associated impacts observed in soil boring SB24 from 20 to 24 feet bgs are highly localized, with no NAPL observed past 24 feet bgs in soil boring SB24. The horizontal extent of NAPL contamination was delineated by the absence of NAPL in soil borings SB2A, SB18, SB24_DB01, SB24_DB02, SB24_DB03, and SB27.

During the installation of MW06, NAPL was observed within the monitoring well; however, NAPL was not encountered during the sampling of MW06. Based on analytes detected in MW06, including creosote- and/or petroleum-related VOCs and SVOCs, there is potential for NAPL soil contamination to be impacting groundwater quality at the site. Creosote- and/or petroleum-related VOCs were identified in soil vapor samples.

No discrete on-site source of the NAPL (identified as coal tar/creosote) were found during the RI. Wood fragments were identified in many borings at the groundwater table across the site and may be remnants of treated/preserved wood products that may have been used for structural piles or other timber-based structures. The NAPL appears isolated to a single boring. Historical site uses are not consistent with those commonly associated with coal tar waste (i.e., manufactured gas plants). Therefore, the most plausible conclusion may be that the NAPL is a result of weathering of buried treated/preserved wood products that induced leaching of creosote, a commonly-used wood preservative.

2.5 Significant Threat Determination

The RIR was submitted to the NYSDEC and NYSDOH on May 3, 2022. The NYSDEC and NYSDOH have not yet determined whether the site poses a significant threat to public health and the environment.

2.6 Geology and Hydrogeology

2.6.1 Regional and Site Geology

Based on a review of the Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens Counties, New York and Parts of Bergen and Hudson Counties New Jersey, by Charles A. Baskerville, dated 1994, the bedrock formation underlying the site is the Manhattan Formation, which is comprised of metamorphic rock including marble, gneiss, schist, and amphibolite. Bedrock was not encountered during the RI or previous environmental investigations conducted at the site. Bedrock was encountered during a 2004 geotechnical investigation, conducted by Langan, from about 46 to 53 feet bgs.

The site is underlain by a layer of non-native soil, predominantly consisting of brown to grey, fine- to medium-grained sand with varying amounts of gravel, silt, brick, metal, concrete, coal ash, wood, glass, slag, and coal, ranging in depth from about 10 to 22 feet bgs. The non-native soil layer is underlain by brown to gray fine- to medium-grained sand with varying amounts of gravel and silt, generally consistent across the site. A 0.5 to 4-foot-thick dark grey to black clay layer was encountered at about 20 to 24 feet bgs in soil borings in the southern and western parts of the site. In one soil boring in the southern-central part of the site, the clay layer was underlain by a gray fine- to medium-grained sand with shell fragments from 24 to 28 feet bgs.

2.6.2 Regional and Site Hydrogeology

Groundwater flow is typically topographically influenced, as shallow groundwater tends to originate in areas of topographic highs and flow towards areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeological network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeological and anthropogenic variables such as precipitation, evaporation, extent of vegetation cover, and coverage by impervious surfaces. Other factors influencing groundwater include depth to bedrock, the presence of artificial fill, and variability in local geology and groundwater sources or sinks.

Groundwater was observed at depths between 10.49 to 13.32 feet bgs with elevations ranging from el. -0.52 to -2.85 feet NAVD88 during synoptic groundwater level measurements collected from nine wells during the RI, including three monitoring wells previously installed by others. Groundwater at the site was evaluated and determined to generally flow to the north-northeast. A groundwater contour map is presented as Figure 4.

Groundwater in this area of New York City is not used as a potable water source. Potable water provided to New York City is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

2.7 Contamination Conditions

2.7.1 Conceptual Model of Site Contamination

A conceptual site model (CSM) was developed based on the findings of previous investigations and the RI. The purpose of the CSM is to develop a simplified framework for understanding the distribution of impacted media, potential migration pathways, and potentially complete exposure pathways, as discussed below.

Sources of Contamination

Potential sources of contamination include non-native soil, petroleum-related impacts from a historical release, and localized NAPL contamination. No CVOCs exceeded the minimum concentrations for which mitigation is recommended by the NYSDOH Decision Matrices in soil vapor samples collected during the RI. No CVOCs exceeded applicable criteria in soil and groundwater samples collected during the Phase II ESI or RI.

Exposure Media and Contaminants of Concern

The contaminated media include soil and groundwater. The contaminants in the media include: 1) VOCs and SVOCs in soil and groundwater; 2) metals in soil; and 3) petroleum impacts and NAPL in soil.

Receptor Populations

Site access is currently limited to authorized personnel and visitors throughout the site. Under future construction conditions, human receptors may include construction and remediation workers, authorized guests, and the public adjacent to the site. Under future use conditions, human receptors include residents, visitors and customers at the mixed-used residential and commercial building and the nearby community, including children.

2.7.2 Nature and Extent of Contamination

This section evaluates the nature and extent of soil, groundwater, and soil vapor contamination.

Soil Contamination

Non-native soil contains VOCs, SVOCs (benzo[a]anthracene, benzo[b]fluoranthene, chrysene, and indeno[1,2,3-cd]pyrene), pesticides, and metals (copper, lead, mercury, nickel, and zinc) at concentrations above the UU, PGW and/or RURR SCOs. Non-native soil was identified site-wide and ranges in depth from about 10 feet to 22 feet bgs based on visual observations and analytical results. SVOCs and metals above the PGW and/or RURR SCOs were detected within the non-native soil layer. With the exception of SVOCs detected in one soil boring in the southern-central part of the site (SB24) from 20 to 22 feet bgs associated with NAPL contamination, no SVOCs or metals exceeded the UU, PGW or RURR SCOs in native soil.

The presence of SVOCs and metals detected at concentrations above the UU, PGW and/or RURR SCOs across the site are attributed to non-native soil quality.

Residual petroleum contamination (as evidenced by PID readings above background, odors, staining, and/or analytical data) was observed in ten soil borings from 9 to 24 feet bgs in the southern part of the site encompassing an area of about 1,300 square feet. Petroleum impacts were delineated horizontally and vertically (as evidenced by the field observations and analytical data). The source of the petroleum contamination in soil is likely a historical release from the UST, its lines, and the former fuel dispenser.

The NAPL, identified as coal tar/creosote by laboratory hydrocarbon identification analysis, was observed in one soil boring in the southern-central part of the site from 20 to 24 feet bgs. The NAPL was horizontally and vertically delineated and appears to be highly localized and confined to one soil boring. NAPL-impacted soil in the boring exhibited SVOCs above the PGW and RURR SCOs at depths of 20 to 22 feet bgs.

Based on analytical results and field observations, no discrete on-site source of the NAPL (identified as coal tar/creosote) were found during the RI. Wood fragments were identified in many borings at the groundwater table and may be remnants of treated/preserved wood products that may have been used for structural piles or other timber-based structures. The NAPL appears isolated to a single boring and is highly localized. Historical site uses are not consistent with those commonly associated with coal tar waste (i.e., manufactured gas plants). Therefore, the most plausible conclusion may be that the NAPL is a result of weathering of buried treated/preserved wood products that induced leaching of creosote, a commonly-used wood preservative. Soil sample analytical results are shown on Figures 5A through 5D.

Groundwater Contamination

Creosote and/or petroleum-related VOCs were identified in groundwater above the NYSDEC SGVs in two monitoring wells in the southern part of the site. The sources of the creosote- and/or petroleum-related VOCs in groundwater are likely a historical release from the UST, its lines, or the former fuel dispenser and/or the coal tar/creosote NAPL.

SVOCs were identified in groundwater above the NYSDEC SGVs in four monitoring wells across the site. The source of SVOCs in groundwater is likely suspended solids derived from non-native soil and the coal tar/creosote NAPL observed in the southern-central part of the site.

PFAS were identified in six monitoring wells across the site. The PFAS in groundwater is attributed to an unidentified off-site source or regional groundwater condition as no PFAS was detected in soil on-site. Groundwater analytical results are shown on Figures 6A through 6C.

Soil Vapor Contamination

Creosote- and/or petroleum-related VOCs were identified in soil vapor samples across the site and are likely related to a historical release from the UST, its lines, or the former dispenser and/or the coal tar/creosote NAPL. No CVOCs exceeded the minimum concentrations for which mitigation is recommended by the NYSDOH Decision Matrices in the seven soil vapor samples collected during the RI. No CVOCs exceeded applicable criteria in soil and groundwater samples collected during the Phase II ESI or the RI. The analytical data does not support a vapor intrusion risk at the site based on the NYSDOH matrices. Soil vapor sample analytical results are shown on Figures 7A and 7B.

2.8 Qualitative Human Health Exposure Assessment

Human health exposure risk was evaluated for both current and future on-site and off-site conditions in accordance with NYSDEC DER-10. The assessment includes an evaluation of contaminant sources, contaminant release and transportation mechanisms, points of exposure, routes of exposure and receptor populations in an effort to determine whether complete exposure pathways exist.

In addition to the human health exposure assessment, NYSDEC DER-10 requires an on-site and off-site Fish and Wildlife Resources Impact Analysis (FWRIA) if certain criteria are met. According to the requirements stipulated in Section 3.10 and Appendix 3C of DER-10, there was no need to prepare an FWRIA for the site.

2.8.1 Site Setting

Current Conditions

The site encompasses an area of about 11,255 square feet and is currently a vacant lot with overgrown vegetation and an asphalt-paved driveway in the northwestern part of the property.

Proposed Conditions (Construction/Remediation and Future Site Use)

The site will be redeveloped with one mixed-use residential and commercial building with affordable housing units and ground floor commercial space. The new building will comprise commercial retail space, residential units, mechanical floors, and a partial cellar in the northern part of the site. The building footprint is about 9,771 square feet in area and the remainder of the lot will be comprised of sidewalk entranceways and a rear yard with a dog run with artificial turf over a concrete slab.

2.8.2 Potential Exposure Pathways – On-Site

Current Conditions

The site footprint is covered in part with impervious surfaces, including an asphalt-paved driveway in the northwestern part of the property; however, the remainder of the site includes vegetated areas with exposed soil/fill. Because of site access restrictions, including a locked

construction gate, human exposure to contaminated soil through ingestion or direct contact is limited. Groundwater in this area of New York City is not used as a potable water source.

There is a potential exposure pathway to contaminated soil/fill, groundwater and soil vapor during site investigation through dermal absorption, inhalation, and/or ingestion. Activity is limited to trained investigation personnel and is performed under a site-specific Construction Health and Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) with provisions to minimize exposure risk, including vapor and dust suppression techniques.

Construction/Remediation Condition

Construction and remediation includes the excavation and off-site disposal of contaminated non-native soil, importing of soil and fill material, and construction of a capping system. During construction and remediation, points of exposure will include disturbed and exposed non-native soil/soil, dust and organic vapors generated during excavation, and groundwater. Potential routes of exposure will include ingestion, dermal absorption and inhalation (dust) of non-native soil/soil or groundwater and inhalation of organic vapors arising from contaminated soil. The receptor population includes construction and remediation workers. The implementation of a CHASP and CAMP, as well as vapor and dust suppression techniques, will limit the exposure pathways presented by potential dermal absorption, ingestion, and inhalation.

Proposed Future Use Condition

The proposed development will encompass the entire site footprint and include residential and commercial use. Upon completion of the new development, non-native soil and contaminated soil will be excavated to accommodate the cellar level and as required for at-grade concrete foundations. The foundation for the cellar level will include a waterproofing membrane system. Exposure pathways to residual soil contamination will be incomplete unless the composite cover system is disturbed. There is no reasonable pathway for ingesting groundwater since the site and surrounding areas obtain their drinking water supply from surface water reservoirs located upstate. There is no or limited potential for accumulation of contaminated vapors below the new building at the site based on the RI data compared to the NYSDOH Guidance Document. Regardless, the lowest level slabs of the building will be constructed with a waterproofing/vapor barrier membrane system. In addition, deed restrictions on use of groundwater, allowable uses of the site, and vegetable farming will be placed on the property as part of remediation; these institutional controls will promote incomplete exposure pathways.

2.8.3 Potential Exposure Pathways – Off-Site

The potential off-site migration of site soil, groundwater, and/or soil vapor contaminants is not expected to result in a complete exposure pathway for current, construction-phase, or future conditions for the following reasons:

- The site is located in an urban area
- During site excavation, foundation construction, and remediation the following protective measures will be implemented:
    - Air monitoring will be conducted for particulates (dust) and VOCs during ground-intrusive work as part of a CAMP. Dust and/or vapor suppression techniques will be employed to limit the potential for off-site migration of soil and vapors.
    - Vehicle tires and undercarriages will be washed as necessary at a truck wash pad prior to leaving the site to prevent tracking material off-site.
    - A soil erosion/sediment control plan will be implemented during construction to control off-site migration of soil.
    - Removal of source material will prevent future off-site migration of contaminants.
- The asphalt-paved roadways and concrete sidewalk prevent direct exposure to the off-site subsurface.
- Groundwater extracted during remediation activities and/or construction dewatering will be treated before it is discharged to the municipal sewer system under a New York City Department of Environmental Protection (NYCDEP) permit.
- Groundwater in New York City is not used as a potable water source and the nearest ecological receptor, the Hudson River, is located about 1,300 feet south of the site.
- There is no or limited potential for soil vapor migrating from the site into adjacent structures based on the RI data.

