REMEDIAL INVESTIGATION REPORT

for

THE BEACON – 413 EAST 120TH STREET
413 East 120th Street
New York, New York
NYSDEC BCP No. C231155

Prepared for:

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LIST OF ACRONYMS

Acronym	Definition
AGV	Air Guideline Values
AOC	Areas of Concern
AST	Aboveground Storage Tank
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bsg	Below Sidewalk Grade
CAMP	Community Air Monitoring Plan
COC	Contaminant of Concern
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
DER	Division of Environmental Remediation
DER-10	Division of Environmental Remediation Program Policy: Technical Guidance for Site Investigation and Remediation, May 2010
DER-31	Division of Environmental Remediation Policy: Green Remediation Policy, January 2011
DUSR	Data Usability Summary Report
el	Elevation
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
eV	Electron volt
FWRIA	United States Fish and Wildlife Resources Impact Analysis
GHG	Greenhouse Gas
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
mg/kg	Milligram per Kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAPL	Non-Aqueous Phase Liquid
NAVD88	North American Vertical Datum of 1988
ng/L	Nanogram per Liter
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	Polycyclic Aromatic Hydrocarbons
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PFAS	Per- and Polyfluoroalkyl Substances

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Acronym	Definition
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PID	Photoionization Detector
PM10	Particulate Matter Less Than 10 Micrometers in Size
ppm	Part per Million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAWP	Remedial Action Work Plan
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RL	Reporting Limit
RURR	Restricted Use Restricted-Residential
SCO	Soil Cleanup Objective
SGV	Standards and Guidance Value
SMDS	Sub-Membrane Depressurization System
SMP	Site Management Plan
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethylene
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series
µg/m^3	Microgram per Cubic Meter
µg/L	Microgram per Liter
UN/DOT	United Nations/Department of Transportation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UU	Unrestricted Use
VOC	Volatile Organic Compound
York	York Analytical Laboratories, Inc.

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CERTIFICATION

I, Ryan Manderbach, certify that I am currently a Qualified Environmental Professional as defined in Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375 and that this Remedial Investigation Report (RIR) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

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Ryan Manderbach, CHMM

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1.0 INTRODUCTION

This Remedial Investigation Report (RIR) was prepared on behalf of TCB Beacon East Harlem Limited Partnership (the Volunteer) for The Beacon at 413 East 120th Street in the East Harlem neighborhood of Manhattan, New York (the site). The Volunteer entered the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) to investigate and remediate the site in accordance with a Brownfield Cleanup Agreement (BCA) executed on April 3, 2024, for Site No. C231155.

This RIR summarizes data and findings from the following investigations:

- Phase II Environmental Site Investigation (ESI) conducted on October 6 and 7, 2022 by Langan
- Remedial Investigation (RI) conducted between February 18 and April 15, 2025 by Langan

The RI was conducted in accordance with the NYSDEC-approved October 18, 2024 Remedial Investigation Work Plan (RIWP) prepared by Langan pursuant to NYSDEC Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375, Subparts 375-1, -3.8, and -6.8 (Part 375); NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance for Site Investigation and Remediation, May 2010 (DER-10); New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 with updates (Soil Vapor Guidance); and the NYSDEC Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, April 2023 (April 2023 PFAS Guidelines).

The objectives and goals of the RI were to:

- Define the nature and extent of contamination in all media at the site
- Evaluate whether contamination is emanating from the site
- Generate sufficient data to evaluate the remedial action alternatives and prepare a Remedial Action Work Plan (RAWP)
- Generate sufficient data to evaluate actual and potential threats to human health and the environment, to the extent present

The remainder of this RIR is organized as follows:

- Section 2.0 describes the site setting and physical characteristics
- Section 3.0 describes the site background, including results of previous investigations and identified areas of concern (AOC)
- Section 4.0 presents the RI field procedures
- Section 5.0 describes the RI field observations and analytical results

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- Section 6.0 describes green remediation principles and techniques implemented as per the NYSDEC DER-31: Green Remediation Policy
- Section 7.0 presents a qualitative assessment of the exposure risks of site contaminants to human, fish, and wildlife receptors
- Section 8.0 presents the nature and extent of contamination in sampled media as determined through the field investigation and analysis of environmental samples
- Section 9.0 summarizes the investigation results and presents conclusions based on field observations and analytical results
- Section 10.0 presents the references used in the preparation of this report

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2.0 SITE PHYSICAL CHARACTERISTICS

2.1 Site Description

The approximately 35,000-square-foot (0.80-acre) site is identified as Tax Block 1808, Lot 8 on the Manhattan Borough Tax Map. The site is developed with a 6-story former school building used for offices and community services, and an asphalt parking lot. The building is situated in the southern part of the site and has an area of about 18,300 square feet with a full cellar. The site is bound to the north and east by two 16-story, multi-family residential buildings [New York City Housing Authority Wagner development (Block 1808, Lot 1)]; to the south by East 120th Street, followed by 4- and 6-story residential buildings (Block 1807, Lots 36 through 41, 136, and 138); and to the west by a 10-story, mixed-use commercial and residential building [Acacia Gardens (Block 1808, Lot 7501)]. A Site Location Map and Site Plan are provided as Figure 1 and Figure 2, respectively.

Following a recent rezoning, the New York City (NYC) Planning Commission Zoning Map, indicates the site is located within R8 zoning district, which can range from mid-rise, eight- to ten-story buildings to much taller buildings set back from the street on large zoning lots. New buildings in R8 districts may be developed under either height factor regulations or the optional Quality Housing regulations that often reflect the older, pre-1961 neighborhood streetscape.

2.1.1 Description of Surrounding Properties

The site is located in an urban setting that is characterized by residential, commercial, and mixed-use residential and commercial buildings.

The following table summarizes the surrounding property usage:

Direction	Adjoining Properties				Surrounding Properties
	Block No.	Lot No.	Description	Owner	
North	1808	1	Multi-family residential buildings	NYC Housing Authority	Residential, commercial, and institutional properties
East	1808	1		NYC Housing Authority	
South	1807	143		Paul Durstenberg	
		43		David Aaron	
		7501		Unavailable (Condominium)	
		41		416 East 120 LLC	
		40		RJN Realty LLC	
		39		RJN Realty LLC	
		138		RJN Realty LLC	
		38		424 E 120th Street LLC	
		37		426 HBH LLC	
		136		Nelson Erazo	
		36		William Artis Jr.	
West	1808	7501		Acacia Gardens Housing Development Fund Company	

Major infrastructure (storm drains, sewers, and underground utility lines) exists within sidewalks, streets, and properties surrounding the site. The nearest ecological receptor is the Harlem River, which is located about 800 feet east of the site.

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Land use within a half mile of the site is urbanized and includes residential, commercial, and mixed-use residential and commercial buildings. Sensitive receptors, as defined in DER-10, located within a half mile of the site, include those listed below:

Success Academy Charter School – Harlem 2 – M384 (approximately 0.52 miles to the northwest of the site)
Chief Executive Officer: Eva Moskowitz
144-176 East 128 Street
New York, NY 10035

Kings Academy (The) (approximately 0.49 miles northwest of the site)
Principal: Elder S-A, Streitferdt, Sr.
2345 3rd Avenue
New York, NY 10035

Addie Mae Collins 3 – MASA/Collins Daycare + Lewis Senior (approximately 0.47 miles northwest of the site)
Daycare Director: Diane Spann
2322 3rd Avenue
New York, NY 10035

Harlem Prep Charter School – M708/Touro College – Harlem (approximately 0.25 miles northwest of the
site)
Principal: Bryan Stroud
240 East 123 Street,
New York, NY 10035

P.S. 007 – Samuel Stern – M007 (approximately 0.38 miles west of the site)
Principal: Michelle Martinez
160 East 120th Street,
New York, NY 10035

P.S. 096 Joseph Lanzetta – M096 (approximately 0.28 miles west of the site)
Principal: James Konstantinakos
216 East 120th Street
New York, NY 10035

GED Plus Youth Actions & Homes Program (approximately 0.32 miles west of the site)
Executive Director: Robert Taylor
206 East 118th Street
New York, NY 10035

James Weldon Johnson – M057 (approximately 0.45 miles southwest of the site)
Principal: Yaira Jimenez
176 East 115th Street
New York, NY 10029

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P.S. 155 William Paca/Renaissance School of the Arts – M377 (approximately 0.19 miles southwest of the site)
Principal: Rick Wilson
319 East 117th Street
New York, NY 10035

Harlem Village Academy East Charter School – M335 (approximately 0.09 miles northwest of the site)
Principal: Kimberly Clincy
2351 First Avenue
New York, NY 10035

P.S. 102 Jacques Cartier – M102 (approximately 0.38 miles southwest of the site)
Principal: Erica O Connor
315 East 113th Street
New York, NY 10029

P.S. M169 – Robert F. Kennedy (approximately 0.29 miles southeast of the site)
Principal: Eleyna Rivas
260 Pleasant Avenue
New York, NY 10029

Isaac Newton Middle School for Math & Science – M825 (approximately 0.30 miles southeast of the site)
Principal: Flourin Purice
260 Pleasant Avenue
New York, NY 10029

Mt. Carmel Holy Rosary School (approximately 0.08 miles southeast of the site)
Principal: Trista Rivera
371 Pleasant Avenue
New York, NY 10035

River East Elementary/P.S. 206 Jose Celso Barbosa – M206 (approximately 0.17 miles east of the site)
Principal: Camille Forbes
508 East 120 Street
New York, NY 10035

Surrounding land use within a half mile of the site is shown on Figure 3.

2.1.2 Topography

According to a December 19, 2022, Boundary and Topographic Survey, prepared by Control Point Associates, Inc., elevations in the site parking lot range from about elevation (el) 11.3 along the western part of the site to about el 12.4 in the eastern part of the site[1].

[1] Elevations in this report are with respect to the North American Vertical Datum of 1988 (NAVD88).

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2.1.3 Wetlands and Floodplain

According to the United States Fish & Wildlife Service National Wetlands Inventory and NYSDEC regulated wetlands map, there are no wetlands at the site or adjacent to the site. The Harlem River is about 800 feet east of the site and is identified as an estuarine and marine deep-water wetland with adjacent tidal wetlands.

According to the current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) dated September 5, 2007 (Map No. 3604970091F), the northern and western portion of the site are in Zone AE, which is an area 1% annual chance flood hazard, and the eastern part of the site is in Zone X, which is an area of 0.2% chance annual flood.

2.2 Geology and Hydrogeology

2.2.1 Regional and Site Geology

According to the United States Geological Survey (USGS) 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 (1994), the site is underlain by bedrock of white calcite-dolomite marble (Inwood Marble with lenses of the Hartland Formation), and coarse-grained siliceous dolomite. Soil and bedrock stratigraphy throughout Manhattan typically consists of a layer of fill that overlies glacial till, decomposed unconsolidated bedrock, and bedrock.