2.8.4 Evaluation of Human Health Exposure

Based upon the CSM and the exposure evaluation above, complete exposure pathways to both on- and off-site receptors:

- Do not exist under current use conditions
- Would be avoided under investigation/construction/remediation use conditions through implementation of a CHASP and CAMP and other construction measures (dust suppression, soil/erosion sediment control plan, etc.); and
- Would be mitigated through the use of planned engineering controls and institutional controls (ECs/ICs) under future use conditions as part of a Track 4 remedy.

2.9 Remedial Action Objectives

Based on the results of previous investigations and the RI, the following Remedial Action Objectives (RAO) were identified:

2.9.1 Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

2.9.2 Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Remove the source of groundwater contamination to the extent practical.
- Treat residual sources of groundwater contamination to the extent practical

2.9.3 Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or potential for, soil vapor intrusion into buildings at the site.

3.0 DESCRIPTION OF REMEDIAL ACTION

This section presents an evaluation of the proposed remedial alternatives. The proposed SCOs will be UU SCOs for Alternative I (Track 1) and the RURR SCOs will be used for comparison for Alternative II (Track 4).

This section is organized as follows:

- Sections 3.1 describes the remedial standards, criteria, guidance, and objectives
- Sections 3.2 and 3.3 provide technical descriptions of:
  - Alternative I, a Track 1/Unrestricted Use remedy
  - Alternative II, a Track 4/Restricted Use Restricted - Residential remedy
- Section 3.4 evaluates the remedial alternatives based on the BCP Remedy Selection Evaluation Criteria
- Section 3.5 summarizes the recommended remedial alternative

3.1 Standards, Criteria, and Guidance and Remedial Action Objectives

In accordance with Environmental Conservation Law (ECL) § 27-1415 and DER-10, the objectives of the remedial action are to: (1) reduce the concentrations of contaminants of concern at the site to meet those levels that will protect public health and the environment, and (2) isolate the site from on-site migration of contaminated groundwater and soil vapor, to the extent feasible, from potential off-site sources. In accordance with DER-10 and 6 NYCRR Part 375 1.8(d)(2), the Volunteer will have no remedial responsibilities with respect to groundwater contamination migrating under the site from an off-site source; however, remedial alternatives will be developed for such a case that eliminate or mitigate on-site human exposures, to the extent feasible, resulting from the off-site contamination entering the site. Where identifiable sources of contamination are found on the site, the sources will be removed or treated to the extent feasible.

Also, in accordance with DER-10, the RAOs for this site are defined as medium-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific standards, criteria, and guidance (SCG), which include:

- Code of Federal Regulations (CFR) Title 29 Part 1910.120 – Hazardous Waste Operations and Emergency Response Standard;
- CFR Title 29 Part 1926 – Safety and Health Regulations for Construction;
- 6 NYCRR Part 365 – Waste Transporter Permits;
- 6 NYCRR Part 370 – Hazardous Waste Management System;
- 6 NYCRR Part 375 – Environmental Remediation Programs;

- 6 NYCRR Part 376 – Land Disposal Restrictions;
- 6 NYCRR Part 612 – Registration for Petroleum Storage Facilities (February 1992);
- 6 NYCRR Part 700-706 – Surface Water and Groundwater Classification Standards;
- 6 NYCRR Part 750 – State Pollutant Discharge Elimination System (SPDES) Regulations;
- Commissioner's Policy (CP)-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- NYSDEC CP-51 – Soil Cleanup Guidance (2010);
- NYSDEC DER-10 – Technical Guidance for Site Investigation and Remediation (2010);
- NYSDEC – Permanent Closure of Petroleum Storage Tanks (July 1988);
- NYSDEC – Spill Response Guidance Manual;
- NYSDEC TOGS 1.1.1 – Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (1998);
- NYSDEC TOG 5.1.8 – NYS Stormwater Management Design Manual (2008);
- NYSDEC TOGS 5.1.10 – NYS Standards and Specifications for Erosion and Sediment Controls (2005);
- NYSDOH – Guidance for Evaluating Soil Vapor Intrusions in the State of New York (2006) and subsequent updates through May 2017;
- Spills Technology and Remediation Series (STARS) #1 – Petroleum-Contaminated Soil Guidance Policy;
- DER-23 – Citizen Participation Handbook for Remedial Programs (March 2010); and
- Spill Response Guidance Manual.

In addition to the SCGs listed above, the RAOs were developed from information derived from the 2021 Phase II ESI and the 2022 RI, and previous environmental investigations referenced in Section 2.2, including contaminated media and potential public health and environmental exposure pathways, which are summarized in Section 2.8. The RAOs for this RAWP are listed in Section 2.9.

3.2 Alternative I – Technical Description

3.2.1 Summary of Alternative I – Track 1 Remedy

Alternative I, a Track 1 remedy, would include implementation of the following remedial elements:

- Establishment of the Track 1 SCOs as the UU SCOs
- Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation and construction activities
- Screening of soil for indications of contamination source areas, by visual, olfactory, or instrumental methods, during any intrusive site work
- Construction of a secant pile support of excavation (SOE) system (around the entire site perimeter) and design, construction, and operation of a dewatering system (including pre-treatment) to facilitate remedial excavation and provide treatment of residual creosote and/or petroleum impacts to groundwater
- Excavation and removal of all non-native soil and/or soil exceeding the UU SCOs from across the site (estimated to depth of about 22 feet bgs)
- Excavation and removal of all NAPL-impacted soil in the southern-central part of the site (estimated to a depth of about 24 feet bgs)
- Decommissioning and removal of a 3,000-gallon UST in the southern part of the site and any additional discovered USTs in accordance with 6 NYCRR Part 613.9 and NYSDEC DER-10 Section 5.5
- Closure of open Spill No. 2107485
- In the event that remedial excavation and construction dewatering system do not successfully decrease contaminant levels in groundwater, additional groundwater treatment measures would be considered
- Appropriate off-site disposal of soil and non-native soil removed from the site in accordance with federal, state, and local rules and regulations for handling, transport, and disposal
- Collection and analysis of confirmation soil samples in accordance with DER-10 to evaluate the performance of the remedy with respect to attainment of UU SCOs
- Backfilling of remediated areas to design grade with certified-clean granular fill material (i.e., soil meeting UU SCOs), virgin quarry stone, or recycled concrete aggregate (RCA)

The requirements for each of the Track 1 tasks are described below. Estimated costs for this are shown in Table 2.

3.2.2 On-Site Worker, Public Health and Environmental Protection

A site-specific CHASP has been developed and would be implemented during excavation and foundation construction to protect on-site Langan workers from accidents and acute and chronic exposures from the identified contaminated media. Each contractor performing RAWP operations on the site would have and enforce a Health and Safety Plan (HASP) that, at a minimum, meets the CHASP criteria. Public health would be protected by implementing and enforcing dust, odor, and organic vapor control as specified in the CAMP. The CAMP would include continuous perimeter monitoring of dust and organic vapors utilizing DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. Field personnel, supervised by the Remedial Engineer (RE), would monitor site perimeters for visible dust and odors. The environment would be protected by implementing and enforcing the appropriate soil erosion prevention measures.

The CHASP is included in Appendix C. A generic guidance for CAMP implementation is included in Appendix D.

3.2.3 Excavation, SOE, and Contaminated Soil/Fill Removal

To achieve Track 1, the existing site cover systems would be removed to facilitate remedial excavation. Remedial excavation would include the removal of non-native soil exceeding the UU SCOs and residual creosote and/or petroleum-impacted soil across the site. The estimated volume of soil and non-native soil requiring removal and off-site disposal for a Track 1 cleanup is about 10,000 cubic yards of non-native soil and/or residual creosote and/or petroleum-impacted soil and 10 cubic yards of NAPL-contaminated soil. This estimate is based on the complete removal of the non-native soil layer and residual creosote and/or petroleum-impacted soil that extends below the non-native soil layer in the southern part of the site. To facilitate a Track 1 remedial excavation, a secant pile SOE system would be constructed. The extent of the Track 1 remedial excavation is shown on Figure 8.

3.2.4 UST System Removal

The closed-in-place 3,000-gallon UST and associated piping present in the southern part of the site and any additional USTs encountered would be decommissioned in accordance with 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC tank closure requirements including DER-10 Section 5.5. Any petroleum-contaminated soil would be characterized and removed in accordance with state guidance. Newly discovered USTs would be registered with the NYSDEC petroleum bulk storage (PBS) unit under PBS No. 2-601410.

3.2.5 Construction Dewatering and Groundwater Treatment

Construction dewatering would be required to facilitate the remedial excavation. Dewatering would be required to accommodate excavation of soil exceeding UU SCOs and would also act

as a method of groundwater remediation (pump and treat) in conjunction with source removal and in-situ groundwater treatment (if needed). Prior to dewatering, the contractor would follow the Rules of the City of New York (RCNY) Title 15, Chapter 19, Use of the Public Sewers and the NYCDEP "Procedure for Obtaining Letter of Approval for Groundwater Discharge to Sanitary or Combined Sewer" and would use the approval to obtain a Temporary Discharge of Groundwater into the City Sewer System Permit. The dewatering system would include pretreatment (e.g., bag filters, carbon filtration, etc.) to reduce contaminant concentrations below NYCDEP effluent limitations prior to discharge to the New York City Sewer system. If the Contractor would discharge more than 10,000 gallons per day, approval from the NYCDEP's Bureau of Water and Sewer Operations, Chief of Permitting and Compliance would also be needed. The dewatering and treatment system would be designed, operated and maintained by the Contractor's NYS-licensed Professional Engineer.

3.2.6 In-Situ Groundwater Treatment

In the event that remedial excavation and construction dewatering (pump and treat) system do not successfully decrease contaminant levels in groundwater, additional groundwater treatment measures would be considered. If additional treatment measures are required, a Remedial Design Document would be prepared and submitted to the NYSDEC and NYSDOH for review and approval. Depending on the concentrations remaining in site groundwater, additional treatment measures may include in-situ remedial measures e.g., chemical oxidant injections, activated carbon injections, bioremediation methods). The Remedial Design Document would detail the in-situ groundwater treatment program including any pre-treatment investigations and treatment plan.

3.2.7 Confirmation Soil Sampling

Confirmation soil samples would be collected from the excavation base at a frequency of one per 900 square feet. Sidewall samples would be precluded by the perimeter secant pile SOE system. Post-excavation confirmation soil samples (one additional base and four sidewalls) would be collected from the NAPL-contaminated soil hotspot excavation area. Based on these criteria, about 18 confirmation endpoint soil samples, plus QA/QC samples, would be collected to confirm remedial performance and would be analyzed for the 6 NYCRR Part 375 VOCs, SVOCs (including 1,4-dioxane), pesticides/herbicides, PCBs, metals, and PFAS. Over-excavation may be required as necessary to remove soil that does not meet the UU SCOs. If over-excavation is completed, additional confirmation samples would be required.

3.2.8 Excavation Backfill

After remedial excavation, the site would be backfilled to design grade. Backfill would consist of soil/fill meeting the UU SCOs or other acceptable fill material such as virgin quarry stone or RCA from a NYSDEC registered facility. RCA would not be used as backfill within two feet of the

groundwater table or as drainage material. All imported fill must be sourced from appropriately licensed facilities with no history of environmental contamination. If sampling of the proposed soil/fill is required, qualified environmental personnel will collect representative samples at a frequency consistent with DER-10. The samples would be analyzed for 6 NYCRR Part 375 VOCs, SVOCs (including 1,4-dioxane), pesticides/herbicides, PCBs, metals, and PFAS, by a NYSDOH ELAP-certified laboratory. No sampling of virgin quarry stone or RCA is anticipated unless the quarry stone or RCA is a blended-product or contains fines in excess of 10% by weight passing through a No. 80 sieve. Documentation of the source of fill must be provided to the NYSDEC for approval before it is used on site. Upon meeting these criteria, the certified-clean fill would be transported to the site and segregated from impacted soil/fill, as necessary, on plastic sheeting until used as backfill.