During the Phase II ESI and the RI, fill was observed from below the approximately 1-foot-thick concrete building cellar slab to depths up to 6.5 feet below the top of cellar slab (about 9 to 14.5 feet below sidewalk grade [bsg]) within the building footprint and from below ground surface to 15 feet bsg outside of the building footprint. The fill predominantly consists of gray to orangish brown fine- to medium-grained sand with varying amounts of silt, gravel, vegetation, and anthropogenic materials (brick, concrete, glass, slag, and ash). Layers of silt and fine- to medium-grained sand with gravel were observed beneath the fill layer. Bedrock was not encountered during the Phase II ESI or RI. Geological surface features (e.g., rock outcroppings) were not observed at the site. A November 2022 Geotechnical Evaluation Report, prepared by GEO Design, identified bedrock at about 60 feet bsg.

2.2.2 Regional and Site Hydrogeology

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

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Groundwater was encountered at elevations ranging from about el 2.19 to 2.73 (about 0.87 to 9.26 feet below top of casing) during the RI and flows southeast based on gauging during the RI. Groundwater in Manhattan is not used as a potable water source. Potable water is provided by the City of New York and is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

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3.0 SITE BACKGROUND

This section describes historical site use, the proposed redevelopment, and findings from previous environmental investigations. AOCs were developed based on this information and are detailed at the end of the section.

3.1 Historical Site Use

The site was formerly used as a coal and lumber yard from 1897 to 1911. The present-day, 5-story site building was constructed in 1923, used as a school until 1981, and then as a community service center from 1981 to present. The site has been under the ownership and operation of the City of New York since April 6, 1954.

3.2 Proposed Redevelopment Plan

The proposed development will include demolition of the northern and western parts of the current building, construction of a new 21-story affordable housing residential building, and renovation of the portion of the current building to remain. The new building will occupy about 60 percent of the lot area and will include a stormwater detention tank, community space on the 1st floor, and about 254 affordable dwelling units. Renovations of the existing building will include the addition of a sixth floor, and this structure will include an educational greenhouse, basketball court, and community recreation space.

3.3 Previous Reports and Documents

The following previous environmental reports were reviewed as part of this RIR and are summarized below. The reports are included in Appendix A.

- Phase I Environmental Site Assessment (ESA) for 413 East 120th Street, New York, New York, prepared by ALC Environmental, dated June 28, 2022
- Phase II ESI Report for 413 East 120th Street, New York, New York, prepared by Langan, dated February 1, 2023

June 28, 2022, Phase I ESA prepared by ALC Environmental

ALC Environmental completed a Phase I ESA report for the site prior to the site's entry into the NYSDEC BCP. The report identified a recognized environmental condition (REC) related to on-site petroleum bulk storage, including two active, 10,000-gallon No. 2 fuel oil aboveground storage tanks (AST) in the cellar boiler room. NYSDEC Petroleum Bulk Storage (PBS) Database Registration # 2-604478 for the site notes that the in-service ASTs were installed in 1980.

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February 1, 2023, Phase II ESI Report prepared by Langan

Langan completed the Phase II ESI on October 6 and 7, 2022. The Phase II ESI included the following:

- Geophysical survey
- Advancement of six soil borings and collection and laboratory analysis of 10 soil samples, including one duplicate
- Installation of two temporary groundwater monitoring wells, and collection and laboratory analysis of three groundwater samples, including one duplicate
- Installation of four soil vapor points (two sub-slab and two subsurface), and collection and laboratory analysis of four soil vapor samples, two indoor air samples, and one ambient air sample

Field observations and laboratory analytical results are summarized below:

- The geophysical survey identified anomalies resembling an out-of-use utilities pit in the northern central part of the site and an about 3,000-square-foot vault north of the site building and adjoining the cellar boiler room. Two active fill lines and one cut/capped fill line were observed northwest of the boiler room. Anomalies resembling potential underground storage tanks (UST) were not identified.
- A layer of fill was observed beneath the surface cover to depths of up to 3 feet below cellar slab (about 13 feet bsg) within the building footprint and about 3 to 8 feet bsg outside of the building footprint. The fill generally consisted of fine-to-medium-grained sand, with varying amounts of silt, gravel, brick, and concrete. Layers of silt and fine-to-medium-grained sand with fine gravel, and coarse sand were observed beneath the fill layer.
- Tar-like material (presumed waterproofing) was observed in soil below the concrete cellar slab. The material exhibited a maximum photoionization detector (PID) response of 350.6 parts per million (ppm) in the northern part of the building cellar and was observed at each interior boring location between about 1 and 2 feet below the slab.
- Groundwater was observed at depths of about 10 to 12 feet bsg.
- Soil analytical results:
    - The volatile organic compound (VOC) naphthalene exceeded NYSDEC 6 NYCRR Part 375 Restricted Use – Restricted Residential (RURR) soil cleanup objectives (SCO) in a soil sample collected from below the cellar slab.
    - Several semivolatile organic compounds (SVOC), specifically polynuclear aromatic hydrocarbons (PAHs), were reported at concentrations above

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Unrestricted Use (UU) and RURR Soil Cleanup Objectives (SCOs) throughout most of the site at depths between about 3 to 13 feet bsg.
    - The metals lead, mercury, and zinc exceeded UU and/or RURR SCOs throughout the site to depths between 1 and 5 feet bsg.

- Groundwater analytical results:
    - The VOC naphthalene exceeded the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS) and Guidance Values for Class GA groundwater (collectively referred to as SGVs).
    - Several SVOCs were reported above the SGVs.
    - Two PFAS exceeded the NYSDEC guidance values; however, soil results and the site history do not indicate an on-site source of PFAS.
- Petroleum-related and chlorinated VOCs were detected in subsurface and sub-slab vapor, as well as indoor air. No regulatory standards currently exist for sub-slab soil vapor samples in New York State.

3.4 Summary of Pre-Remedial Investigation Areas of Concern

The following areas of concern (AOCs) were identified during the Phase I ESA and Phase II ESI and were investigated during the RI:

AOC 1: Tar-like Impacts to Soil and Groundwater

Tar-like staining, odors, and organic vapor readings above background were encountered in three soil borings located within the building footprint. A maximum PID reading of 350.6 ppm was recorded in the stained and odorous soil. Naphthalene exceeded the RURR SCO at about 1 to 3 feet below the cellar slab in the northeast part of the building (about 11 to 13 feet bsg) and was detected at a maximum concentration of 180 µg/l in groundwater, exceeding the SGV. SVOCs in soil at this location also exceeded RURR SCOs.

AOC 2: SVOC and Metal Impacts in Fill

SVOCs, specifically PAHs, and/or the metals lead, mercury, and zinc were identified in soil samples at concentrations above their respective RURR SCOs throughout most of the site at depths to about 5 to 13 feet bsg.

AOC 3: Vault

A vault was identified in the northern part of the site during the Phase II ESI, and the contents and use of the vault were not determined.

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4.0 REMEDIAL INVESTIGATION

The RI was implemented between February 18 and April 15, 2025 to investigate AOCs, determine the nature and extent of contamination in soil, groundwater, soil vapor and indoor air, evaluate the nature of any impacts emanating from the site, and to design a remedy that will be protective of human health and the environment.

Langan completed the BCP RI in accordance with the NYSDEC-approved October 18, 2024 RIWP, prepared by Langan; 6 NYCRR Part 375-3.8; NYSDEC DER-10 (May 2010); the NYSDEC Draft BCP Guide (May 2004); the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates); and the Sampling, Analysis and Assessment of PFAS under NYSDEC's Part 375 Remedial Programs, dated April 2023.

The RI included the following activities:

Geophysical Survey

- Completed a site-wide geophysical survey to clear sample locations and identify potential subsurface utilities and structures, including USTs. Sample locations were relocated as needed, based on the findings of the geophysical survey and other available utility information.

Soil Boring Advancement and Sampling

- Advanced 15 soil borings throughout the site. Soil borings that were converted to groundwater monitoring wells were advanced to about 5 feet below the observed groundwater interface.
- Continuously screened recovered soil for environmental impacts using visual and olfactory methods and with a PID equipped with a 10.6 electron volt (eV) lamp.
- Collected of up to three samples from each soil boring, for a total of 32 samples (plus quality assurance/quality control [QA/QC] samples) for laboratory analysis. Samples for laboratory analysis were collected from within fill, terminus of fill, the groundwater interface, soil/fill that exhibited evidence of a chemical or petroleum release, and/or the clean interval below soil/fill that exhibited evidence of a chemical or petroleum release (if observed).

Vault Evaluation

- Further evaluated a sub-grade vault below the north-central parking area by opening accessible, unsealed hatches to inspect vault contents and general construction type.

Monitoring Well Installation and Sampling

- Installed nine groundwater monitoring wells.
- Developed groundwater monitoring wells by surging and pumping upon installation.

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- Collected one groundwater sample from each monitoring well, for a total of 9 samples (plus quality QA/QC samples) for laboratory analysis.
- Surveyed and gauged the monitoring wells to measure groundwater elevation and evaluate flow direction.

Soil Vapor Sampling

- Installed five sub-surface soil vapor points to about one foot above groundwater and five sub-slab vapor points immediately below the cellar slab.
- Collected one soil vapor sample from each point, for a total of 10 samples for laboratory analysis.
- Collected four indoor air samples co-located with sub-slab soil vapor points.
- Collected one outdoor ambient air sample for each day sub-slab and/or soil vapor samples were collected.

A sample summary is included as Table 1, and sample locations, including Phase II ESI and RI sample locations, are shown on the AOC and Sample Location Map – Pre-RI, included as Figure 4.

4.1 Geophysical Survey and Utility Location

Prior to ground-intrusive sampling, the New York City 311 utility mark-out system (Udig) was contacted for Code 753 utility mark-outs. On February 18, 2025, NOVA Geophysical Services (NOVA) conducted a geophysical survey using ground penetrating radar and electromagnetic detection equipment to document potential subsurface utilities, USTs, and subsurface anomalies at proposed investigation locations. The geophysical survey was limited to accessible areas throughout the site; parked cars and miscellaneous storage and debris limited coverage throughout the site exterior and mechanical equipment and miscellaneous storage limited coverage throughout the on-site building cellar. A copy of the geophysical survey report is included in Appendix B.

4.2 Soil Investigation

4.2.1 Soil Investigation Methodology

Langan field personnel documented the advancement of 15 soil borings by AARCO Environmental Services, Inc. (AARCO) of Lindenhurst, New York, from February 18 through April 4, 2025. Boring locations were selected to investigate the AOCs listed in Section 3.4. Select soil borings within the building cellar (SB07, SB08, SB16, SB17, and SB22A) were advanced using a hand auger. Remaining soil borings were advanced using a hand auger (for hand clearance) for about the first 5 feet, and a Geoprobe 420M (SB15 and SB18) and/or a Geoprobe 8140LC Sonic drill rig (SB09 through SB14, and SB23). Borings were advanced from surface grade to depths ranging from about 5 to 10 feet below the top of cellar slab (about 13 to 18 feet bsg) within the

building footprint and from about 5 to 35 feet bsg outside the building footprint. Boring locations are shown on Figure 4.