3.3 Alternative II – Technical Description

3.3.1 Summary of Alternative II – Track 4 Remedy

Alternative II, a Track 4 remedy, would include implementation of the following remedial elements:

1. As a pre-requisite to site remediation, removal of existing asphalt and concrete cover systems by the contractor as hazardous waste or construction and demolition (C&D) debris in accordance with Part 360 and 361 regulations - Review and certification of hazardous building materials and C&D and refuse transport and disposal methodologies is not a requirement of the RE; however, documentation of proper disposal will be provided in the Final Engineering Report (FER). The RE is responsible for documenting that C&D debris and refuse is not comingled with contaminated site soil and fill
2. Development and implementation of a CHASP and CAMP for the protection of on-site workers, visitors, and the environment during remediation activities
3. Establish Track 4 SCOs that include NYSDEC Part 375-list RURR SCOs
4. Screening of soil for indications of contamination source areas, by visual, olfactory, or instrumental methods, during any intrusive site work - During surface cover and foundation component demolition in contact with site soil, segregation of C&D debris and site soil will be observed to document that site soil was not commingled with the C&D debris.
5. Design and construction of a secant pile SOE system to facilitate remedial excavations within the partial cellar footprint and construction of lagging and/or sloping SOE to facilitate remedial excavations at the elevator pit and removal of the closed-in-place UST and its appurtenances in the southern part of the site
6. Design, installation and operation of construction dewatering system inside of the secant pile SOE system with an associated pre-treatment system to facilitate development-

related excavation. The dewatering system may require a Water Withdrawal Permit from the NYSDEC and will require a permit from the NYCDEP to allow the discharge of treated effluent to the municipal sewer system

7. Excavation, stockpiling, off-site transport, and disposal of non-native soil and soil to achieve a Track 4 cleanup in accordance with federal, state, and local rules and regulations for handling, transport, and disposal. Soil exceeding the following criteria will be removed to achieve a Track 4 cleanup:
    a) Soil exceeding the RURR SCOs to at least 2 feet below grade surface (bgs) and deeper (as necessary for source removal) across the remainder of the site
    b) Soil exceeding the 6 NYCRR Part 371 hazardous criteria
    c) Soil containing total SVOCs exceeding 500 parts per million (ppm)
    d) Soil exceeding the RURR SCOs with evidence of petroleum or chemical-like impacts (visual, olfactory, and/or PID above background) encountered during excavation of deeper, development-related excavation (cellar, pile caps, and/or elevator pits) or during the removal of the closed-in-place UST and its appurtenances
8. Localized in-situ stabilization (ISS) of coal tar/creosote NAPL contamination in on-site soil using a cementitious grout mixture
9. Implementation of a limited, one-time in-situ groundwater treatment program to address residual creosote and/or petroleum impacts to groundwater
10. Installation of two permanent groundwater monitoring wells in the southern part of the site (shown on Figure 9) after the completion of in-situ groundwater treatment program, and at least one round of post-remediation groundwater sampling to evaluate potential residual impacts to groundwater quality resulting from residual creosote and/or petroleum impacts to groundwater and assess the effectiveness of the remedy
11. Decommissioning and removal of the closed-in-place 3,000-gallon UST in the southern part of the site and any additional discovered USTs in accordance with 6 NYCRR Part 613.9 and NYSDEC DER-10 Section 5.5
12. Closure of open Spill No. 2107485
13. Collection and analysis of documentation soil samples in accordance with DER-10 at the completion of the general 2-foot remedial excavation, final remediation depths across the site, and/or development-related excavation depths across the site to document post-remediation soil quality in comparison to the RURR SCOs
14. Demarcation of residual (existing) soil and non-native soil outside of the proposed building footprint by survey and a high-visibility demarcation barrier for visual reference

15. Import of soil and fill for composite cover and backfill, where required, in compliance with: a) RURR SCOs or NYSDEC Part 375-6.8(b) Protection of Groundwater (PGW) SCOs, whichever is more stringent; b) 6 NYCRR Part 360 regulations; c) federal, state, and local rules and regulations for handling and transport of soil and fill; and d) Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs (June 2022) - Imported soil and fill are subject to approval by the NYSDEC project manager and may require sampling as listed in DER-10 Section 5.4
16. Construction of a composite cover system consisting of concrete foundation slabs and other exterior slabs or, a minimum of 2 feet of soil that meets the lower of the RURR and PGW SCOs or virgin quarry stone.
17. Installation of a concrete foundation with a waterproofing/vapor barrier membrane below the groundwater table - The continuous waterproofing membrane will extend from beneath the partial cellar to surface grade level along the walls of the cellar. A vapor barrier membrane will tie into the waterproofing membrane and extend beneath the at-grade foundations slabs. The waterproofing/vapor barrier membrane will be compatible with the vapor barrier membrane will be compatible with creosote- and petroleum-related VOCs and CVOCs, have a minimum thickness of 20 mils and be installed as a continuous sub-slab membrane.
18. Recording of ICs in an Environmental Easement.
19. Preparation and submission of a Site Management Plan (SMP) that describes management of the ECs and ICs – Implementation of the SMP, following completion of the remedy, will be required by the Environmental Easement.
20. Preparation and submission of an FER to NYSDEC following implementation of the Remedial Action defined in this RAWP (see Section 8.0).
21. Overall performance of the remedial action including permitting requirements, in accordance with applicable federal, state, and local rules and regulations with NYSDEC approval.

The requirements for each of the Track 4 tasks are described below. Estimated costs for this remedy are shown in Table 3.

3.3.2 On-Site Worker, Public Health and Environmental Protection

A site-specific CHASP would be enforced to protect on-site Langan workers from accidents and acute and chronic exposures from the identified contaminated media. The site CHASP is included as Appendix C. Each contractor performing RAWP operations on the site would have and enforce a HASP that, at a minimum, meets the CHASP criteria. Public health would be protected by implementing and enforcing dust, odor, and organic vapor control as specified in the CAMP (Appendix D). The CAMP includes continuous perimeter monitoring of dust and organic vapors

utilizing DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. Field personnel, supervised by the RE, would monitor site perimeters for visible dust and odors. The environment would be protected by implementing and enforcing the appropriate soil erosion prevention measures.

3.3.3 Excavation, SOE, and Contaminated Soil/Fill Removal

To achieve a Track 4 remedy, the existing site cover system would be removed to facilitate remedial excavations. A secant pile SOE system would be constructed along the perimeter of the partial cellar and lagging and/or sloping SOE system would be constructed as needed across the remainder of the site to facilitate the balance of the remedial excavation.

Anticipated remedial excavation areas and depths are as follows:

- A 2-foot remedial excavation across the entire 11,255-square-foot site for the removal of the soil exceeding the RURR SCOs and placement of a site cover system.
- An approximately 1,700-square-foot area would be excavated to the groundwater table or about 10 feet bgs, whichever is shallower, to remove the closed-in-place 3,000-gallon UST and its appurtenances and any associated residual petroleum-contaminated soil in the southern part of the site. The excavation area will be sloped (1:1 slope) to facilitate the remedial excavation.
- If encountered, removal of source areas with evidence of petroleum or chemical-like impacts (visual, olfactory, and/or PID above background) during excavation of the 3,000-gallon UST and its appurtenances and other deeper, development-related excavation. (mats, pile caps, elevator pits) as described in Section 3.2.7.

Open NYSDEC Spill No. 2107485 is anticipated to be addressed during the removal of the closed-in-place 3,000-gallon UST and adjacent source areas in soil with evidence of residual petroleum contamination, if encountered during the removal of the UST.

3.3.4 Construction Dewatering

Construction dewatering will be required to facilitate development-related excavation in the footprint of the partial cellar. The construction dewatering system is still under design at the time. Specifications for the dewatering and pre-treatment system will be submitted to the NYSDEC when available. If the construction dewatering system design capacity exceeds an extraction volume of 45 gallons per minute/100,000 gallons per day, a Water Withdrawal Permit will be obtained from the NYSDEC.

Before the initiation of construction dewatering operations, the contractor would follow the RCNY Title 15, Chapter 19, Use of the Public Sewers and the NYCDEP "Procedure for Obtaining Letter of Approval for Groundwater Discharge to Sanitary or Combined Sewer" and would use the

approval to obtain a Temporary Discharge of Groundwater into the City Sewer System Permit. The dewatering system will likely include pretreatment (e.g., bag filters, carbon filtration, etc.) to reduce contaminant concentrations below NYCDEP effluent limitations prior to discharge to the New York City Sewer system. If the Contractor would discharge more than 10,000 gallons per day, approval from the NYCDEP's Bureau of Water and Sewer Operations, Chief of Permitting and Compliance would also be needed. The dewatering and treatment system would be designed, operated and maintained by the Contractor's NYS-licensed Professional Engineer.

3.3.5 In-situ Stabilization of NAPL-Contaminated Soil

Localized ISS of coal tar/creosote NAPL-contaminated soil in the southern part of the site would include the installation of three, about 3-foot-diameter soil-mix columns within the delineation area to stabilize and reduce the mobility of the NAPL. The elevation of the top of the installed soil-mix columns would be at existing site grades (about 8 feet NAVD88) and the elevation of the bottom of the installed soil-mix columns would be at about el. -15 feet NAVD88. At least one core through the cured soil-mix columns would be completed as a method of QA/QC to document the effectiveness of the ISS after field implementation is completed. In-situ and laboratory tests to determine compressive strength, presence of NAPL in the core, on drilling tools, or associated wash tubs, and a hydraulic conductivity of $1x10^{-7}$ centimeters per second (cm/sec) or less would be performed in general accordance with the NYSDEC In-Situ Solidification QA/QC guidance document (dated November 8, 2019) and a project specification developed for the soil-mix columns.

3.3.6 In-situ Groundwater Treatment Program

After the ISS program and removal of the UST and its appurtenances and any associated petroleum-impacted soil/fill or source material, a limited, one-time in-situ groundwater treatment program utilizing injection points will be implemented to address residual creosote and/or petroleum-related groundwater impacts. The treatment program would target the 11- to 25-foot bgs depth interval in the southern part of the site, where petroleum-related VOCs exceeding the NYSDEC SGVs were observed. The treatment program will include the application of a remediation product, PetroFix™, which is manufactured by Regenesis®, a remediation product vendor based in San Clemente, California. The PetroFix™ mixture consists of water, micron-scale activated carbon and an anaerobic electron acceptor blend (sodium nitrate/ammonium sulfate as white powder). After application, dissolved-phase hydrocarbons are expected to sorb onto the activated carbon particles, while the fast- and slow-release electron acceptors stimulate prolonged biodegradation. About 10,500 gallons of the PetroFix™ mixture (including 2,400 pounds of PetroFix™ and 120 pounds of electron acceptor blend) will be applied in the injection area. Application methods would include injections through about 28 temporary locations using direct-push drilling with retractable stainless steel injection tooling across an about 1,000-square foot treatment area. The temporary injection points would be spaced about 6 feet from each

other (on-center) and yield a radius of influence (ROI) of about 35 square feet based on the soil type within the injection zone (fine to medium sands with varying amounts of silt and gravel). Calculations for the application of PetroFix™ are included in Appendix E.

After the completion of the in-situ groundwater treatment program, two permanent groundwater monitoring wells will be installed in the southern part of the site. Proposed locations for groundwater monitoring wells will be submitted to the NYSDEC for approval prior to installation. At least one round of post-remediation groundwater sampling will be completed to assess the effectiveness of the remedy and to evaluate potential residual impacts to groundwater quality. The groundwater monitoring results will be provided to the NYSDEC for review and requirements for additional treatment or remedial action will be discussed with the NYSDEC. The monitoring wells will be incorporated into the foundation of the new building to facilitate long-term monitoring and groundwater sampling efforts, as required by the NYSDEC.

In the event petroleum-related VOCs in groundwater remain at recalcitrant concentrations exceeding the NYSDEC SGVs after the one-time treatment program, groundwater use at the site will be restricted through the forthcoming Environmental Easement and other ICs implemented as part of the remedy to control potential exposure pathways and human health risks.

3.3.7 UST System Removal

The closed-in-place 3,000-gallon UST and associated piping present in the southern part of the site and any additional USTs encountered during remedial and/or foundation excavation would be decommissioned in accordance with 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC tank closure requirements including DER-10 Section 5.5. Documentation soil samples would be collected in accordance with DER-10. Any petroleum-contaminated soil would be characterized and removed in accordance with state guidance. Newly discovered USTs would be registered with the NYSDEC PBS unit, under PBS No. 601410.

3.3.8 Documentation Soil Sampling

Documentation soil samples would be collected from the excavation base of remedial and development-related excavations at a frequency of one per 900 square feet in accordance with DER-10 Section 5.4(b)(5). Sidewall samples would be precluded by the perimeter secant pile SOE system. Based on these criteria, about 13 documentation soil samples, plus QA/QC samples, would be collected to confirm remedial performance and would be analyzed for the Part 375 list of VOCs, SVOCs (including 1,4-dioxane), PCBs, pesticides/herbicides, metals, PFAS. The proposed documentation soil sampling plan is shown on Figure 10.