Soil was recovered continuously from the surface to the termination depth of each boring via hand auger, 4.5-foot-long macrocore with acetate liners (Geoprobe 420M), or 5-foot-long bag sampler (Geoprobe 8140LC Sonic). The soil was screened for visual, olfactory, and instrumental evidence of a chemical or petroleum release, and visually classified for soil type, grain size, texture, and moisture content. Instrument screening for the presence of organic vapors was performed using a PID equipped with a 10.6 electron volt (eV) lamp. Following sample collection, borings that were not converted to groundwater monitoring wells were backfilled with soil cuttings that did not display evidence of environmental impacts, grout, and/or clean No. 2 sand, and restored to match the pre-investigation conditions (i.e., patched at grade with concrete and/or asphalt). RI soil boring logs are included in Appendix C.

4.2.2 Soil Sampling and Analysis

Thirty-two soil samples, plus QA/QC samples, were collected and submitted for laboratory analysis. Up to three grab soil samples were collected for laboratory analysis from each boring location, depending on the depth of refusal and field screening observations, to investigate AOCs and to provide vertical and horizontal delineation of identified impacts. Samples were collected to represent the following intervals:

1. Shallow fill/soil
2. Terminus of fill (if observed)
3. At the groundwater interface (if no impacts observed)
4. Soil that exhibited evidence of a chemical or petroleum release (if observed)
5. Clean interval below observed impacts (if observed)

Samples submitted for the analysis of VOCs were collected directly from undisturbed soil retained from the hand auger, bag sampler, or acetate liner into laboratory-supplied TerraCore soil samplers. The remaining sample volume was homogenized and placed in laboratory-supplied containers for additional analyses. The sample containers were labeled, placed in a laboratory-supplied cooler, packed on ice (to maintain a temperature of about 4° C), and picked up and delivered via courier service to York Analytical Laboratories, Inc. (York) under standard chain-of-custody protocol for analysis using the latest United States Environmental Protection Agency (USEPA) methods. York is a NYSDOH Environmental Laboratory Approval Program-certified laboratory located in Stratford, Connecticut.

Soil samples were analyzed for the following:

- Part 375 List and Target Compound List (TCL) VOCs
- Part 375 List and TCL SVOCs

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- Part 375 List Polychlorinated biphenyls (PCB)
- Part 375 List and TCL Pesticides
- Part 375 List and TCL Herbicides
- Target Analyte List (TAL)/Part 375 List metals, including hexavalent and trivalent chromium and total cyanide
- NYSDEC List PFAS

4.2.3 Vault Evaluation

Langan conducted a further evaluation of a sub-grade vault below the north-central parking area. Accessible, unsealed hatches were opened to inspect vault contents and general construction type. Due to safety concerns, the vault interior was observed from an entryway located within the northern part of the cellar boiler room. The vault appeared to be a crawl space containing foundation elements and heating, ventilation, and air conditioning (HVAC) ductwork. Langan screened the air space at the entryway of the vault using a PID; no readings above background were observed. No visible contaminants or areas of concern were observed; therefore, additional sampling within or adjacent to the vault was not warranted.

4.3 Groundwater Investigation

4.3.1 Monitoring Well Installation and Development Methodology

Nine of the soil borings were converted into permanent groundwater monitoring wells (MW07, MW09, MW10, MW12, MW14, MW16, MW18, MW22, and MW23). Monitoring well locations are shown on Figure 4.

Monitoring wells were installed to depths ranging from 5.25 feet below the top of cellar slab (about 13.25 feet bsg) to 17 feet bsg. Monitoring wells were constructed by installing 5 feet of 2-inch-diameter, 0.01-inch-slot polyvinyl chloride (PVC) screen with pre-packed 20/40 mesh sand (MW07, MW16, MW18, and MW22) or 10 feet of 2-inch-diameter, 0.01-inch-slot PVC screen at termination depth, followed by solid PVC riser (MW09, MW10, MW12, MW14, and MW23). The annulus of each non-prepacked monitoring well was filled with a filter consisting of No. 2 sand. Each monitoring well was sealed with hydrated bentonite and the wells were finished with a concrete pad and an 8-inch manhole cover. A table including additional monitoring well construction details and monitoring well construction logs are included in Appendix D.

Following installation, the monitoring wells were surged and developed with a submersible whale pump until the water became clear. Purged development water was containerized in labeled United Nations/Department of Transportation (UN/DOT)-approved 55-gallon drums that were staged on site pending future off-site disposal to a facility permitted to accept the waste.

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4.3.2 Monitoring Well Survey and Gauging

Langan surveyed the top of the well casing elevations of the nine permanent monitoring wells on June 20, 2025. Vertical control was established relative to the North American Vertical Datum of 1988 (NAVD88) by a New York State-licensed land surveyor. Elevations of the wells were surveyed to the nearest 0.01 foot. The monitoring wells were gauged for non-aqueous phase liquids (NAPL), and groundwater levels were measured with a Solinst oil-water interface probe between March 18 and April 15, 2025. Groundwater elevations are included in Table 2.

4.3.3 Groundwater Sampling and Analysis

Groundwater sampling was completed from March 18 through April 15, 2025, at least one week following well development. One groundwater sample was collected from each monitoring well. Samples were collected in accordance with the USEPA low-flow groundwater sampling procedure ("Low Stress [low-flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells," dated July 30, 1996, and revised September 19, 2017) to allow for the collection of representative samples. Groundwater samples were collected with a peristaltic pump with dedicated high-density polyethylene tubing. Prior to sample collection, groundwater was purged from each well while monitoring physical and chemical groundwater parameters (i.e., pH, conductivity, turbidity, dissolved oxygen, temperature, and oxidation-reduction potential). Groundwater was purged until physical and chemical groundwater parameters stabilized or until the well was purged for one hour, whichever was sooner. An exception was made for well MW22 where an oil sheen was observed; monitoring equipment was not used for this well to prevent equipment damage. Three well volumes of groundwater were purged from MW22 prior to sampling and water appeared clear at the time of sampling.

Groundwater sampling logs are included in Appendix D. Purged water was containerized in labeled UN/DOT-approved 55-gallon drums that were staged on site for future off-site disposal to a facility permitted to accept the waste.

Twenty groundwater samples (including QA/QC groundwater samples) were collected in laboratory-supplied containers, sealed, labeled, placed in a laboratory-supplied cooler, packed on ice (to maintain a temperature of about 4° C), and picked up and delivered via courier service to York under standard chain-of-custody protocol for analysis using the latest USEPA methods.

Groundwater samples collected from the on-site monitoring wells installed during the RI were analyzed for the following:

- Part 375 and TCL VOCs
- Part 375 and TCL SVOCs
- Part 375 and TCL PCBs

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- Part 375 and TAL total and dissolved metals (including hexavalent and trivalent chromium and total cyanide)
- Part 375 and TCL pesticides
- Part 375 and TCL and herbicides
- NYSDEC list PFAS
- 1,4-dioxane

4.4 Soil Vapor and Indoor Air Investigation

A soil vapor intrusion evaluation was completed in accordance with the Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH October 2006, with updates). The evaluation included sub-slab soil vapor samples, sub-surface soil samples, indoor air samples, and outdoor ambient air samples. Prior to collecting samples, an Indoor Air Quality Questionnaire and Building Inventory from (Appendix B in the NYSDOH 2006) was completed to identify potential sources of interference. Samples were relocated as necessary to avoid interference from products stored within the building. The Indoor Air Quality Questionnaire and Building Inventory is included in Appendix E.

4.4.1 Soil Vapor Point Installation and Methodology

Langan field personnel documented the installation of six sub-slab soil vapor points (SS07 and SS17 through SS21) and four subsurface soil vapor points (SV09, SV10, SV12, and SV13) from February 19 through March 22, 2025. Sub-slab and sub-surface soil vapor points were installed using a hand auger, a hammer drill, and/or a Geoprobe 8140LC Sonic drill rig to either immediately below the existing cellar slab or to depths of up to 7 feet bsg.

Sub-surface soil vapor points consisted of 2-inch polyethylene implants threaded into 1/4-inch-diameter Teflon-lined polyethylene tubing. The annulus of each subsurface soil vapor point was filled with No. 2 sand to about 1 foot above the bottom of the probe, then sealed to the surface with hydrated bentonite. The sub-slab vapor samples were constructed by advancing 1/4-inch-diameter Teflon-lined polyethylene tubing immediately below the bottom of the cellar slab within the building (about 1 foot below the top of cellar slab). No. 2 sand was backfilled around the tubing annulus from 6 inches to about 2.5 inches below the bottom of the slab then sealed to the surface with hydrated bentonite.

Following sample collection, sub-slab and subsurface soil vapor points were removed, boreholes were backfilled with clean sand or soil cuttings that did not display evidence of environmental impacts, and the ground was restored flush to the existing grade consistent with the surrounding surface cover (e.g., concrete or asphalt).

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4.4.2 Soil Vapor Sampling and Analysis

Sub-slab soil vapor samples and indoor air samples were collected on March 11, 2025. Sub-surface soil vapor samples were collected on March 29, 2025. As a QA/QC measure, a helium tracer gas was introduced into an above-grade sampling chamber to verify that the soil vapor points were properly sealed above the target sampling depth, thereby preventing subsurface infiltration of ambient air both before and after sampling. Concentrations of less than 10 percent helium in the sampling tube were considered sufficient to verify a tight seal at each sample point.

Prior to sample collection, each soil vapor probe was purged using a MultiRAE PID at a rate of 0.2 liters per minute to evacuate a minimum of three sample volumes. The purged soil vapor was also monitored for VOCs. Indoor air sample locations were also screened for VOCs prior to sample collection. Soil vapor and indoor air samples were collected into laboratory-supplied, batch-certified, 6-liter Summa canisters equipped with eight-hour sample interval flow controllers. For QA/QC purposes, two ambient air samples were collected, one per sampling event. Indoor and ambient air samples were collected from at least 3 feet above ground. After sample collection, canisters were sealed, labeled, and transported via courier service to York for analysis of VOCs by USEPA Method TO-15.

Soil vapor samples were not collected from two sub-slab vapor points (SS17 and SS18) due to issues encountered with the Summa canisters. Although the regulators were activated, the laboratory reported the vacuums in the canisters were -29.92 inches of mercury [inHg] for SS17_031125 and -29.85 inHg for SS18_031125), indicating no samples were collected from these sub-slab vapor points. Soil vapor point construction and air sampling logs are included in Appendix E.