3.3.9 Demarcation

After excavation and soil/fill removal activities are completed and before backfilling with imported soil or fill and placing the final composite cover system, the top elevation of residual contaminated

soil or non-native soil would be surveyed by a NYS-licensed surveyor (except under the new building footprint) and a physical high-visibility demarcation layer, consisting of orange snow fencing material or equivalent material, would be placed on this surface to provide a visual reference for demarcation. No demarcation layer will be installed underneath the concrete building slabs. The survey would constitute the written record of the top of the remaining contamination zone that requires adherence to special conditions for disturbance of contaminated residual soil defined in the SMP. The demarcation survey or map showing the location and extents of the high-visibility demarcation barrier or bottom of slab underneath the building would be included in the FER and the SMP.

3.3.10 Excavation Backfill

After the remedial excavation, parts of the site would be backfilled to design grade. Backfill would consist of soil/fill meeting the lower of RURR and PGW SCOs or other acceptable fill material such as virgin quarry stone or RCA from a NYSDEC registered facility. RCA would not be used as backfill within two feet of the groundwater table or as drainage material. Imported fill must be sourced from appropriately licensed facilities with no history of environmental contamination. If sampling of the proposed soil/fill is required, qualified environmental personnel would collect representative samples at a frequency consistent with DER-10. The samples would be analyzed for Part 375 VOCs, SVOCs (including 1,4-dioxane), pesticides/herbicides, PCBs, metals, and PFAS, by a NYSDOH ELAP-certified laboratory.

No sampling of RCA is anticipated unless the RCA is a blended-product or contains fines in excess of 10% by weight passing through a No. 80 sieve per DER-10 Section 5.4(e)10. No samples of virgin quarry stone is anticipated unless the quarry stone contains fines in excess of 10% by weight passing through a No. 10sieve (2.0 millimeters). Limited, representative sampling is required for sand (including mixtures with gravel, rock or stone) consisting of virgin material from a permitted mine or quarry, provided that less than 10% by weight passes through a size 100 sieve.

Documentation of the source of fill must be provided to the NYSDEC for approval before it is imported and used on site. Upon meeting these criteria, the certified-clean fill would be transported to the site and segregated from other contaminated/impacted materials, as necessary, on plastic sheeting until placed into service.

3.3.11 Composite Cover System

A composite cover system would be installed to allow for mixed-use commercial and residential use of the site. The composite cover system would consist of the concrete foundation, other concrete slabs (i.e., in the rear yard with a dog run) or a minimum of 2 feet of soil that meets the lower of RURR or PGW SCOs or virgin quarry stone in landscaped areas. Any soil that is imported to the site would require sampling and approval from the NYSDEC. The composite cover system

would serve as an EC for the protection of human health by preventing contaminated soil direct contact, ingestion and inhalation.

3.3.12 Waterproofing/Vapor Barrier Membrane

Potential contaminated soil vapor may migrate onto the site from off-site sources. The potential vapor may be mitigated by the presence of the new site building concrete foundation with a waterproofing/vapor barrier membrane below the groundwater table. The continuous waterproofing membrane would extend from beneath the partial cellar, along the walls of the partial cellar, to surface grade level. A vapor barrier membrane would also extend beneath the at-grade foundations slabs. The waterproofing/vapor barrier membrane would be compatible with creosote- and petroleum-related VOCs and CVOCs, have a minimum thickness of 20 mils and would be installed as a continuous sub-slab membrane. The waterproofing/vapor barrier system would serve as an EC for the protection of human health by preventing potential inhalation of VOCs from the subsurface.

3.3.13 Post-Excavation Groundwater Monitoring

After the completion of remedial excavations and groundwater treatment programs, two permanent groundwater monitoring wells will be installed in the southern part of the site. At least one round of post-remediation groundwater sampling will be conducted to evaluate potential residual impacts to groundwater quality and assess the effectiveness of the remedy. If the groundwater sampling results are favorable, a request would be made to the NYSDEC to discontinue sampling and consider the groundwater remedy complete. Groundwater samples will be analyzed for Part 375 VOCs and SVOCs (total and dissolved) by a NYSDOH ELAP-certified laboratory. The monitoring wells will be incorporated into the foundation of the new building to facilitate long-term monitoring and groundwater sampling efforts, as required by the NYSDEC. Depending on the initial round of groundwater sampling results, additional groundwater treatment may be necessary or a determination will be made in consultation with NYSDEC to forgo additional treatment and restrict groundwater use through the Environmental Easement and other ICs. .

3.3.14 Engineering Controls and Institutional Controls

The ECs for the Track 4 remedy are a composite cover system and waterproofing/vapor barrier membrane system. An Environmental Easement would be recorded referencing ECs/ICs that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property. The Track 4 cleanup would require ICs that would restrict site uses (e.g., use restricted to restricted-residential, commercial or industrial). An Environmental Easement will be used to record the ICs and ECs for the property and require implementation of an SMP. The SMP would identify EC/IC monitoring, maintenance, and certification requirements.

3.4 Evaluation of Remedial Alternatives

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

A. Protection of human health and the environment
B. Compliance with standards, criteria, and guidance
C. Short-term effectiveness and impacts
D. Long-term effectiveness and permanence
E. Reduction of toxicity, mobility, or volume of contaminated media
F. Implementability
G. Cost effectiveness
H. Community acceptance
I. Land use

3.4.1 Protection of Public Health and the Environment

Alternative I – The remedy would remove exposure pathways to all on-site contaminated media. Remediating the site to Track 1 standards would result in the removal of on-site soil exceeding UU SCOs. The RAOs for public health and environmental protection would be met through the removal of contaminated soil and treatment of groundwater, which would eliminate any possibility for ingestion and inhalation of or dermal contact with contaminated soil, groundwater, and soil vapor. Because no ECs or ICs would be required for this remedy to maintain the site in the future, this remedy is the most protective of human health and the environment.

Alternative II – The remedy would eliminate the most significantly contaminated soil from the site and mitigate exposure pathways to on-site contaminated media. Under Alternative II, the most contaminated soil and non-native soil exceeding the RURR SCOs would be removed and disposed of off-site. The RAOs for public health and environmental protection would be met through the removal of contaminated on-site soil, stabilization of NAPL-contaminated soil, and installation of a composite cover EC. A composite cover system would prevent direct contact, ingestion and inhalation of residual contaminated soil that will remain in place under the foundation. An IC restricting groundwater use would prevent ingestion of groundwater. The vapor intrusion risk would be mitigated by the installation of a waterproofing/vapor barrier membrane.

Public health would be protected during remediation activities under both remedial alternatives by implementing the CAMP, and dust, odor, and organic vapor control and mitigation procedures when needed. The environment would be protected by implementing and enforcing a Stormwater Pollution Prevention Plan (SWPPP).

3.4.2 Compliance with Standards, Criteria, and Guidance

Alternative I – Remediating the site to Track 1 cleanup standards would comply with all applicable SCGs because of the removal of all impacted on-site soil and non-native soil and treatment of contaminated groundwater.

Alternative II – Alternative II complies with the SCGs by removing at least two feet of soil/fill from across the site plus additional source soil areas in the location of the tank after removal if any source areas are present, and in locations for the deeper foundation elements. Residual soil exceeding the UU and/or RURR SCOs would be mitigated with ECs and ICs.

Both remedial alternatives would also comply with SCGs that involve protection of the public health and environment during the remedial action by implementing and enforcing a site-specific CHASP and CAMP.

3.4.3 Short-Term Effectiveness and Impacts

Alternative I – The most significant short-term adverse impacts and risk to the community would be through the migration of contaminants carried in dewatering fluid, vapor and dust generated during construction. Additional short-term adverse impacts include the potential complications and risk involved with designing and constructing SOE for foundation work, potential obstructions on roadways, and pedestrian traffic associated with construction. The Track 1 remedy has the most significant short term impacts and has more construction risks associated with a deeper soil excavation.

Both Alternatives I and II would require 25-cubic-yard capacity truck trips to haul excavated soil and non-native soil and imported backfill required for the remediation and construction program. However, the Track 1 remedy would require a substantial increase in the number of 25-cubic yard truck trips over the Track 4 remedy and generation of more dewatering fluids because to the site-wide excavation depth.

Alternative II – The Track 4 remedy would have far less short term impacts since significantly less soil will be excavated.

Truck traffic impacts from both alternatives would be routed on the most direct course using major thoroughfares where possible and flaggers would be used to protect pedestrians at site entrances and exits under both alternatives. The effects of these potential adverse impacts to the community, workers and the environment would be minimized by implementing appropriate control plans (including the CHASP, CAMP, and dust, odor and vapor control measures).

3.4.4 Long-Term Effectiveness and Impacts

Alternative I – The Track I remedy would remove all non-native soil and soil exceeding the UU SCOs from the site, remove on-site areas of residual petroleum contamination (including NAPL-contaminated soil), and treat petroleum-impacted groundwater. Because an Environmental Easement and SMP are not required as part of the Track 1 remedy, Article 141 of the NYSDOH code would be relied upon to prevent ingestion of groundwater, which prohibits potable use of groundwater without prior approval. Future site use would be unrestricted; therefore, the long-term effectiveness of this remedy would eliminate known environmental risks and satisfy the objectives of this criterion.

Alternative II - The Track 4 remedy would remove the most contaminated source soil and non-native soil areas that exceeds the RURR SCOs, remove on-site areas of residual petroleum contamination, stabilize NAPL-contaminated soil, and treat on-site petroleum-impacted groundwater. Residual soil contamination left in place under a Track 4 remedy would be addressed with the composite site cover system in perpetuity. The stabilized NAPL-contaminated soil is expected to prevent further impacts to groundwater quality. Potential exposure to soil vapor intrusion would be prevented by installation of a concrete foundation below the groundwater table and installation of a waterproofing/vapor barrier membrane. Long-term management of these ECs would be accomplished through adherence to the SMP and Environmental Easement and other ICs that restrict groundwater use. The long-term effectiveness of the Track 4 remedy would mitigate risks to the extent needed to protect human health and the environment and satisfy the objectives of this criterion.

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

Alternative I – The Track I remedy would permanently and significantly reduce the toxicity, mobility, and volume of contamination through excavation and removal of all on-site non-native soil exceeding the UU SCOs and off-site disposal and dewatering, treatment, and disposal of groundwater. Therefore, Alternative I provides the greatest reduction of the toxicity, mobility, and volume of contaminated soil and non-native soil.

Alternative II - The Track 4 remedy would also reduce the toxicity, mobility, and volume of soil contamination across the site through the removal of the most contaminated soil and non-native soil source areas and any additional sources, if identified during remedial excavation. The stabilization of NAPL-contaminated soil is expected to prevent further impacts to groundwater quality. Based on the results of the RI, including the spatial distribution of contaminants, the mobility of remaining contaminants does not represent an off-site migration concern. The Track 4 remedy would also provide a barrier to the potential for soil vapor intrusion into the site building through the installation of waterproofing/vapor barrier membrane.

3.4.6 Implementability

Alternative I – Implementing the Track 1 remedy is less feasible because of the substantial increase in excavation volume and backfill required for the site-wide remedial excavation, and significant dewatering and support of excavation to reach the excavation depths required to meet Track 1 standards. Track 1 remedial activities would significantly increase remediation costs and duration of remediation activity, thereby making this remedy more difficult to implement.

Alternative II - Implementing the Track 4 remedy is feasible and more easily implementable because the depth of remedial excavation is more easily achieved with conventional construction and earthmoving methods and equipment, including the use of standard bucket excavators, and site-wide dewatering would not be necessary. Track 4 remedial activities would be significantly less expensive and faster than the Track 1 remedy, thereby making this remedy easier to implement.

3.4.7 Cost Effectiveness

The estimated remediation cost of each cleanup track is as follows:

- Track 1 remedy: about $9.9 million
- Track 4 remedy: about $6.4 million

Tables 2 (Track 1) and 3 (Track 4) detail the estimated costs needed to achieve each remedy.

Based on the assumptions detailed for Alternative I, including removal of all non-native soil exceeding UU SCOs and dewatering across the site, the estimated remediation cost of a Track 1 cleanup is $9.9 million. As the site would be remediated to an unrestricted use level, there would not be any long-term operations, maintenance, or monitoring costs associated with the proposed remedy.

Based on the assumptions detailed for Alternative II, including removal of the most contaminated soil and non-native soil exceeding the RURR SCOs, in-situ stabilization of NAPL contamination, in-situ groundwater remediation, and construction of an engineered composite cover system, installation of waterproofing/vapor barrier membrane, and implementation of ICs, the estimated remediation cost of a Track 4 cleanup is $6.4 million. In this scenario, an SMP would be required to maintain the implementation of ECs and ICs in the long-term in completion of the remedy. Alternative II is the most cost effective alternative for achieving the RAOs.