4.5 Quality Assurance/Quality Control Sampling

During the RI, field blanks, trip blanks, field duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, and ambient air samples were collected and submitted for laboratory analysis. QA/QC samples included the following:

<u>Soil QA/QC samples</u>

- Three field duplicate samples
- Three MS/MSD samples
- One field blank sample

<u>Groundwater QA/QC samples</u>

- One field duplicate sample
- One MS/MSD duplicate sample
- One field blank sample

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- Four PFAS field blank samples
- Four trip blank samples

Soil Vapor Samples

- Two outdoor ambient air samples

Field duplicates were collected to assess the precision of the analytical methods relative to the sample matrix. Duplicates were collected from the same material as the primary sample by splitting the volume of a homogenized sample collected in the field into two sample containers.

Trip blank samples were collected to assess the potential for contamination of the sample containers and samples during the trip from the laboratory to the field, and back to the laboratory for analysis. Trip blanks contain approximately 40 milliliters of acidic water (doped with hydrochloric acid) that is sealed by the laboratory when the empty sample containers are shipped to the field, and unsealed and analyzed by the laboratory when the sample shipment is received from the field. The trip blank samples were analyzed for VOCs.

Field blank samples were collected to determine the effectiveness of the decontamination procedures for the groundwater sampling equipment train and the cleanliness of unused neoprene gloves and acetate liners used to collect soil samples. Field blank samples consisted of deionized, distilled water provided by the laboratory that passed through the sampling apparatus. Field blank samples were analyzed for the same lists as the corresponding sampling event and sample matrix.

MS/MSD samples were collected to assess the effect of the sample matrix on the recovery of target compounds or target analytes and the accuracy of the analytical methods relative to the sample matrix. MS/MSD samples were collected from the same material as the primary sample by splitting the volume of the homogenized sample collected in the field into three sample containers.

Ambient air samples were collected to assess ambient air conditions and determine whether conditions during soil vapor sampling could have potentially interfered with sampling results. The ambient air samples were analyzed for the same parameter list as the soil vapor samples.

4.6 Data Validation

The Phase II ESI and RI laboratory analytical data were validated by a Langan data validator in accordance with USEPA and NYSDEC validation protocols. Copies of the data usability summary reports (DUSR) and the data validator's credentials are included in Appendix F.

4.6.1 Data Usability Summary Report Preparation

A DUSR was prepared for each sampling matrix. The DUSR presents the results of data validation, including a summary assessment of laboratory data packages, sample preservation

and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

For each of the organic analytes, the following was assessed:

- Holding times
- Instrument tuning
- Instrument calibration
- Blank results
- System monitoring compounds or surrogate recovery compounds (as applicable)
- Internal standard recovery results
- MS/MSD analytical results
- Target compound identification
- Chromatogram quality
- Pesticide cleanup (if applicable)
- Compound quantization and reported detection limits
- System performance
- Analytical results verification

For each of the inorganic analytes, the following was assessed:

- Holding times
- Calibrations
- Blank analytical results
- Interference check sample
- Laboratory check samples
- Duplicates
- Matrix Spike
- Inductively Coupled Plasma (ICP) Atomic Emission Spectrometry QC
- ICP serial dilutions
- Analytical results verification and reported detection limits

Based on the results of data validation, the validated analytical results reported by the laboratory were assigned one of the following usability flags:

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- "J" – The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample
- "UJ" – The analyte was not detected at a level greater than or equal to the reporting limit (RL); however, the reported RL is approximate and may be inaccurate or imprecise
- "U" – The analyte was analyzed for, but was not detected at a level greater than or equal to the RL, or the sample concentration for results was impacted by blank contamination

After data validation was complete, validated data was used to prepare the tables and figures included in this report.

4.7 Air Monitoring

Worker and community air monitoring was conducted during ground-intrusive sampling pursuant to the Community Air Monitoring Plan (CAMP) (Appended to the RIWP). Ground-intrusive work was limited to hand clearance and direct-push boring advancement, and soil vapor point and well installation. Air monitoring results were downloaded from field instruments and summarized in daily reports.

4.7.1 Worker Air Monitoring

Air monitoring of the breathing zone was performed periodically during ground-intrusive activities to document health and safety protection for the field team. Langan monitored VOCs with a PID in accordance with the site-specific Health and Safety Plan ([HASP]; Appended to the RIWP).

4.7.2 Community Air Monitoring Plan

In addition to air monitoring in the workers' breathing zone, community air monitoring was performed in compliance with the CAMP during any indoor and outdoor intrusive work.

The CAMP consisted of continuous monitoring for VOCs and dust emissions during ground-intrusive activities (e.g., soil boring, soil vapor point, and monitoring well installation). Upwind concentrations were measured at the start of each workday to establish background concentrations and continuously thereafter. VOCs and dust emissions were monitored at the downwind perimeter of the work zone, which was established at a point on the site where the general public or site employees may be present. VOC monitoring was conducted with a PID equipped with a 10.6 eV lamp. Dust emissions were monitored using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM10) and capable of averaging 15 minutes (or less) for comparison to the airborne particulate action level.

PM10 and VOC concentrations were not reported above the action levels established in the CAMP. CAMP data and daily site observation reports are included in Appendix G and Appendix H, respectively.

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4.8 Field Equipment Decontamination

Handheld sampling equipment, including the hand auger, interface probe, water quality meter, and well development and sampling pumps, was decontaminated by hand using an Alconox-based solution and triple rinsed with PFAS-free distilled water. Liquids were temporarily contained in 5-gallon buckets, and between rinses, equipment was placed such that contact with the ground was avoided. Decontamination wastewater was containerized in labeled UN/DOT-approved 55-gallon drums that were staged on site pending future off-site disposal to a facility permitted to accept the waste.

4.9 Investigation-Derived Waste Management

Investigation-derived waste (IDW), including excess soil/drill cuttings, purged groundwater, and decontamination wastewater generated during the RI, was placed into UN/DOT-approved 55-gallon steel drums with sealed tops. The drums were profiled and transported off-site by AARCO on July 17, 2025 for disposal at the Dale Transfer Corp. facility. Copies of the disposal manifests are included in Appendix I.

4.10 Work Plan Deviations

The following are deviations from the RIWP and supporting rationale:

- Only two soil samples were collected from exterior soil borings SB09, SB10, and SB11 because the terminus of fill and the groundwater interface were encountered at the same depth and there were no observed impacts.
- A monitoring well was not installed at the proposed location of SB22 because the boring could not be advanced further than 5 feet below grade due to concerns about subsurface utilities observed during the geophysical survey and hand clearance of the soil borings. Alternatively, MW22 was relocated and installed inside the on-site building footprint (SB22A) (communicated to the NYSDEC via a phone call on March 20, 2025 and NYSDEC concurred via email on March 21, 2025).
- Monitoring well construction details differed from the proposed monitoring well construction details provided in Table 2A of the RIWP for monitoring wells installed inside the building cellar (MW07, MW16, MW18, and MW22). Changes in monitoring well construction details for MW07, MW16, and MW18 were due to the limitations of the remote access direct push drill rig, which was unable to accommodate the borehole diameter and filter pack thickness originally specified in the RIWP; however, the 2-inch well diameter specified in the RIWP was maintained. Changes in monitoring well construction details for MW22 were also a result of the relocation of the monitoring well from an exterior, landscaped area to inside the building cellar (communicated to the NYSDEC via a phone call on March 20, 2025).

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- Soil vapor samples were not collected from two sub-slab vapor points (SS17 and SS18) due to issues encountered with the Summa canisters. Although the regulators were activated, the laboratory reported the vacuums in the canisters were -29.92 inches of mercury [inHg] for SS17_031125 and -29.85 inHg for SS18_031125), indicating no samples were collected from these sub-slab vapor points. Sub-slab soil vapor samples SS07, SS19, SS29, and SS21 and indoor air samples IA19, IA20, and IA21 were collected over a 6 hour and 28 minute to 6 hour and 47 minute time range, rather than the original 8-hour sampling time proposed in the RIWP. This was a result of site access limitations; however, the pressure upon receipt measured by York for each of the canisters indicated a sufficient sample was collected from each sample location. In addition, data collected from these sub-slab soil vapor and indoor air samples were determined to be 100% valid.

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5.0 FIELD OBSERVATIONS AND ANALYTICAL RESULTS

This section summarizes the RI field observations and laboratory analytical results. This summary includes data generated during the 2022 Phase II ESI. Soil analytical results are compared to the Part 375 UU, RURR, and Restricted Use Commercial (CU) SCOs. Groundwater analytical results are compared to the NYSDEC Part 375 SGVs and the "Sampling, Analysis, and Assessment of PFAS under NYSDEC's Part 375 Remedial Programs", dated April 2023. No regulatory standards currently exist for soil vapor samples in New York State. The nature and extent of contamination are discussed in Section 8.0.

A summary of Phase II ESI and RI soil, groundwater, and soil vapor samples is included in Table 1. Copies of the laboratory analytical reports are included in Appendix J. Summaries of the analytical results for the soil, groundwater, and soil vapor samples are provided in the following tables:

- Table 3: Soil Sample Analytical Results
- Table 4: Groundwater Sample Analytical Results
- Table 5: Subsurface Soil Vapor Sample Analytical Results
- Table 6: Sub-Slab Soil Vapor and Indoor Air Sample Analytical Results
- Table 7: QA/QC Sample Analytical Results

5.1 Geophysical Survey Findings

A geophysical survey was conducted across accessible areas of the site, to the extent feasible; parked cars and miscellaneous storage and debris limited coverage throughout the site exterior and mechanical equipment and miscellaneous storage limited coverage throughout the on-site building cellar. Anomalous findings, as interpreted by NOVA, are summarized below:

- Subsurface anomalies resembling various utilities (e.g., gas, water, sewer) were identified on site.
- A scattered anomaly was observed in the western part of the exterior parking lot; it was determined that the anomaly did not resemble a UST and may have indicated a buried structure.

Borings were relocated as necessary to avoid subsurface utilities or other impediments identified during the survey. A copy of the geophysical survey report is included as Appendix B.

5.2 Geology and Hydrogeology

Geologic and hydrogeologic observations are described below. Soil boring logs are included in Appendix C.

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5.2.1 Geology

Fill, predominantly consisting of gray to orangish brown fine- to medium-grained sand with varying amounts of silt, gravel, vegetation, and anthropogenic materials (brick, concrete, glass, slag, and ash), was encountered from below the approximately 1-foot-thick concrete building cellar slab to depths up to 6.5 feet below the top of cellar slab (about 9 to 14.5 feet bsg) within the building footprint and from below ground surface to 15 feet bsg outside of the building footprint. A 5-foot subsurface layer of concrete was observed from about 5.5 to 10 feet bsg at soil boring SB11, in the northern part of the site. Gray to orange or red to brown fine- to medium-grained sand, with varying amounts of silt, gravel and vegetation, was encountered beneath the fill. Bedrock was not encountered during the investigation but is estimated at about 60 feet bsg. Subsurface profiles are provided as Figures 5A and 5B.