3.4.8 Community Acceptance

The Track 1 remedy would be acceptable to the community because the potential exposure pathways to on-site contamination would be eliminated upon completion, however, it does create a more lengthy period of short term impacts. The Track 4 remedy would also be acceptable to the community, as RAOs would be met through removal of the most contaminated soil and non-

native soil source areas and other remedial measures and the use of ECs and ICs to prevent exposure to residual impacted soil and non-native soil and/or off-site contamination. Ultimately, the Track 1 remedy may be less acceptable to the community because the increased truck traffic, construction noise and longer construction time associated with complete removal of soils above Track 1 SCOs. The selected remedy would be subject to a 45-day public comment period, and substantive public comments received would be addressed before the remedy is approved by NYSDEC.

3.4.9 Land Use

The current, intended, and reasonably anticipated future land use of the site and its surroundings are compatible with the selected remedy. The future proposed development is one mixed-use commercial and residential building with affordable housing. Review of previous environmental and public documents for the site led to the following conclusions:

1. The proposed use of the site and its surroundings would be compatible with the selected remedy.
2. The proposed site use conforms to applicable zoning laws and maps.
3. The proposed site use conforms to historical and/or recent development patterns in the area.
4. The site does not fall within the boundaries of an existing Brownfield Opportunity Area (BOA) or New York State Environmental Zone (En-Zone).
5. The site is located in an urban area characterized by mixed-use residential, commercial, and institutional uses.
6. The site does not fall within a potential environmental justice area.
7. There are no federal or state land designations.
8. The population growth patterns and projections support the proposed land use.
9. The site is accessible to existing infrastructure.
10. Eight historic properties and structures were identified with a 400-foot radius of the site.
11. No NYSDEC-regulated wetlands or ecological receptors are located on the site.
12. Groundwater is not used as a potable water source in New York City. Potable water provided to the City of New York is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.
13. According to the Preliminary National Flood Insurance Rate map for the City of New York, Preliminary Map Panel No. 3604970184G, dated December 5, 2013, the site falls within Zone AE, which is subject to inundation by the 1% annual chance flood.
14. The site geology is described in Section 2.6.

3.5 Summary of the Selected Remedy

Based on the evaluation of the remedial alternatives described above, both alternatives would be protective of human health and the environment and meet the RAOs and SCGs. Implementation of Alternative I provides for a Track 1 remedy by removal of all impacted, on-site soil and non-native soil exceeding UU SCOs (more than under Alternative II); however, given the extensive excavation depths required to remove all soil exceeding UU SCOs, this alternative is not considered practical or quickly implementable, costs significantly more and carries increased risk. The additional excavation required to achieve UU SCOs endpoints would extend into the groundwater table and would substantially complicate design of SOE and dewatering systems, increase truck traffic, and prolong potential exposure to noise and contaminated dust, groundwater and vapors associated with additional excavation.

The Track 4 (Alternative II) remedy is the selected remedy for this site. The Track 4 remedy achieves the remedial action objectives established for the project, addresses open Spill No. 2107845, and is effective in the short- and long-term. The selected remedy effectively reduces mobility, toxicity, and volume of contaminants. The exposure pathways to residual soil contaminants will be controlled through the use of an engineered composite cover system and a waterproofing/vapor barrier membrane. The building concrete foundation slab and vapor barrier provides a barrier to potential vapor intrusion from VOCs in the subsurface. ICs are designed to make the remedy protective of human health and the environment after the remedy is complete. The remedy is considered feasible and cost effective because the excavation depths do not present significant hardship or increased risk. Alternative II can be feasibly and practically implemented, while providing protection to human health and the environment. For these reasons, Alternative II is the recommended remedial alternative for this site.

4.0 REMEDIAL ACTION PROGRAM

4.1 Governing Documents

The primary documents governing the remedial action are summarized in this section. Where indicated, copies of the full plans are provided in the appendices.

4.1.1 Standards, Criteria and Guidance

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

4.1.2 Standards and criteria typically applicable to UST closures

- 6 NYCRR Part 613 - Petroleum Bulk Storage
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil
- 6 NYCRR Parts 700-706 - Water Quality Standards
- 40 Code of Federal Regulations (CFR) Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

4.1.3 Guidance typically applicable to UST closures

- Spills Technology and Remediation Series (STARS) #1 - Petroleum-Contaminated Soil Guidance Policy (1992) (Sections III and IV have been replaced CP-51)
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects (1996)
- CP-51- Soil Cleanup Guidance (2010)
- Spill Response Guidance Manual (1995)
- Permanent Closure of Petroleum Storage Tanks (2003)
- Technical and Administrative Guidance Memorandum (TAGM) 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations (1998, Addenda 2000 and 2004)
- DAR-1 (formerly Air Guide 1) (1997) - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

4.1.4 Standards and Criteria Typically Applicable to Remedial Actions

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program
- 10 NYCRR Part 67 – Lead Poisoning Prevention and Control
- 12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 360 - Solid waste Management Facilities General Requirements
- 6 NYCRR Part 361 - Material Recovery Facilities
- 6 NYCRR Part 364 - Waste Transporters
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste
- 6 NYCRR Part 375 - Environmental Remediation Programs
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 19 NYCRR Part 600-603 - Waterfront Revitalization of Coastal Areas and Inland Waterways
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 – Classifications and Standards of Quality and Purity
- 6 NYCRR Part 750 - SPDES Permits
- Screening and Assessment of Contaminated Sediment (Division of Fish, Wildlife and Marine Resources, June 2014)

4.1.5 Guidance Typically Applicable to Remedial Actions

- Analysis and Assessment of PFAS (January, 2021)
- CP-51 – Soil Cleanup Guidance (2010)
- DER-2 - Making Changes To Selected Remedies (Revised April, 2008)

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy (1992) (Sections III and IV have been replaced CP-51)
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- DER-10 - Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March, 2010)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- DAR-1 (formerly Air Guide 1) - Guidelines for the Control of Toxic Ambient Air Contaminants (1997)
- NYSDOS State Coastal Management Program
- U.S. EPA OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, Resource Conservation and Recovery Act (RCRA) Corrective Action, and Underground Storage Tank Sites (December 1997)
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)

4.1.6 Site-Specific Construction Health & Safety Plan (CHASP)

The RE prepared a site-specific CHASP (Appendix C). The CHASP requires that all remedial work performed under this plan will be in full compliance with governmental requirements, including site and worker safety requirements mandated by Federal Occupational Safety and Health Administration (OSHA). The CHASP provides a mechanism for establishing a site safety office, on-site safe working conditions, safety organization, procedures, and PPE requirements. The CHASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65). The CHASP includes, but is not limited to, the following components:

- Organization and identification of key personnel;
- Training requirements;

- Medical surveillance requirements;
- List of site hazards;
- Excavation safety;
- Work zone descriptions and monitoring procedures;
- Personal safety equipment and protective clothing requirements;
- Decontamination requirements;
- Standard operating procedures;
- Contingency/protective measure plan;
- CAMP; and
- Safety Data Sheets (SDS).

The Volunteer 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 CHASP and for the appropriate performance of work according to the CHASP and applicable laws. All contractors performing work on the site must prepare their own CHASP that, at a minimum, meets the requirements of the CHASP in Appendix C.

The CHASP and requirements defined in this RAWP pertain to all remedial and invasive work performed at the site until the issuance of a Certificate of Completion. Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gases.

4.1.7 Quality Assurance Project Plan

The RE prepared a Quality Assurance Project Plan (QAPP) that describes the quality control components employed so that the proposed remedy accomplishes the remedial goals, remedial action objectives, and is completed in accordance with the design specifications. The QAPP is provided as Appendix F and includes:

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

4.1.8 Soil/Materials Management Plan

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

4.1.9 Erosion and Sediment Control Plan

The erosion and sediment controls will be in conformance with requirements presented in the NYS Guidelines for Urban Erosion and Sediment Control. Erosion and sediment controls will be implemented as necessary. Best Management Practices (BMP) for soil erosion will be selected to minimize erosion and sedimentation off site from the start of the remediation to the completion of development. Erosion and sediment control measures will be implemented as described in Section 5.4.10. A SWPPP is not necessary because the project will disturb less than one acre, there is not a water body adjacent to the site and the storm drains to the NYCDEP combined sewer and not to the river. Stormwater discharge, as required, will be to a combined sewer in accordance with the New York City SPDES General Permit for Stormwater Discharges from Construction Activities.

4.1.10 Community Air Monitoring Plan

When ground intrusive work is being performed within 20 feet of the sidewalk, a CAMP station (including particulate and organic vapor monitoring equipment) will be situated between the work zone and the sidewalk. Community air monitoring will be conducted in compliance with the NYSDOH Generic CAMP included in Appendix D.

4.1.11 Contractors Site Operations Plan

The RE will review plans and submittals for this remedial project (including those listed above as well as submittals from the contractor and subcontractor) and document their compliance with this RAWP. The RE is responsible for documenting that contractor and subcontractor document submittals are in compliance with this RAWP. Remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and before the start of work.

4.1.12 Citizen Participation Plan

A certification of mailing will be sent by the Volunteer to the NYSDEC project manager following the distribution of 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, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of the applicable project documents.

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

The draft Citizen Participation Plan for this project is included as Appendix G.

Document repositories were established at the following locations, as proposed in the BCP Application, and will contain all applicable project documents:

New Amsterdam Public Library
9 Murray Street
New York, NY 10007
(212) 732-8186

Manhattan Community Board 1
Lucian Reynolds - District Manager
Alice Blank - Environmental Protection Committee Chairwoman
1 Centre Street, Room 2202 North
New York, NY 10007
(212) 602-6300

4.2 General Remedial Construction Information

4.2.1 Project Organization

This section presents the anticipated project organization and associated roles, including key personnel, descriptions of duties and lines of authority in the management of the RAWP. Information regarding the organization/personnel and their associated responsibilities is provided below:

Remedial Engineer:	Jason J. Hayes, PE, LEED AP
Project Manager:	Gregory C. Wyka, PG, LEED AP ND
Langan Health & Safety Officer:	Anthony Moffa Jr., CHMM
Site Safety Coordinator:	William Bohrer, PG
Qualified Environmental Professional (QEP):	Michael Burke, PG, CHMM
Field Team Leader:	Kristen Wexler

Project personnel resumes are provided in Appendix H.

4.2.2 Remedial Engineer

The RE for this project will be Jason J. Hayes, P.E. The RE is a registered Professional Engineer licensed by the State of New York who will have primary direct responsibility for implementation

of the remedial program. The RE will certify in the FER that the remedial activities were observed by personnel under his supervision and that the remediation requirements set forth in the RAWP and any other relevant provisions of Environmental Conservation Law (ECL) 27-1419 were achieved in full conformance with that plan. Other RE certification requirements are listed later in this RAWP.

The RE will direct field personnel to document the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, dewatering, air monitoring, emergency spill response services, import of backfill material, and management of waste transport and disposal. The RE will be responsible for appropriate communication with the NYSDEC and NYSDOH.

The RE will review pre-remedial plans submitted by contractors for compliance with this RAWP and will certify compliance in the FER.

In the FER, the RE will provide the certifications listed in Section 8.1.

4.2.3 Project/Remediation Schedule

The anticipated project/remediation construction schedule is provided in Appendix I. Proposed changes, delays or deviations will be promptly communicated to the NYSDEC. To obtain a Certificate of Completion (COC), the following document deadline goals have been established by the NYSDEC for the calendar year in which the COC is expected.

Submission of Draft Environmental Easement – June 2023 or earlier

Completion of Construction – April 2023

Submission of the Draft Site Management Plan – August 2023 or earlier

Submission of the Draft Final Engineering Report – October 2023 or earlier

Submission of the Final Site Management Plan – October 2023 or earlier

Recording of Environmental Easement – October 2023

Submission of the Final Engineering Report – November2023 or earlier

4.2.4 Work Hours

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

4.2.5 Site Security

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

4.2.6 Traffic Control

Site traffic will be controlled through designated points of access along Washington and Carlisle Streets. Access points will be continuously monitored and if necessary, a flagging system will be used to protect workers, pedestrians, and authorized guests. Traffic will also adhere to applicable local, state, and federal laws. Proposed in-bound and out-bound truck routes to the site are discussed in Section 5.4 and are shown on Figure 11.

4.2.7 Contingency Plan

Contingency plans, as described below, were developed to effectively deal with unexpected discoveries of additional contaminated media or unexpected USTs.