5.2.2 Hydrogeology

Groundwater measurements were collected between March 18 and April 15, 2025 from monitoring wells installed during the RI. Groundwater was encountered at elevations ranging from about el 2.19 to 2.73 (about 8.87 to 9.26 feet bsg). The results of the elevation gauging event and the groundwater elevation summary are presented in Table 2 and groundwater contours are included on Figure 6.

5.3 Soil Findings

5.3.1 Field Screening Observations

Environmental impacts, evidenced by odors, staining, and/or PID readings above background, observed during the Phase II ESI and RI are summarized below:

Event	Boring ID	Evidence of Impacts	Depth of Impacts	Maximum PID Reading
Phase II ESI	SB04	Tar-like material on soil beneath cellar slab	9 to 15 feet bsg	350.6 ppm at 10 feet bsg
	SB05	Tar-like material on soil beneath cellar slab	9 to 13 feet bsg	259.1 ppm at 10 feet bsg
	SB06	Tar-like material on soil beneath cellar slab	9 to 15 feet bsg	149.2 ppm at 10 feet bsg
RI	SB15	Positive sheen test/tar-like staining and PID readings above background on soil beneath cellar slab	9 to 11 feet bsg	30.5 ppm at 10.5 feet bsg
		Naphthalene-like odor, gray to tar-like staining, and PID readings above background on soil beneath cellar slab	9 to 14 feet bsg	41.2 ppm at 13 feet bsg

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Event	Boring ID	Evidence of Impacts	Depth of Impacts	Maximum PID Reading
	SB16	PID readings above background	9 to 13 feet bsg	4.9 ppm at 9.5 feet bsg
	SB17	PID readings above background	9 to 13 feet bsg	5.3 ppm at 9.5 feet bsg
	SB18	Naphthalene-like odor, tar-like staining, and PID readings above background	9 to 13 feet bsg	29.3 ppm at 9.5 feet bsg
		PID readings above background	13 to 18 feet bsg	9.1 ppm at 13.5 feet bsg
	SB22A	Naphthalene-like odor and PID readings above background	9 to 13 feet bsg	47.7 ppm at 12.5 feet bsg

5.3.2 Analytical Results

Soil sample analytical results were compared to the NYSDEC Part 375 UU, RURR and CU SCOs and Guidance Values. A summary of laboratory detections for Phase II ESI and RI soil samples is included in Table 3 and shown on Figures 7A, 7B, and 7C. Copies of the analytical laboratory reports are included in Appendix J.

The following is a summary of soil sample analytical results from the Phase II ESI and the RI that exceed the UU, RURR and/or CU SCOs/Guidance Values, organized by analytical parameter set.

VOC

Four VOCs were detected above the UU and/or RURR SCOs in the Phase II ESI and RI samples. VOCs were not detected above the CU SCOs. The following table provides details on VOC concentrations above the SCOs. The VOC concentration above the RURR SCO is shown in **bold**.

Analyte	UU SCOs (mg/kg)*	RURR SCOs (mg/kg)	CU SCOs (mg/kg)	Minimum Detected Concentration above SCOs (mg/kg)		Maximum Detected Concentration above SCOs (mg/kg)	
Acetone	0.05	100	500	0.072	SB08 _2-4	0.098	SB18_2-4
Benzene	0.06	4.8	44	0.072	SB04_1-3	0.074	SB06_1-3
Naphthalene	12	100	500	**180**	SB05_1-3	180	SB05_1-3
Total Xylenes	0.26	100	500	0.62	SB06_1-3	1.9	SB04_1-3

*mg/kg = milligrams per kilogram

Note: SB-05_1-3 was collected during the Phase II. Naphthalene was only reported as an SVOC (discussed below) during the RI.

SVOCs

Twelve SVOCs were detected above the UU, RURR, and/or CU SCOs in Phase II ESI and RI samples. The following table provides details on SVOC concentrations above the SCOs. SVOC

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concentrations above the RURR SCOs are shown in **bold** and concentrations above the CU SCOs are underlined.

Analyte	UU SCOs (mg/kg)	RURR SCOs (mg/kg)	CU SCOs (mg/kg)	Minimum Detected Concentration above SCOs (mg/kg)		Maximum Detected Concentration above SCOs (mg/kg)	
2-Methylphenol (o-Cresol)	0.33	100	500	0.524	DUP01_021925	0.65	SB15 _0-2
3 & 4 Methylphenol (m&p Cresol)	0.33	100	500	0.72	SB05_1-3	1.29	SB15 _0-2
Benzo(a)anthracene	1	1	5.6	**1.35**	SB17_0-2	**<u>24.4</u>**	DUP02_021925
Benzo(a)pyrene	1	1	1	**<u>1.17</u>**	SB17_0-2	**<u>18.2</u>**	DUP02_021925
Benzo(b)fluoranthene	1	1	5.6	**1.05**	SB17_0-2	**<u>17</u>**	SB05_1-3
Benzo(k)fluoranthene	0.8	3.9	56	0.97	SB01_3-5	**15.9**	DUP02_021925
Chrysene	1	3.9	56	1.28	SB17_0-2	**21.8**	DUP02_021925
Dibenz(a,h)anthracene	0.33	0.33	0.56	**0.366**	SB22 _0-2	**<u>2.48</u>**	DUP02_021925
Dibenzofuran	7	59	350	10	SB05_1-3	10	SB05_1-3
Indeno(1,2,3-cd)pyrene	0.5	0.5	5.6	**0.502**	SB18_0-2	**<u>10</u>**	DUP02_021925
Naphthalene	12	100	500	12.6	SB15 _0-2	41	SB05_1-3
Phenol	0.33	100	500	0.798	SB15 _0-2	0.847	DUP01_021925

Pesticides

One pesticide, 4,4'-DDT, was detected above the UU SCOs, but below the RURR and CU SCOs in one RI sample. The following table provides details on the pesticide concentration above the UU SCO.

Analyte	UU SCOs (mg/kg)	RURR SCOs (mg/kg)	CU SCOs (mg/kg)	Minimum Detected Concentration above SCOs (mg/kg)		Maximum Detected Concentration above SCOs (mg/kg)	
4,4'-DDT	0.0033	7.9	47	0.00595	SB09_0-2	0.00595	SB09_0-2

Herbicides and PCBs

Herbicides and PCBs were not detected in soil samples at concentrations exceeding UU, RURR and/or the CU SCOs.

Metals

Six metals were detected above the UU, RURR, and/or CU SCOs in Phase II ESI and RI samples. The following table provides details on metal concentrations above the SCOs. Metal concentrations detected above the RURR SCOs are shown in **bold** and concentrations above the CU SCOs are underlined.

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Analyte	UU SCOs (mg/kg)	RURR SCOs (mg/kg)	CU SCOs (mg/kg)	Minimum Detected Concentration above SCOs (mg/kg)		Maximum Detected Concentration above SCOs (mg/kg)	
Barium	350	400	400	**458**	SB09_0-2	**458**	SB09_0-2
Chromium, Hexavalent	1	110	400	1.24	SB14_10-12	1.25	SB18_8-10
Copper	50	270	270	78.4	SB09_0-2	78.4	SB09_0-2
Lead	63	400	1000	64.7	SB18_0-2	**1100**	SB17_0-2
Mercury	0.18	0.81	2.8	0.185	DUP01_021925	**5.99**	SB12_0-2
Zinc	109	10000	10000	130	SB07 _0-2	429	SB09_0-2

PFAS (21-compound list)

Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) results are compared to the UU, RURR, and CU Guidance Values provided in the NYSDEC guidance document "Sampling, Analysis and Assessment of PFAS under NYSDEC's Part 375 Remedial Programs", dated April 2023. Two PFAS were detected above UU SCOs, but below RURR and CU SCOs in one RI sample. The following table provides details on PFAS concentrations above UU SCOs.

Analyte	UU SCOs (mg/kg)	RURR SCOs (mg/kg)	CU SCOs (mg/kg)	Minimum Detected Concentration above SCOs (mg/kg)		Maximum Detected Concentration above SCOs (mg/kg)	
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.044	0.44	0.00288	SB22 _0-2	0.00288	SB22 _0-2
Perfluorooctanoic Acid (PFOA)	0.00066	0.033	0.5	0.000698	SB22 _0-2	0.000698	SB22 _0-2

5.4 Groundwater Findings

5.4.1 Field Screening Observations

PID headspace readings during the Phase II and RI were recorded above background levels at MW03 (54.5 ppm), MW04 (137.2 ppm), MW18 (55.5 ppm), and MW22 (109.4 ppm). Three of the four wells (MW04, MW18, and MW22) coincide with boring locations were tar-like material (presumed waterproofing) was observed below the cellar slab. On-site monitoring wells were gauged for NAPL with an oil-water interface probe between March 18 and April 15, 2025. No NAPL was observed; however, a petroleum-like odor and tar-like sheen were observed at MW22. Groundwater elevation measurements were collected between March 18 and April 15, 2025. Groundwater was encountered at elevations ranging from about el 2.19 to 2.73 (about 0.87 to 9.26 feet below top of casing).

5.4.2 Analytical Results

Groundwater sample analytical results were compared to the NYSDEC SGVs. A summary of laboratory detections for Phase II ESI and RI groundwater samples is included in Table 4 and

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shown on Figures 8A, 8B, and 8C. Copies of the laboratory analytical reports are included in Appendix J.

The following is a summary of groundwater sample analytical results from the Phase II ESI and the RI that exceed the NYSDEC SGVs, organized by analytical parameter set.

VOCs

One VOC was detected above the SGVs in one groundwater sample and its duplicate collected during the Phase II ESI. The following table provides details on VOC concentrations above SGVs.

Analyte	NYSDEC SGVs (µg/L)*	Minimum Detected Concentration above SGVs (µg/L)		Maximum Detected Concentration above SGVs (µg/L)	
Naphthalene	10	110	GWDUP01_100622 (MW04_100622)	180	MW04_100622

*µg/L = micrograms per liter

Note: Well MW-04 was sampled during the Phase II. Naphthalene was only reported as an SVOC (discussed below) during the RI.

SVOCs

Seven SVOCs were detected above the SGVs in groundwater samples collected during the Phase II ESI and RI. The following table provides details on SVOC concentrations above SGVs.

Analyte	NYSDEC SGVs (µg/L)	Minimum Detected Concentration above SGVs (µg/L)		Maximum Detected Concentration above SGVs (µg/L)	
Benzo(a)anthracene	0.002	0.05	MW12_041525	0.46	GWDUP01_100622
Benzo(a)pyrene	0	0.0556	MW18_031825	0.2	MW22_041125
Benzo(b)fluoranthene	0.002	0.01	MW03_100722	0.15	MW22_041125
Benzo(k)fluoranthene	0.002	0.04	MW04_100622	0.15	MW22_041125
Chrysene	0.002	0.05	MW12_041525	0.38	GWDUP01_100622
Indeno(1,2,3-cd)pyrene	0.002	0.02	MW04_100622	0.1	MW22_041125
Naphthalene	10	79	GWDUP01_100622	88	MW04_100622

Pesticides and Herbicides

Pesticides and herbicides were not detected at concentrations exceeding the SGVs.

PCBs

Total PCBs were detected above the SGVs in one groundwater sample collected from monitoring well MW14 during the RI. The following table provides details on the PCB concentration above SGVs.

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Analyte	NYSDEC SGVs (µg/L)	Minimum Detected Concentration above SGVs (µg/L)		Maximum Detected Concentration above SGVs (µg/L)	
Total PCBs	0.09	0.604	MW14_040425	0.604	MW14_040425

Total and Dissolved Metals

Five metals were detected above the SGVs in groundwater samples collected during the Phase II ESI and RI. The following table provides details on total and dissolved metal concentrations above SGVs.

Analyte	NYSDEC SGVs (µg/L)	Minimum Detected Concentration above SGVs (µg/L)		Maximum Detected Concentration above SGVs (µg/L)	
Metals – Dissolved					
Iron	300	408	MW12_041525	3790	MW10_041425
Magnesium	35000	67,800	MW10_041425	67800	MW10_041425
Manganese	300	307	MW14_040425	4126	MW04_100622
Sodium	20000	45,400	MW14_040425	172000	MW10_041425
Metals – Total					
Iron	300	412	MW18_031825	24500	MW10_041425
Lead	25	37	MW09_041125	37	MW09_041125
Magnesium	35000	35,900	MW09_041125	66600	MW10_041425
Manganese	300	340	MW14_040425	3997	GWDUP01_100622
Sodium	20000	44,300	MW14_040425	158,000	MW10_041425

PFAS (21-compound list)

PFAS concentrations in groundwater were compared to the NYSDEC April 2023 Screening Levels for PFAS. The guidance states that further assessment or evaluation may be warranted should the following screening levels be exceeded:

- Concentrations of PFOA above 0.0067 µg/L
- Concentrations of PFOS above 0.0027 µg/L or

The PFAS compounds PFOS and/or PFOA were detected above the SGVs in monitoring wells MW03, MW04, MW07, MW12, MW14, MW16, MW18, MW22, and MW23. The following table provides details on PFAS concentrations above SGVs.

Analyte	NYSDEC SGVs (µg/L)	Minimum Detected Concentration above SGVs (µg/L)		Maximum Detected Concentration above SGVs (µg/L)	
PFOS	0.0027	0.0093	MW16_031825	0.0403	MW14_040425
PFOA	0.0067	0.00716	MW16_031825	0.0302	MW07_031825

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5.5 Soil Vapor Findings

5.5.1 Field Observations

Pre- and post-purge PID readings recorded at the soil vapor sample points across the site ranged from 0.0 ppm at SS17 to 5.8 ppm at SS20.

5.5.2 Analytical Results

Six subsurface soil vapor samples, eight sub-slab soil vapor samples, eight indoor air samples, and three ambient air samples were collected and submitted for laboratory analysis for USEPA TO-15 VOCs during the RI and Phase II ESI. No regulatory standards currently exist for soil vapor samples in New York State. A summary of the laboratory detections for the Phase II ESI and RI soil vapor samples is included in Table 5 and a summary of the laboratory detections for sub-slab soil vapor and coupled indoor and ambient air samples is included in Table 6. Laboratory analytical results for soil vapor, sub-slab soil vapor, and indoor and ambient air samples are shown on Figure 9. Copies of the laboratory analytical reports are included in Appendix J.

VOCs detected in subsurface and sub-slab soil vapor samples, including maximum concentrations (noted in parentheses), are listed below.

- 1,1,1-Trichloroethane (1.53 µg/m^3*)
- 1,2,4-Trimethylbenzene (61.0 µg/m^3)
- 1,3,5-Trimethylbenzene (40.0 µg/m^3)
- 1,3-Butadiene (4.82 µg/m^3)
- 2,2,4-Trimethylpentane (25.0 µg/m^3)
- 2-Hexanone (62.0 µg/m^3)
- 4-Ethyltoluene (150 µg/m^3)
- Acetone (3,700 µg/m^3)
- Acrylonitrile (64.0 µg/m^3)
- Benzene (428 µg/m^3)
- Carbon Disulfide (88.8 µg/m^3)
- Carbon Tetrachloride (0.47 µg/m^3)
- Chloroform (5.80 µg/m^3)
- Chloromethane (0.547 µg/m^3)
- Cis-1,2-Dichloroethene (9.40 µg/m^3)
- Cyclohexane (3,290 µg/m^3)
- Dibromochloromethane (420 µg/m^3)
- Dichlorodifluoromethane (2.40 µg/m^3)
- Ethanol (22.0 µg/m^3)
- Ethyl Acetate (33.0 µg/m^3)
- Ethylbenzene (640 µg/m^3)
- Isopropanol (78.0 µg/m^3)
- M,P-Xylene (1,100 µg/m^3)
- Methyl Ethyl Ketone (2-Butanone) (470 µg/m^3)
- Methyl Isobutyl Ketone (4-Methyl-2-Pentanone) (25.0 µg/m^3)
- Methyl Methacrylate (1.40 µg/m^3)
- Naphthalene (15.0 µg/m^3)
- n-Heptane (42.2 µg/m^3)
- n-Hexane (68.4 µg/m^3)
- o-Xylene (1,2-Dimethylbenzene) (440 µg/m^3)
- Propylene (11.0 µg/m^3)
- Styrene (203 µg/m^3)
- Tert-Butyl Alcohol (20.2 µg/m^3)
- Tetrachloroethene PCE (580 µg/m^3)
- Tetrahydrofuran (19.0 µg/m^3)
- Toluene (1,600 µg/m^3)
- Total Xylenes (1,500 µg/m^3)
- Trichloroethene (TCE) (0.26 µg/m^3)
- Trichlorofluoromethane (1.40 µg/m^3)

*µg/m^3 = micrograms per cubic meter

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Sub-Slab Soil Vapor and Indoor Air Summary

As a screening method, sub-slab soil vapor and co-located indoor air sample results were evaluated using the NYSDOH Decision Matrices contained in the October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York Decision Matrices for Sub-Slab Vapor and Indoor Air and subsequent updates (2017 and 2024). The NYSDOH Decision Matrices (Matrices A through F) address the compounds tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, vinyl chloride, methylene chloride, carbon tetrachloride, benzene, ethylbenzene, naphthalene, cyclohexane, 2,2,4-trimethylpentane, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, o – xylene, m, p – xylene, heptane, hexane, and toluene. The following is a summary of matrix-recommended actions for detected compounds:

Analyte	Sub-Slab Soil Vapor Concentration Range (µg/m³)	Indoor Air Concentration Range (µg/m³)	Matrix Recommendation
1,2,4-Trimethylbenzene	7.4 - 61	2.4 - 70	Mitigate
1,3,5-Trimenthylbenzene	2.2 – 40	0.72 - 23	Identify source(s) or resample or mitigate
2,2,4-Trimethylpentane	25	0.63 – 1.4	No further action
Benzene	19 – 428	1.2 – 24	Mitigate
Carbon Tetrachloride	ND*	0.39 – 0.566	No further action
Cis-1,2-Dichloroethene	9.4	0.89	Monitor
Cyclohexane	4.4 – 3,290	1.5 – 74	Mitigate
Ethylbenzene	ND - 640	1.6 – 47	Mitigate
M,P-Xylene	ND - 1,100	5.7 – 170	Mitigate
Methylene Chloride	ND	ND – 2.32	No further action
Naphthalene	ND - 15	ND - 1.9	No further action
n-Heptane	ND - 42.2	1.8 – 66	Identify source(s) or resample or mitigate
n-Hexane	ND - 68.4	2.1 – 79	Identify source(s) or resample or mitigate
o-Xylene (1,2-Dimethylbenzene)	ND – 440	2.4 – 74	Mitigate
PCE	ND – 580	ND – 2.9	No further action
Toluene	ND – 1,600	4.5 – 79	Mitigate

*ND – Not Detected

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Results for indoor air were also compared against the NYSDOH Air Guideline Values (AGVs). Indoor air samples from the Phase II ESI and RI did not exceed the AGVs, which are limited to the compounds TCE, PCE, and methylene chloride.

Subsurface Soil Vapor Summary

The NYSDOH matrix evaluation requires both soil vapor and indoor air data; therefore, subsurface soil vapor sample results could not be fully evaluated using the matrices. Several petroleum and chlorinated VOCs were detected in sub-surface soil vapor samples. Total VOCs range from 381 µg/m^3 in SV10 to 1,043 µg/m^3 in SV03.

5.6 Quality Assurance/Quality Control Results

QA/QC sample results were evaluated during data validation. The duplicates and MS/MSD sample pairs for soil and groundwater were collected at a frequency of 1 per 20 primary samples (including Phase II an RI samples); one full suite field blank was collected for soil and groundwater. PFAS field blanks were collected at a frequency of 1 per every day of groundwater sampling. The soil field duplicate results and the soil and groundwater MS/MSD results, with the exception of the duplicate sample collected with parent sample SB07_0-2, closely matched the results from their parent samples, thereby demonstrating the accuracy of the analytical methods. The field and trip blank results indicated that field procedures were effective and highlighted no cross-contamination issues during sample transport, respectively. Field and trip blank sample results are presented in Table 7. Full laboratory reports are provided in Appendix J.

5.7 Data Usability

New York Analytical Services Protocols Category B laboratory reports for the soil, groundwater, and soil vapor samples were provided by York and reviewed by a Langan data validator in accordance with USEPA and NYSDEC validation protocols. No major deficiencies were identified for the data, which was judged to be 100% valid, as qualified. Data qualifiers were updated following completion of the DUSRs. The DUSRs are included in Appendix F.

5.8 Evaluation of AOCs

5.8.1 Modification to Areas of Concern

Based on the field observations during investigation of the vault (RIWP AOC 3) in the northern part of the site, there were no findings that warrant further investigation, so it is no longer considered an AOC. Based on soil vapor results, petroleum- and chlorinated VOC-impacted soil vapor has been added as AOC 3. The pre-RI AOCs are presented on Figure 4 and the post-RI AOCs are shown on Figure 10 and discussed below. Based on field observation of deeper petroleum like impacts below the tar-like material (presumed waterproofing), AOC 1 was expanded to include petroleum impacts.

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5.8.2 AOC 1: Petroleum- and/or Tar-related Impacts to Soil, Groundwater, and Sub-Slab Soil Vapor

AOC 1 is related to petroleum- and/or tar-related impacts in soil, groundwater, and sub-slab soil vapor within the building footprint, in the central and southern parts of the site. A summary of findings for AOC 1 is presented below.