Discovery of Additional Contaminated Soil and Source Areas

During remediation and construction activities, the soil will be continuously monitored by the RE's field representatives using a PID as well as visual and olfactory field screening techniques to identify additional source areas and soil that may not be suitable for the selected disposal facility(ies). Additional source areas may include the following:

- Grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u)
- Soil exceeding the 6 NYCRR Part 371 hazardous criteria for lead
- Concentrated solid or semi-solid hazardous substances per 6 NYCRR Part 375-1.2(au)(1)
- NAPL
- Soil with visual waste material or non-aqueous phase liquid
- Soil containing total SVOCs exceeding 500 parts per million (ppm)
- Soils which exceed the PGW SCOs, as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards
- Soils that create a nuisance condition, as defined in CP-51 Section G

This material will be segregated and sampled for lab analysis in accordance with disposal facility requirements. If the facility is not permitted to receive the waste, the waste will be disposed off-site at a permitted facility able to receive it based on the characterization data. Identification of unknown or unexpected contaminated media identified by screening during invasive site work

will be promptly communicated by phone and email to the NYSDEC Project Manager within 48 hours. These findings will be detailed in daily reports and subsequent monthly BCP progress reports.

Discovery of Additional USTs

Previously unidentified USTs may be discovered during site-wide excavation. Additional USTs encountered during remedial and/or construction activities will be decommissioned in accordance with 6 NYCRR Parts 612.2 and 613.9 and NYSDEC DER-10 Section 5.5. After the tank, its contents, and associated piping are removed, post-excavation endpoint soil samples will be collected per the requirements of NYSDEC DER-10. If encountered, petroleum-impacted soils will be excavated, stockpiled separately, and disposed of off-site at a permitted disposal facility in accordance with applicable regulations. UST closure documentation, including contractor affidavits, waste manifests, and tank disposal receipts, will be included as appendices to the FER. Additional USTs will be registered and decommissioned with the NYSDEC PBS unit, as necessary.

If USTs are encountered during invasive site work, the findings will be promptly communicated by phone to the NYSDEC's Project Manager and detailed in daily reports and subsequent monthly BCP progress reports.

4.2.8 Worker Training and Monitoring

Worker training and monitoring will be conducted in accordance with the CHASP (Appendix C).

4.2.9 Agency Approvals

The Volunteer addressed all State Environmental Quality Review Act (SEQRA) requirements for this site. Permits or government approvals required for remediation activities will be obtained prior to the start of remedial construction. The planned end use for the site conforms to current zoning for the property as determined by New York City Department of City Planning. A Certificate of Completion will not be issued for the project unless conformance with the zoning designation is demonstrated. Local, regional, and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work will be acquired prior to the start of remediation.

A list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remediation activities is provided below:

- NYCDOB Foundation, Support of Excavation and New Building Permits

This list will be updated in the FER.

4.2.10 NYSDEC BCP Signage

Signs are optional for BCP sites and will be discussed with the NYSDEC Project Manager. If a sign is to be displayed, it must follow NYSDEC specifications for design and content. The NYSDEC Project Manager can provide details on signage protocol.

4.2.11 Pre-Construction Meeting with the NYSDEC

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

4.2.12 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in the CHASP (Appendix C). That document will define the specific project contacts for use by the NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.13 Remedial Action Costs

The estimated engineer and contractor cost of the preferred Track 4 remedy is about $6.4 million. An itemized and detailed summary of estimated costs for remedial activity is provided as Table 2. This estimate will be revised based on actual costs and submitted as an appendix to the FER.

4.3 Site Preparation

The RE will work with the Volunteer and its contractors so that site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

4.3.1 Mobilization

Before commencing site remediation, the remediation contractor will mobilize to the site and prepare for remedial activities. Mobilization and site preparation activities may include the following:

- Identifying the location of all aboveground and underground utilities (e.g., power, gas, water, sewer, telephone), equipment, and structures (as necessary to implement the remediation);
- Mobilizing necessary remediation personnel, equipment, and materials to the site;
- Constructing one or more stabilized construction entrances consisting of virgin quarry stone or RCA at or near the site exit, which takes into consideration the site setting and site perimeter;
- Constructing a decontamination pad for trucks, equipment, and personnel that come into contact with impacted materials during remedial activities;

- Installing erosion and sedimentation control measures, as necessary; and
- Installing temporary fencing or other temporary barriers to limit unauthorized access to areas where remediation activities will be conducted.

4.3.2 Monitoring Well Decommissioning

Existing groundwater monitoring wells will be properly decommissioned in accordance with NYSDEC CP-43. The only exception to this is if the full length of the well is to be removed or excavated during remediation activities. Well decommissioning will be performed by an experienced driller and logged by Langan field personnel. Decommissioning documentation will be provided in the FER.

4.3.3 Stabilized Construction Entrance(s)

Stabilized entrance areas will be constructed to prevent decontaminated trucks from being re-contaminated by site soil before exiting. The areas will be covered with virgin quarry stone or RCA and graded so that runoff water will be directed onto the site. The contractor will protect and maintain the existing sidewalks and roadway at site entrance points.

4.3.4 Utility Marker and Easements Layout

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

The presence of utilities and easements on the site will be investigated by the RE, Volunteer and its contractors. No impediments to the planned work under this RAWP are expected by known utilities or easements on the site.

4.3.5 Equipment and Material Staging

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

4.3.6 Decontamination Area

The contractor will construct decontamination pads at each site entrance/exit planned for construction vehicle usage. The location of decontamination pads may change periodically to accommodate the contractor's sequencing of work. Where required, the pads will be constructed by the contractor to collect wastewater for off-site disposal or treatment and discharge, if generated during decontamination activities. The design will consider adequate space to decontaminate equipment and vehicles, and sloping and liners to facilitate collection of wastewater. Collected decontamination wastewater shall be either discharged in accordance with the contractor's NYCDEP permit or tested and transported to an off-site disposal facility that is permitted to accept this waste, in accordance with applicable local, state and federal regulations. The contractor will maintain the decontamination pad(s) throughout the duration of site work. Prior to demobilization, the contractor will deconstruct the pads and dispose of materials as required

If the contractor uses high pressure washing methods, the contractor shall provide splash protection around the vehicle decontamination facility to prevent splatter and mist migrating off-site during the vehicle decontamination process. Splash protection shall be temporary and stable and capable of being dismantled in the event of high winds.

4.3.7 Site Fencing

The site perimeter will be secured with gated, signed, plywood fencing. The purpose of the fencing is to limit site access to authorized personnel, protect pedestrians from site activities and maintain site security.

4.3.8 Demobilization

The contractor will be responsible for demobilizing all labor, equipment and materials not designated for off-site disposal. The RE will be required to document that the remediation contractor has decontaminated all equipment and materials before removal from the site. The RE will document performance by the contractor of any follow-up coordination and maintenance for the following activities: removal of sediment and erosion control measures and disposal of materials in accordance with acceptable rules and regulations; removal of residual contaminated soil/non-native soil or other wastes; equipment decontamination; and general refuse disposal.

4.4 Reporting

Daily and monthly reports and an FER will be required to document the remedial action. The RE responsible for certifying the FER will be an individual licensed to practice engineering in the State of New York; Jason Hayes, P.E., of Langan, will have this responsibility. Should Mr. Hayes become unable to fulfill this responsibility, another suitably qualified New York State professional engineer will take his place. All daily and monthly reports will be included in the FER. In addition

to the periodic reports and the FER, copies of all relevant contractor documents will be submitted to the NYSDEC.

4.4.1 Daily Reports

Daily reports will be submitted to the NYSDEC and NYSDOH Project Managers no later than noon the following day, following the reporting period and will include:

- An update of progress made during the reporting day, including a photographic log;
- Locations of work and quantities of soil and fill material imported to and soil and non-native soil exported from the site;
- Draft analytical sampling results received;
- References to alpha-numeric map for site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP data and findings, including excursions and actions taken to address any excursion;
- An explanation of notable site conditions;
- A description of anticipated site activities; and
- The NYSDEC-assigned project number will appear on all reports.

Daily progress will be detailed on a site map. Daily reports are not intended to be the primary mode of communication when notifying the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to the NYSDEC Project Manager via personal communication.

4.4.2 Monthly Reports

Monthly reports will be submitted to the NYSDEC and NYSDOH Project Managers by the tenth of the following month of the reporting period and will include the following information, as well as the information required in the Brownfield Cleanup Agreement (BCA):

- 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 soil and fill material exported and/or imported, etc.);
- Description of approved activity modifications, including changes to the scope of work and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and

- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of remedial activities and submitted to the NYSDEC in digital (JPEG) format. Photographs will illustrate the remedial program elements and will be of acceptable quality. Representative photographs of the site before any remedial actions and of each contaminant source area and site structures before, during and after remediation will be provided. Photographs will be submitted to NYSDEC in digital format (e.g. jpeg files). A photograph log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos.

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

4.4.4 Complaint Management Plan

The management plan for documenting complaints is detailed below.

Item	**Description**
Approach	Complaints regarding remediation or construction activities/operations will be minimized and mitigation measures will be implemented to reduce the incidence of complaints.
Objective	To manage environmental complaints from the community regarding construction or remediation.
Implementation Strategy/Mitigation Measures	All complaints will be documented on a complaint register. The register will be maintained as an ongoing record. Each entry will include the following information: • Time, date and nature of complaint; • Type of communication (telephone, letter, personal, etc.); • Name, contact address and contact number; and • Response and investigation undertaken as a result of the complaint and action taken with the signature of the responsible person. Each complaint will be investigated as soon as practicable in relation to the requirements.
Monitoring	A representative from the Volunteer or the RE will follow up on the complaint within two weeks of receipt to ensure it has been resolved.
Reporting	Upon receipt, the NYSDEC will be notified. Complaints and resolutions will be documented in the daily reports.
Corrective Action	Should an incident or failure to comply occur in relation to the management of environmental complaints, one or more of the following corrective actions will be undertaken as appropriate:

Item	Description
	• Conduct additional training of staff to handle environmental complaints; • Investigate why the environmental complaint was not addressed within the specified time frame; and • Investigate the complaint and action follow-up according to the investigation results.

4.4.5 Deviations from the RAWP

Necessary deviations from the RAWP will be coordinated with the NYSDEC in advance. Notification will be provided to the NYSDEC by telephone/email for conditions requiring immediate action (e.g., conditions judged to be a danger to the surrounding community). Addendums to the RAWP will be prepared, as necessary and will include:

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

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Remediation involving materials removal from the site will be completed in conjunction with foundation construction and will include the following tasks:

1. Excavation of soil/fill for remediation and construction purposes.
2. Decommissioning and removal of USTs encountered during excavation.

5.1 Soil Cleanup Objectives

A Track 4 remediation is proposed. The remediation consists of source area soil/fill removal comparing the NYSDEC RURR SCOs listed in 6 NYCRR Part 375-6.8(b), as set forth in Table 1 with the endpoint samples to document the residual contamination that will be left at the site.

In the context of remedial excavation in accordance with this RAWP, the phrase "source soil/fill" is defined as:

- Grossly contaminated soil/fill, as defined in 6 NYCRR Part 375-1.2(u);
- Soil/fill exceeding the 6 NYCRR Part 371 hazardous criteria;
- Concentrated soil or semi-solid hazardous substances per 6 NYCRR Part 375-1.2(au)(1);
- Non-aqueous phase liquids;
- Soil/fill with visual waste material or non-aqueous phase liquid;
- Soil/fill containing total SVOCs exceeding 500 ppm;
- Soil/fill that exceeds the protection of groundwater SCOs, as defined by 6 NYCRR 375-6.8 for those contaminants found in site groundwater above standards; and
- Soil/fill exhibiting visual, olfactory, or PID evidence of contamination that creates a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Soil management will be conducted in accordance with the SMMP described below (Section 5.4). The closed-in-place 3,000-gallon UST in the southern part of the site and closure of additional USTs, if encountered, will conform to the criteria defined in 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements including DER-10 Section 5.5.

5.2 Remedial Performance Evaluation (Documentation Sampling)

One documentation soil sample will be collected from the excavation base of remedial and development-related excavations in accordance with DER-10 Section 5.4(b))5). Sidewall sample collection will be precluded by the SOE system for the partial cellar and by minimal sidewall exposure associated with the 2-foot excavations for at-grade foundations for the new building and exterior areas include sidewalk entranceways and a rear yard with a dog run with artificial

turf over a concrete slab. An estimated 13 base documentation soil samples, plus QA/QC samples, will be collected to document remedial performance.

Documentation samples will be transported under standard chain-of-custody protocol to an NYSDOH ELAP-certified laboratory for comparison with the Part 375 RURR SCOs for VOCs, SVOCs (including 1,4-dioxane), pesticides/herbicides, PCBs, metals, and PFAS via Method 1633. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC ASP Category B deliverable format. QA/QC procedures required by the NYSDEC ASP and SW-846 methods will be followed, including instrument calibration, standard compound spikes, surrogate compound spikes, and analysis of quality control samples. The laboratory will provide sample bottles, which are pre-cleaned and preserved. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP shall take precedence. Guidance on sampling frequency is presented in Section 5.4 of DER-10.

A data usability summary report (DUSR) will be included in the FER. Quality control procedures for the sampling are included in the QAPP (Appendix F). Documentation sample results will be provided in NYSDEC electronic data deliverable (EDD) format for EQuIS™.

The proposed documentation sampling locations are presented on Figure 10. The FER will provide a tabular and map summary of all documentation sample results.

5.3 Estimated Soil/Fill Removal and Import Quantities

As a pre-requisite to commencement of site remediation, the contractor will remove any existing asphalt and concrete surface cover systems and manage it as construction and demolition (C&D) debris in accordance with Part 360 and 361 regulations. The estimated quantity of soil/non-native soil to be removed from the site for a Track 4 cleanup is about 4,100 cubic yards of non-native soil and/or petroleum-impacted soil. Over-excavated areas to remove source material will require backfill meeting the lower of the RURR or PGW SCOs, RCA, or virgin quarry stone. RCA will not be used as backfill within two feet of the groundwater table or as drainage material. The estimated quantity of soil to be imported to the site for backfill is about 1,200 cubic yards. The Track 4 remedial excavation extents are shown on Figure 9.

5.4 Soils/Materials Management Plan

This section presents the approach to management and disposal of soil and non-native soil excavated from the site. Reuse of on-site soil is not anticipated for this site. This plan is based on the current knowledge of site conditions, and will be augmented with the additional data collected during remediation. Langan field personnel, under the direction of the RE, will monitor and document the handling and transport of contaminated soil and non-native soil removed from the site for disposal as a regulated solid waste. Field personnel, under the direction of the RE, will assist the remedial contractor in identifying impacted soil and non-native soil during excavation, determining soil and non-native soil suitable for direct load-out versus temporary on-

site stockpiling, selection of samples for waste characterization, and determining the proper off-site disposal facility. Separate stockpile areas will be constructed as needed to stage various excavated soil and non-native soil with the intent to more efficiently manage and characterize the soil and non-native soil and to avoid comingling of impacted soil and non-native soil with non-impacted soil.

5.4.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by Langan field personnel under the direct supervision of the RE during remedial and development excavations into known or potentially contaminated soil and non-native soil. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed after the removal of asphalt and concrete surface cover and during the remedy and during the development phase, such as excavations for foundations and utility work before issuance of the Certificate or Completion.

Primary contaminant sources (including but not limited to, USTs and any identified hotspots) identified during the RI, waste characterization, and remedial action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the FER.

5.4.2 Stockpile Methods

Soil stockpile areas, if needed for different soil and fill materials, will be constructed for staging of site soil, pending loading or waste characterization testing. Separate stockpile areas will be constructed to avoid comingling soil and non-native soil of differing waste types. Stockpile areas will meet the following minimum requirements:

- The excavated soil will be placed onto an impermeable surface or on minimum thickness of 6-mil low-permeability plastic sheeting or tarps of sufficient strength to prevent puncture during use; separate stockpiles will be created where material types are different (e.g., non-native soil on areas where non-native soil is present.). The use of multiple layers of thinner liners is permissible.
- Equipment and procedures will be used to place and remove the soil so as to minimize the potential to jeopardize the integrity of the liner.
- Stockpiles will be covered at the designated times (see below) with minimum 6-mil plastic sheeting or tarps, which will be securely anchored to the ground. Stockpiles will be routinely inspected and broken sheeting covers will be promptly replaced.
- Stockpiles that have reached their capacity will be appropriately covered until they ready for loading for off-site transport.
- Active stockpiles (e.g. stockpiles that have not reached their capacity) will be covered at the end of each workday.

- Each stockpile area will be encircled with silt fences and hay bales, as needed, to contain and filter particulates from rainwater that has drained off the soils, and to mitigate the potential for surface water run-off off-site.
- Stockpiles will be inspected at a minimum once each day and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

5.4.3 Soil Characterization, Excavation and Loading

Excavated soil and non-native soil will be characterized for off-site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC data will be reported in the FER. Data available for soil or non-native soil to be disposed at a given facility must be submitted to the disposal facility for review and approval before shipment and receipt.

The Volunteer and its contractors are solely responsible for safe execution of invasive work, the structural integrity of excavations, structures that may be affected by excavations, and other work performed under this RAWP. Sheeting, shoring, or sloping will be used for deeper excavations. Sheeting or shoring will be used where sloping is not practical (i.e., at the perimeter of the site). Field personnel under the direct supervision of the RE or QEP will observe and document all invasive work and the excavation and loading of excavated soil and non-native soil. Remediation areas will be excavated and post-excavation documentation sampling completed before excavations related to site development can move. Petroleum-impacted soil will be excavated, stockpiled separately, characterized, and disposed of off-site at a permitted disposal facility in accordance with applicable regulations. If the site excavation does not extend beyond the bottom of the remediation area, additional confirmation soil samples will be collected as required. Additional source areas, as outlined in Section 3.2.7, will be segregated and sampled for lab analysis in accordance with disposal facility requirements. If the facility is not permitted to receive these soils, the soil will be disposed off-site at a permitted facility able to receive the soil based on the characterization data. Development-related grading cuts and filling activity will not be performed without NYSDEC approval of the RAWP, and the RE will assist with the coordination of site development activities so that they do not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

The RE's field personnel will be responsible for monitoring egress points for truck and equipment transport from the site. The RE and the Volunteer will be responsible for notifying the Contractor of their obligation to immediately clean the sidewalks and streets of dirt and other materials derived from the site during site remediation and development. Non-compliance will be reported to the NYSDEC. Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site sediment tracking. Cleaning of the adjacent streets will be performed as

needed to maintain a clean condition with respect to site-derived materials. Loaded vehicles leaving the site will be appropriately lined, securely covered, manifested, and placarded in accordance with appropriate federal, state, and local NYCDOT requirements, and all other applicable transportation requirements. Trucks hauling non-native soil will not be lined unless the material exhibits free liquids or is grossly contaminated. On-site, mechanical processing of non-native soil and contaminated soil is prohibited unless otherwise approved by the NYSDEC.

5.4.4 Soil Transport Off-Site

Transport of soil and historic will be performed by licensed haulers in accordance with appropriate local, state and federal regulations, including 6 NYCRR Part 364 and NYC's Business Integrity Commission (BIC) Trade Waste Hauler requirements. Haulers will be appropriately licensed and trucks properly placarded. Trucks will enter and exit the site using dedicated ingress/egress points. Trucks loaded with soil and non-native soil will exit the vicinity of the site using only approved truck routes. Trucks will be prohibited from stopping and idling unnecessarily in the neighborhood outside the site. To the extent possible, queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be minimized. Trucks entering or leaving the site will be securely covered with tight-fitting opaque truck bed covers; mesh-type truck bed covers will not be allowed.

Proposed in-bound and out-bound truck routes to the site are shown on Figure 11. This is the most appropriate route and takes into account:

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

A truck wash pad/cleaning area will be designated and operated on-site. The RE will be responsible for documenting that outbound trucks are washed and cleaned at the truck wash before leaving the site until the remedial construction is complete. Locations where vehicles enter or exit the site will be inspected daily (at a minimum) for evidence of off-site sediment tracking.

The RE will be responsible for documenting that egress points for truck and equipment transport from the site are free of dirt and other solid waste derived from the site during remediation and development. Cleaning of the adjacent streets will be performed by the remediation contractor as needed to maintain a clean condition with respect to site-derived solid waste.

5.4.5 Soil Disposal Off-Site

Excavated soil/non-native soil removed from the site will be handled, transported and disposed of in accordance with local, state (including 6 NYCRR Parts 360, 361, 370, 371, and 372) and federal regulations. If disposal of soil/non-native soil 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's Project Manager. Unregulated off-site management of soil/non-native soil from this site is prohibited without formal NYSDEC approval.

Excavated soil/non-native soil must be disposed of at an in-state or out-of-state facility licensed to accept it. Non-hazardous fill material can be sent to a construction and demolition debris handling and recovery facility only with written approval from the NYSDEC. Hazardous waste is prohibited from being sent to a construction and demolition debris handling and recovery facility (6 NYCRR Part 361-5). Hazardous wastes derived from the site will be managed, transported and disposed of in full compliance with applicable local, state and federal regulations.

The following documentation will be obtained and reported by the RE for each off-site disposal location used in this project to fully demonstrate and document that the disposal of soil and non-native soil material derived from the site conforms to applicable laws:

1) A letter from the RE or BCP Volunteer to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that soil and non-native soil to be disposed of is a contaminated waste 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 waste being transported (including site characterization data); and
2) A letter from each receiving facility stating it is in receipt of the correspondence (above) and is approved to accept the waste. These documents will be included in the FER.

The FER will include an account of the destination of all solid wastes removed from the site during the remedy, including excavated soil, contaminated soil, non-native soil, hazardous waste, and fluids. Documentation associated with disposal of waste must also include records (i.e., manifests and scale tickets) and approvals for receipt of the waste by the facilities. This information will also be presented in the FER.

5.4.6 Soil Reuse On-Site

Soil excavated during the remedy is not anticipated to be reused on this site under the proposed remedy. If soil reuse is considered, it will be reused only if the requirements in this section and 6 NYCRR Part 360 are met. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html will be prepared and submitted to the NYSDEC

project manager allowing a minimum of 5 business days for review. Grossly contaminated soil or soil with petroleum staining or odor will not be reused on-site. Soil acceptable for reuse must be non-hazardous and meet the lower of the RURR and PGW SCOs.

Soil removed during implementation of the remedy or removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. Soil deemed unfit for reuse will be transported for off-site disposal.

5.4.7 Fluids Management

Dewatering fluids and any other fluids will be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. If the construction dewatering system design capacity exceeds an extraction volume of 45 gallons per minute/100,000 gallons per day, a Water Withdrawal Permit will be obtained from the NYSDEC. The construction dewatering system is still under design at the time. Specifications for the dewatering and pre-treatment system will be submitted to the NYSDEC when available. Dewatering fluids will be discharged into the New York City sewer system under a NYCDEP discharge permit. A construction dewatering and treatment system will be designed by the Contractor's NYS-licensed Professional Engineer. Dewatered fluids will not be recharged back to the land surface or subsurface. Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without an SPDES permit (not anticipated).

5.4.8 Demarcation

Concrete building slabs will cover most of the site footprint and will constitute part of the final composite cover system. No demarcation layer will be installed underneath the concrete building slabs. A demarcation layer (high-visibility demarcation barrier [e.g., orange snow fencing or equivalent material]) will be placed outside of the proposed building footprint under the rear yard with the dog run. After the completion of soil removal and any other invasive remedial activities and prior to backfilling, a land survey will be performed by a NYS licensed surveyor. The survey will define the base of the excavation and top elevation of remaining soil left in place before the placement of cover soils, pavement and sub-soils, structures, or other materials. After the survey, a high-visibility demarcation barrier 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 soil defined in the SMP. A map showing the demarcation survey and physical extents of the high-visibility demarcation barrier will be included in the FER and the SMP.

5.4.9 Backfill from Off-Site Sources

Backfill proposed for import to the site will be reviewed by the RE based upon documentation that the materials are in compliance with provisions in this RAWP before they are shipped to the

site. Imported backfill will consist of fill meeting the lower of RURR or PGW SCOs or other acceptable fill material such as virgin quarry stone or RCA. RCA will not be used as backfill within two feet of the groundwater table or as drainage material. Soil and fill from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the site. Solid waste will not be imported onto the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. Trucks entering the site with imported soil will be securely covered with tight fitting covers.

Composite samples (with the exception of VOCs) of imported soil/fill will be taken at a frequency in accordance with DER-10 Section 5.4(e) and Table 5.4(e)(10). The samples will be analyzed for Part 375 VOCs, SVOCs (including 1,4-dioxane), pesticides/herbicides, PCBs, metals, and PFAS by a NYSDOH ELAP-certified laboratory. Emerging contaminant sampling will be performed in accordance with the NYSDEC June 2022 Guidelines for Sampling and Analysis of PFAS. Once it is determined that the fill material meets imported backfill SCOs, the fill material will be loaded onto trucks with secure covers for delivery.

RCA will be imported from facilities permitted or registered by the NYSDEC or by the appropriate authority in another state or jurisdiction. Facilities will be identified in the FER. The RE will certify that the facilities have 6 NYCRR Part 360 registration and permitting for the period of acquisition of RCA. RCA imported from DEC-registered or DEC-permitted facilities and virgin gravel, rock or stone from mines, quarries or facilities permitted or registered by the NYSDEC or the applicable state of origin and have no more than 10% by weight passing through a No. 80 sieve will not require additional testing unless required by NYSDEC under its terms for operation of the facility. Additional exemptions from testing requirements may be approved by NYSDEC Project Manager based on their review of requests by the RE. RCA imported to the site must be derived from recognizable and uncontaminated concrete and will not be used within as final surface cover. RCA can only be used under impervious surfaces (i.e., asphalt or concrete).