Soil

Soil borings SB04 through SB08, SB15 through SB18, and SB22A were advanced to evaluate AOC 1. Field evidence of petroleum impacts (e.g. staining, naphthalene-like odors, and/or PID readings above background) were encountered in five RI borings (SB15 through SB18 and SB22A) and three Phase II borings (SB04 through SB06), all located within the building footprint. The noted impacts were generally limited to about 1 to 7 feet below cellar grade (about 9 to 15 feet bsg), which the exception of boring SB-18, where staining extended to 13 feet bsg and PID readings above background extended to 18 feet bsg. The maximum PID reading of 350.6 ppm was recorded in SB04 at about 2 feet below the top of cellar slab (about 10 feet bsg). Visible and instrumental evidence of impacts was limited to borings within the original building footprint and auditorium but was not encountered below the western annex extension (boring SB08).

Three petroleum-related VOCs (benzene, naphthalene, and total xylenes) were detected above the UU, RURR, and/or CU SCOs in samples collected from 1 to 3 feet below the top of cellar slab in soil borings SB04, SB05, and SB06 during the Phase II. Naphthalene, reported as an SVOC, was also detected above the UU SCO in samples collected from 0 to 3 feet below the top of cellar slab in soil borings SB04, SB05, SB15, and SB16.

Groundwater

PID headspace readings were recorded above background levels at monitoring wells MW03 (54.5 ppm), MW04 (137.2 ppm), MW18 (55.5 ppm), and MW22 (109.4 ppm), all located in or directly adjacent to AOC 1. In addition, a petroleum-like odor and tar-like sheen were observed on groundwater at MW22.

One petroleum-related VOC, naphthalene, was detected above the SGV in one groundwater sample and its duplicate collected from monitoring well MW04 during the Phase II ESI. One or more of the seven SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and naphthalene, were detected at concentrations exceeding the SGVs in samples collected from monitoring wells MW03, MW04, MW07, MW16, MW18, and MW22, located within or adjacent to AOC-1.

Soil Vapor

Petroleum-related VOCs were identified in sub-slab soil vapor and indoor air samples collected from the southern and central parts of the site. When evaluated under the NYSDOH Decision Matrices, benzene, ethylbenzene, m,p-xylene, o-xylene, and toluene, were detected at

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concentrations for which monitoring and/or mitigation is recommended for samples located within the original building footprint (portion of the building to be renovated) and auditorium (within the proposed open-air courtyard for the new residential building footprint).

Conclusions

Petroleum- or tar-related impacts, including staining, odors, elevated PID readings, and/or positive sheen test in soil boings and on groundwater, appear limited to the central and southern parts of the site within the current building footprint. The noted impacts were generally limited to about 1 to 7 feet below cellar grade (about 9 to 15 feet bsg), which the exception of boring SB-18, where staining extended to 13 feet bsg and PID readings above background extended to 18 feet bsg. Petroleum-related VOCs and SVOCs in soil exceed UU, RURR, and/or CU SCOs in soil samples collected throughout the building footprint. PID headspace readings above background, a petroleum-like odor, and a tar-like sheen were also observed in groundwater monitoring wells within or immediately adjacent to AOC 1. Petroleum-related VOCs detected in one groundwater sample (MW04) and SVOCs detected in wells MW03, MW04, MW07, MW12, MW16, MW18, and MW22 exceeded SGVs. Petroleum-related VOCs were also identified in sub-slab soil vapor and indoor air samples collected within AOC 1 at concentrations that yielded recommendations, including monitoring and/or mitigation for samples located within the original building footprint (portion of the building to be renovated) and auditorium (within the proposed open-air courtyard for the new residential building footprint). The noted petroleum- and tar-related impacts are attributed primarily to tar-like material (presumed waterproofing) and potential impacts from the on-site petroleum bulk storage, including two No. 2 fuel oil, 10,000-gallon ASTs located in the cellar boiler room.

5.8.3 AOC 2: SVOC and Metal Impacts in Fill

AOC 2 is a site-wide AOC representing SVOC and metal impacts to fill throughout the site; therefore, all on-site borings and wells are considered in this evaluation. A summary of findings for AOC 2 is presented below.

Soil

Fill was observed from below the approximately 1-foot-thick concrete building cellar slab to depths up to 6.5 feet below the top of cellar slab (about 9 to 14.5 feet bsg) within the building footprint and from below ground surface to 15 feet bsg outside of the building footprint. The fill predominantly consists of gray to orangish brown fine- to medium-grained sand with varying amounts of silt, gravel, vegetation, and anthropogenic materials (brick, concrete, glass, slag, and ash). SVOCs (including 2-Methylphenol [o-Cresol], 3 & 4 Methylphenol [m&p Cresol], benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, dibenzofuran, indeno[1,2,3-cd]pyrene, naphthalene, and phenol) and metals (including barium, hexavalent chromium, copper, lead, mercury, and zinc) were detected

in soil samples throughout the site at concentrations above the UU, RURR and/or CU SCOs. The exceedances were reported for samples at varying depths up to about 3 feet below the top of cellar slab (about 11 feet bsg) within the building footprint and outside the building footprint at varying depths up to about 8 feet bsg. Exceedances for one metal (hexavalent chromium) extended to a depth of 10 feet below the top of cellar slab (about 18 feet bsg) in one sample collected from within the building footprint and 12 feet bsg in one sample collected from outside the building footprint.

Groundwater

The metals identified above SGVs in groundwater include iron, lead, magnesium, manganese, and sodium, most of which are typical of regional groundwater and not indicative of a contamination source. Lead exceeded the SGV in the total metals analysis; however, lead was not detected in the dissolved phase above the SGV and is therefore attributed to entrained sediment within the water column. SVOCs, in particular PAHs, were observed in groundwater throughout the site.

Conclusions

SVOC and metal impacts to fill were encountered throughout the site at varying depths to 10 feet bsg (up to 18 feet bsg for one metal, hexavalent chromium) and are attributed to historical site use as a coal yard and/or anthropogenic materials comingled in the soil.

5.8.4 AOC 3: Chlorinated and Petroleum VOC-Impacted Soil Vapor

Three of the sub-slab soil vapor samples and indoor air samples were collected within the original building footprint (portion of the building to be renovated), including SS19/IA19, SS20/IA20, and SS21/IA21. The chlorinated VOC, PCE, was reported at concentrations ranging from 2.9 µg/m^3 to 580 µg/m^3 in the sub-slab samples; however, when compared with the co-located indoor air samples to the NYSDOH Decision Matrices, recommendations are 'no further action'. Petroleum-related VOCs were identified in sub-slab soil vapor and indoor air samples collected from the portion of the building to undergo renovations at concentrations which yielded NYSDOH Matrix recommendations to monitor and/or mitigate for the southeastern and central parts of the site.

Three of the subsurface soil vapor samples were collected within the proposed residential building footprint, including SV09, SV10, and SV13. PCE was reported in these samples at concentrations ranging from 220 µg/m^3 to 320 µg/m^3. Petroleum-related VOCs were also identified in these subsurface soil vapor samples.

Conclusions

PCE concentrations in sub-slab soil vapor samples for the portion of the building to undergo renovations (SS19, SS20, and SS21) ranged from 2.9 µg/m^3 to 580 µg/m^3; however, when compared with the co-located indoor air samples to the NYSDOH Decision Matrices,

recommendations are 'no further action'. Petroleum-related VOCs were identified in sub-slab soil vapor and indoor air samples collected from the portion of the building to undergo renovations (SS19, SS20, and SS21) at concentrations which yielded NYSDOH Matrix recommendations to monitor and/or mitigate for the southeastern and central parts of the site.

PCE was reported at concentrations ranging from 220 µg/m^3 to 320 µg/m^3 in all subsurface soil vapor samples (SV09, SV10, and SV13) located within the proposed residential building footprint. Petroleum-related VOCs were also identified in all subsurface soil vapor samples (SV09, SV10, and SV13) located within the proposed residential building footprint.

An on-site source of PCE was not identified via soil or groundwater sample results; therefore, PCE in soil vapor is inferred to be from an off-site source. Petroleum-related impacts to subsurface and sub-slab soil vapor and indoor air may be attributed to tar-like material (presumed waterproofing) and/or off-site sources.

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6.0 GREEN REMEDIATION STANDARDS

Green remediation principles and techniques were implemented to the extent feasible in the design and investigation phase and will be implemented during the upcoming remedy as per the NYSDEC DER-31 Green Remediation Policy (DER-31). DER-31 requires the following green remediation/sustainability concepts to be considered and/or implemented, to the extent feasible, during investigations:

- Increase energy efficiency/minimize total energy use and direct and indirect carbon dioxide/greenhouse gas (GHG) emissions to the atmosphere
- Reduce emissions of air pollutants
- Minimize habitat disturbance and create or enhance habitat or usable land
- Conserve natural resources such as soil and water; promote the sequestration of carbon through reforestation or afforestation
- Minimize fresh water consumption and maximize water reuse during daily operations and treatment processes
- Prevent long-term erosion, surface runoff, and off-site water quality impacts. Prevent unintended soil compaction
- Minimize waste or implement beneficial use of materials that would otherwise be considered waste
- Minimize equipment and truck idling and use sustainably produced biofuels to reduce discharges of pollutants and GHGs to the atmosphere
- Utilize clean diesel (new or retrofitted) equipment to reduce emissions to the atmosphere
- Minimize truck travel for disposal to save energy, reduce emissions, reduce localized noise, vibration, and wear and tear on roads
- Minimize the use of heavy equipment to save energy and reduce emissions

During the RI, the following elements were implemented, to the extent feasible, to reduce greenhouse gas and other emissions:

- Use of Ultra Low Sulfur Diesel in vehicles and machinery by the drilling contractor
- Minimization of vehicle idling of all vehicles (including construction equipment) in accordance with 6 NYCRR Part 217 Motor Vehicle Emissions, Subpart 217-3 Idling Prohibition for Heavy Duty Vehicles.
- Reduction of materials consumption and off-site transport by the reuse of non-impacted soil cuttings within the boring of origin and containerizing of soil cuttings exhibiting visual, olfactory, and instrumental signs of contamination.

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7.0 QUALITATIVE HUMAN AND FISH/WILDLIFE EXPOSURE ASSESSMENT

Human health exposure risk was evaluated for current and future on-site and off-site conditions, in accordance with NYSDEC DER-10. The assessment includes an evaluation of potential sources and migration pathways of site contamination, potential receptors, exposure media, and receptor intake routes and exposure pathways.

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

7.1 Current Conditions

The about 35,000-square-foot (0.80-acre) site is developed with a 6-story, 18,300-square-foot former school building, with a full cellar, used for offices and community services, and an asphalt parking lot. A site location map and site plan are provided as Figures 1 and 2, respectively.

The site is mostly covered with impervious concrete building slabs and asphalt, except for landscaped areas along the exterior of the southern and southeastern sides of the building.