Imported fill documentation will be included in the FER and SMP.

5.4.10 Stormwater Pollution Prevention

Silt fencing or hay bales will be installed around the perimeter of the remedial construction area, as required. Barriers and hay bale checks will be installed and inspected once a week and after every storm event; necessary repairs shall be made immediately. Results of inspections will be recorded in a logbook maintained at the site and available for inspection by the NYSDEC. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. 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

fence damaged due to weathering. 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. Implementation of the SWPPP will mitigate the discharge of erosional sediment to New York City sewer system.

5.4.11 Contingency Plan

If USTs or other previously unidentified contaminant sources are found during on-site remedial excavation or development-related construction, sampling will be performed, if encountered, and surrounding subsurface materials (e.g., sediment, soil, stone, etc.). Chemical analysis will include Part 375 VOCs, SVOCs (including 1,4-dioxane), pesticides/herbicides, PCBs, pesticides, metals and/or PFAS based on the nature of the likely contaminants.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated to NYSDEC's Project Manager. These findings will be also detailed in daily and subsequent monthly BCP progress report.

5.4.12 Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the NYSDOH Generic CAMP outlined below and included in Appendix D.

The CAMP includes real-time monitoring for VOCs and particulates at the downwind perimeter of each designated work area when certain activities are in progress. Continuous monitoring is required for all ground intrusive activities and during demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, advancement of trenches and test pits, and the installation of soil borings or monitoring wells. When ground intrusive work is being performed within 20 feet of a sidewalk, a CAMP station (including particulate and organic vapor monitoring equipment) will be situated between the work zone and the sidewalk. Periodic monitoring for VOCs is required during non-intrusive activities such as the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading before leaving a sample location.

Prior to implementation of CAMP, upwind/background concentrations of particulates and VOCs will be measured at the start of each workday. CAMP monitoring for VOC levels will be conducted with PIDs, and monitoring for dust/particulates will be conducted with particulate sensors equipped with filters to detect particulates less than 10 microns in diameter (PM10). Monitoring for particulates and odors will be conducted during all ground intrusive activities by the RE's field personnel. The work zone is defined as the general area in which machinery is operating in

support of remediation activities. A portable PID will be used to monitor the work zone and for periodic monitoring of VOCs during activities such as soil sampling. The site perimeter will be visually monitored for fugitive dust emissions.

The following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the work zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the work zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the work zone, activities will be shut down.

The following actions will be taken based on visual dust observations:

- If the downwind particulate level is 100 micrograms per cubic meter (µg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work zone, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed 150 µg/m^3 above the background level and provided that no visible dust is migrating from the work zone.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m^3 above the background level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m^3 of the upwind level and in preventing visible dust migration.

CAMP data summary tables and data logs will be provided to the NYSDEC and NYSDOH on a daily basis. Exceedances observed in the CAMP will be reported to the NYSDEC and NYSDOH Project Managers within 24 hours and will be included in the daily report. All CAMP data summary tables and data logs will be included in the FER.

5.4.13 Odor, Dust and Nuisance Control Plan

Dust, odor and nuisance control will be accomplished by the contractor as described in this section.

Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include application of foam suppressants or tarps over the odorous or VOC source areas. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until nuisance odors are abated. The NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls is the responsibility of the Volunteer's contractors. Immediately notifying contractors of the exceedances will be the responsibility of the Volunteer's RE staff; the RE is responsible for certifying the FER. Immediate application of odor controls is the responsibility of the remediation contractor.

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

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

Dust Control Plan

Dust suppression plan that addresses dust management during ground-intrusive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated water distribution system, on-site water trucks, or an alternate source with suitable supply and pressure for use in dust control.
- Gravel will be used for 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 before and during site clearing and 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 the NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since residual contaminated soil, groundwater, and soil vapor will exist beneath the site after the Track 4 remedy is complete, ECs and ICs are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a site-specific SMP that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The site's primary EC system is a composite cover system consisting of concrete foundation slabs and other slabs

The SMP and FER will provide tables and figures documenting residual contamination at the site. This will include presentation of concentrations exceeding both UU and RURR SCOs at the site.

7.0 ENGINEERING AND INSTITUTIONAL CONTROLS

Following completion of the remedy, it is anticipated that the site will achieve a Track 4 RURR remedy and contamination above the site-specific SCOs may remain in place; therefore, ECs and ICs will be required as part of the remedial action. The ECs include a composite cover system consisting of concrete foundation slabs, pavement, and cover soil/gravel and a waterproofing/vapor barrier membrane system. An SMP will be implemented to manage and monitor the ECs and define use restrictions of the site.

The proposed ECs and ICs are detailed below.

7.1 Engineering Controls

7.1.1 Site Cover System

The engineered composite cover will consist of the following components:

- A concrete slab and foundation at least one foot thick with an underlying waterproofing/vapor barrier membrane across the partial cellar and remainder of the building footprint (ground floor); and
- Concrete slabs at sidewalk entranceways and at the rear yard with a dog run at least one foot thick including any gravel underlayment.

The top elevation of residual (existing) soil and non-native soil below the rear yard with a dog run will be surveyed by a New York State-licensed surveyor and marked with a physical, high-visibility demarcation barrier consisting of orange snow fencing or equivalent material for visual reference.

The composite cover system will serve as an EC for the protection of human health by preventing direct contact with residual contamination remaining at the site. As-built construction layout and details of the composite cover system will be included in the FER, as necessary. The composite cover will be inspected and its performance certified at specified intervals as required by the SMP. The SMP will outline the inspection and maintenance procedures to be followed in the event that the composite cover is disturbed after the remedial action is complete. The composite cover system layout is shown on Figure 12.

7.1.2 Waterproofing/Vapor Barrier Membrane

The waterproofing/vapor barrier membrane system will be installed under the partial cellar slab and on foundation sidewalls. The system will consist of GCP Applied Technologies Preprufe® 300R and 160R membranes (46- and 32-mil thickness membrane, respectively [or equivalent]). The waterproofing/vapor barrier membrane will be installed under horizontal surfaces and vertical surfaces (i.e., elevator pit walls, utility pit walls, and subgrade foundation walls to surface grade). A 20-mil vapor barrier (GCP Florprufe® 120 or equivalent) will also be installed beneath the at-grade foundation slabs. Welds, seams and penetrations will be properly sealed to prevent

preferential pathways for vapor migration. The vapor barrier membrane will be compatible with creosote- and petroleum-related VOCs and CVOCs.

The waterproofing/vapor barrier membrane will serve as an EC for the protection of human health by providing a barrier to prevent potential inhalation of VOCs from off-site sources. As-built construction layout and details of the waterproofing/vapor barrier membrane system will be included in the FER.

7.2 Institutional Controls

After the remedy is complete, the site will have remaining contamination. ECs have been incorporated into the remedy to render the overall site remedy protective of public health and the environment. An SMP will be prepared and a site-specific environmental easement will be recorded with New York City/New York County to provide an enforceable means for continual and proper management of remaining contamination and protection of public health and the environment in perpetuity or until released in writing by the NYSDEC. The easement will require that the grantor and the grantor's successors and assigns adhere to all ECs and ICs placed on this site. ICs provide restrictions on site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The SMP will describe appropriate methods and procedures to maintain and protect ECs and ICs that are required by the environmental easement. Once the SMP was approved by the NYSDEC, compliance with the SMP will be required by the grantor of the environmental easement and grantor's successors and assigns.

7.2.1 Environmental Easement

An environmental easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-site after the remedy is complete. A Track 4 cleanup requires that an environmental easement approved by the NYSDEC will be recorded with the New York City/New York County Office before the Certificate of Completion can be issued by the NYSDEC. The environmental easement will be submitted as part of the FER.

The environmental easement renders the site a Controlled Property. The easement will list the ECs and ICs required under this remedy to prevent future exposure to residual contamination, including controlling disturbances of the subsurface residual contamination and restricting the use of the site to restricted residential, commercial, and industrial uses only. The ICs are generally 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 the methods and procedures to be followed to comply with this remedy.

The ICs that support ECs are:

- Compliance with the environmental easement by the grantor and the grantor's successors and adherence of all elements of the SMP is required;

- ECs must be operated and maintained as specified in the SMP;
- ECs on the Controlled Property must be inspected and certified at a frequency and in a manner 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; and
- ECs may not be discontinued without an amendment or extinguishment of the environmental easement.

Adherence to these ICs for the site is mandated by the environmental easement and will be implemented under the SMP (discussed in the next section). The use restrictions that apply to the site are:

- Vegetable gardens and farming in residual site soil on the site are prohibited;
- Use of groundwater underlying the site is prohibited without treatment rendering it safe for the intended purpose;
- All future activities on the site that will disturb residual contaminated soil and non-native soil 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, and industrial uses use only, provided the long-term ECs and ICs included in the SMP are employed; and
- The site may not be used for a higher level of use without an amendment or extinguishment of the environmental easement.

Grantor agrees to submit to the 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 the 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. This certification shall be submitted annually, or at a specified frequency allowed by the NYSDEC. The NYSDEC retains the right to access the site at any time in order to evaluate the continued maintenance of any and all controls.

7.3 Site Management Plan

A Track 4 cleanup requires an SMP. Site management is the last phase of remediation and begins with the approval of the FER and issuance of the Certificate of Completion for the remedy. The finalized SMP is included 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 the NYSDEC. The property owner is responsible for all site

management responsibilities defined in the environmental easement and performance of the SMP.

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 remedy in accordance with the NYSDEC BCA. This includes: (1) development, implementation, and management of all ECs and ICs; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, recovery or other mechanical systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of site information to the NYSDEC; and (5) defining criteria for termination of treatment or other mechanical system operation.

To address these needs, this SMP will include three plans: (1) an EC and IC Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; and (3) 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 and the guidelines provided by the NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a periodic basis, and are submitted in a Periodic Review Report. The certification period will be determined by NYSDEC and the initial submittal will be 15 months after issuance of the Certificate of Completion (COC).

No exclusions for handling of residual contaminated soils will be provided in the SMP. All handling of residual contaminated soil and non-native soil will be subject to provisions contained in the SMP.

8.0 FINAL ENGINEERING REPORT

An FER, prepared in accordance with DER-10, will be submitted to the NYSDEC following completion of the remedial action defined in this RAWP. The FER will provide documentation that the remedial work required under this RAWP was completed and was performed in compliance with this plan. The FER will include the following documentation:

1. Written and photographic documentation (via daily field reports) of the completed remedy;
2. A description of any deviations from the RAWP;
3. An account of soil and non-native soil exported from the site, including waste types and volumes, waste characterization documentation, facility-signed manifests and scale tickets, facility approvals and other waste disposal documentation;
4. An account of soil and fill imported to the site;
5. A tabular summary of post-excavation documentation sampling results and other sampling and laboratory analysis completed as part of the remedial action; and
6. As-built drawings for ECs and commissioning test results (as necessary)

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form (i.e., PDF) on electronic media.

8.1 Certification

The following certification will appear in front of the Executive Summary of the FER. The certification will be signed by the RE, Jason Hayes, 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 _____certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Remedial Action Work Plan (or Remedial Design or Plans and Specifications) was implemented and that all construction activities were completed in substantial conformance with the DER-approved Remedial Action Work Plan (or Remedial Design or Plans and Specifications).

I certify that the data submitted to the Department with this Final Engineering Report demonstrates that the remediation requirements set forth in the Remedial Action Work Plan (or Remedial Design or Plans and Specifications) and all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in the work plan (or Remedial Design or Plans and Specifications).

I certify that all use restrictions, institutional controls, engineering controls and/or any operation and maintenance requirements applicable to the site are contained in an environmental easement

created and recorded pursuant to ECL 71-3605 and that any affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that an SMP has been submitted for the continual and proper operation, maintenance and monitoring of any engineering controls employed at the site including the proper maintenance of any remaining monitoring wells, and that such plan has been approved by DER.

I certify that all documents generated in support of this report have been submitted in accordance with the DER's electronic submission protocols and have been accepted by the Department.

I certify that all data generated in support of this report have been submitted in accordance with the Department's electronic data deliverable and have been accepted by the Department.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as Owner's Designated Site Representative (and if the site consists of multiple properties): [and I have been authorized and designated by all site owners to sign this certification] for the site.

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.

9.0 SCHEDULE

Mobilization will commence before remedial activities at the site and is expected to take about two weeks. Once mobilization is complete, the remedial activities will commence. The first phase is anticipated to take about seven months and includes, but is not limited to, removal of existing surface cover, waste characterization, excavation, stockpiling, and transport of non-native soil, import of materials for the composite cover system and backfilling, and collection of post-excavation and confirmation endpoint samples. The FER will be submitted to the NYSDEC as detailed in Section 8.0 after the remedial activities are completed at the site. A detailed project schedule including deadlines for remedial activities is included in Appendix I.