7.2 Proposed Conditions

The proposed development plan includes demolition of the northern and western parts of the current building, construction of a new 21-story affordable housing residential building, and renovation of the portion of the current building to remain. The new building will occupy about 60 percent of the lot area. The plan includes the installation of a Sub-Membrane Depressurization System (SMDS) in the portion of the current building to remain. The remainder of the site will include excavation of contaminated soil to varying depths to facilitate the remediation and redevelopment.

7.3 Summary of Environmental Conditions

The contaminants of concern (COC) for the site are VOCs, SVOCs, and metals.

Soil

Fill predominantly consisting of gray to orangish brown fine- to medium-grained sand with varying amounts of silt, gravel, vegetation, and anthropogenic materials (brick, concrete, glass, slag, and ash), was encountered across the site from below the approximately 1-foot-thick concrete building cellar slab to depths up to 6.5 feet below the top of cellar slab (about 9 to 14.5 feet bsg) within the building footprint and from below the surface cover to 15 feet bsg outside of the building footprint. Concentrations of SVOCs and metals were detected in fill across the site at concentrations exceeding the UU, RURR, and/or CU SCOs in samples collected from depths between 0 and 10 feet bsg; exceedances for one metal (hexavalent chromium) extended to a

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depth of 10 feet below the top of cellar slab (about 18 feet bsg) in one sample collected from within the building footprint and 12 feet bsg in one sample collected from outside the building footprint. Metal and SVOC impacts are attributed to historical site use as a coal yard and/or anthropogenic materials comingled in the soil.

Petroleum- or tar-like staining, odors, elevated PID readings, and/or a positive sheen test were encountered in soil borings in the central and southern parts of the site, within the building footprint. The petroleum- or tar-impacted area is estimated to be an approximately 14,500-square-foot area including the portion of the building to undergo renovations and the northern part of the building to be demolished at depths between about 8 and 18 feet bsg. The petroleum- and/or tar-impacts are attributed to the historical site operations, including petroleum bulk storage and the use of two 10,000-gallon No. 2 fuel oil ASTs, and the suspected presence of tar-like waterproofing.

The PFAS compounds PFOS and PFOA were detected above UU SCOs, but below RURR SCOs in one soil sample. A source of PFAS was not identified.

Groundwater

PID headspace readings were recorded above background levels at four monitoring wells located in or directly adjacent to AOC 1. In addition, a petroleum-like odor and tar-like sheen were observed on groundwater at MW22 in the southeastern part of the site. One petroleum-related VOC, naphthalene, was detected above the SGV in one groundwater sample and its duplicate collected from monitoring well MW04 in the central part of the site during the Phase II ESI. One or more of the seven SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and naphthalene, were detected at concentrations exceeding the SGVs in samples collected from monitoring wells MW03, MW04, MW07, MW16, MW18, and MW22, located within or adjacent to AOC 1.

The metals identified above SGVs in groundwater include iron, lead, magnesium, manganese, and sodium, most of which are typical of regional groundwater and not indicative of a contamination source. Lead exceeded the SGV in the total metals analysis; however, lead was not detected in the dissolved phase above the SGV and is attributed to entrained sediment within the water column. SVOCs, in particular PAHs, were observed in groundwater throughout the site.

The PFAS compounds PFOS and PFOA were detected above SGVs in nine of the eleven monitoring wells throughout the site, including monitoring wells MW03, MW04, MW07, MW12, MW14, MW16, MW18, MW22, and MW23. Based on publicly available data for nearby NYSDEC remediation sites, PFOS and PFOA concentrations detected in groundwater at the site appear to be consistent with background and regional concentrations. A source of PFAS was not identified.

Soil Vapor

The chlorinated VOC, PCE, was reported at concentrations ranging from 2.9 µg/m^3 to 580 µg/m^3 in sub-slab samples collected within the portion of the building to undergo renovations; however, when compared with the co-located indoor air samples to the NYSDOH Decision Matrices, recommendations are 'no further action'. Petroleum-related VOCs were identified in sub-slab soil vapor and indoor air samples collected from the portion of the building to undergo renovations at concentrations which yielded NYSDOH Matrix recommendations to monitor and/or mitigate for the southeastern and central parts of the site.

PCE was reported in subsurface samples collected from within the proposed residential building footprint at concentrations ranging from 220 µg/m^3 to 320 µg/m^3. Petroleum-related VOCs were also identified in these subsurface soil vapor samples.

PCE was not detected in soil or groundwater samples and an on-site source of chlorinated solvents was not identified; therefore, the elevated concentrations of PCE observed in soil vapor during the RI may be attributed to an off-site source. The source of the petroleum- or tar-related impacts is attributed to historical site operations, including petroleum bulk storage and the use of two 10,000-gallon No. 2 fuel oil ASTs, and the suspected presence of tar-like waterproofing beneath the building.

7.4 Conceptual Site Model

A conceptual site model (CSM) has been developed based on the findings of the Phase II ESI and RI. The purpose of the CSM is to develop a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways.

7.4.1 Potential Sources of Contamination

Potential sources of contamination include:

- Petroleum-impacted soil and groundwater resulting from on-site petroleum bulk storage including the use of two 10,000-gallon No. 2 fuel oil ASTs, and the suspected presence of tar-like waterproofing beneath the building
- SVOC and metal impacts from historical site use as a coal yard and/or anthropogenic materials comingled in the soil
- Potential off-site sources of CVOCs

7.4.2 Exposure Media

Impacted media include the following:

- Soil:
    - Petroleum-related VOCs and SVOCs

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- SVOCs and metals

- Groundwater: Petroleum-related VOCs, SVOCs, and PFAS
- Soil Vapor: Petroleum-related VOCs and PCE

7.4.3 Receptor Populations

The site is currently used as a New York City community service center. Current receptor populations include employees, community members who frequent the site, the community surrounding the site, and authorized individuals completing investigations. During site redevelopment, human receptors will be limited to construction and remediation workers, authorized guests, the community, and pedestrians adjacent to the site. Under future conditions, receptors will include the residential and commercial use occupants, employees, and the nearby community.

7.5 Potential Exposure Pathways – On-Site

7.5.1 Current Conditions

The site is covered by an impervious surface (concrete slab and asphalt) over most of the site, except for landscaped areas along the exterior of the southern and southeastern sides of the building. Human exposure to contaminated soil through dermal absorption, inhalation, and ingestion is minimal and controlled through the presence of the impervious surfaces. There is a potential exposure pathway through dermal absorption, inhalation, and ingestion during sampling associated with any further site investigation, if necessary, but it would be controlled by personal protective equipment (PPE), and implementation of the HASP and CAMP.

Because groundwater near the site is not used as a potable water source and access to groundwater below the site is prevented by surface cover, there is no complete exposure pathway under current site conditions. There is a potential exposure pathway through dermal absorption, inhalation, and ingestion during investigative groundwater sampling, but it is controlled by limiting site access and through the implementation of the HASP during ground-intrusive work. There is a potential exposure pathway to contaminated soil vapor through inhalation during soil vapor sampling. This pathway is controlled through implementation of the HASP and CAMP.

VOCs were detected in soil vapor samples across the site, including withing the site building; however, results for indoor air did not exceed AGVs.

7.5.2 Remediation Conditions

Remediation will include the demolition of the northern and western parts (auditorium and western annex) to facilitate foundation excavation that is expected to remove impacted soil and construction of a new building with a waterproofing/vapor barrier.

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The portion of the exiting building to remain will be improved with the installation of a SMDS and waterproofing/vapor barrier between the existing slab and a topping slab.

Potential exposure pathways for dermal absorption, ingestion, and/or inhalation during remediation will be monitored and controlled through a variety of engineering controls (i.e., the implementation of a HASP, CAMP, Soil/Materials Management Plan, and the use of vapor and dust suppression techniques). The controls for the remedial activities will be proposed in the forthcoming RAWP based on the findings of this report.

7.5.3 Proposed Future Conditions

Upon completion of the new development, most of the site would be covered by a concrete building slab with a continuous waterproofing/vapor barrier under the slab and along subsurface foundation walls that extend to the cellar level. The renovated portion of the existing building would also include vapor mitigation. Excavation would remove contaminated soil from the footprint of the new residential building, which will include a waterproofing/vapor barrier, as a general construction element. Because of the planned remediation and anticipated engineering controls or construction elements, there would be no complete exposure pathway for future users.

There would be no pathway for ingesting groundwater COCs, because the site and surrounding area would continue to obtain municipally supplied drinking water that originates from surface water reservoirs located upstate.

7.6 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, remedial/construction-phase, or future conditions for the following reasons:

- The site is in an urban area and is predominantly covered with continuous impervious surface material (concrete slabs and asphalt pavement). The limited non-impervious areas of the site have vegetative cover.
- The site is enclosed within a locked fence surrounding the building and asphalt-paved parking lot. The on-site community center operates during regular business hours, during which access to the site is limited to those working at and visiting the community center.
- During site excavation, remediation, and foundation construction/renovation, the following protective measures will be implemented:
    - Perimeter 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.

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- Vehicle tires and undercarriages will be washed as necessary 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 any identified source material will prevent future off-site migration of contaminants.

- The site will be capped in areas where soil above UU or RURR is not removed.
- Groundwater in and around the site is not used as a potable water source, and the nearest ecological receptor, the Harlem River, is about 800 feet east of the site.

7.7 Evaluation of Human Health Exposure

Based on the CSM and review of environmental data, complete on-site exposure pathways appear to be present in the absence of remediation, monitoring, and mitigation, or engineering controls (ex., HASP with CAMP, capping system, etc.), in construction/remediation and future use conditions.

Complete exposure pathways have the following five elements: (1) a contaminant source; (2) a contaminant release and transport mechanism; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population. A discussion of the five elements comprising a complete pathway as they pertain to the site is provided below.

7.7.1 Current Conditions

Contaminant sources include 1) petroleum- or tar-impacted soil, groundwater, and soil vapor 2) soil with varying concentrations of SVOCs and metals, 3) groundwater containing varying concentrations of VOCs and SVOCs; and 4) VOCs in soil vapor.

Contaminant release and transport mechanisms include contaminated soil transported as dust (dermal, ingestion, inhalation). The potential receptors on-site include employees and community members who frequent the community service center at the site, the community surrounding the site, and authorized individuals completing investigations. Under current conditions, the likelihood of exposure to humans is limited due to the following:

- The site footprint is predominantly covered by a concrete slab and/or asphalt pavement, which limits direct contact with soil and groundwater.
- Groundwater at the site is not a potable water source.
- Because the site has several occupied spaces, exposure pathways for soil vapor intrusion do exist. Petroleum-related VOCs were identified in sub-slab soil vapor and indoor air samples collected from the portion of the building to undergo renovations at

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concentrations which yielded NYSDOH Matrix recommendations to monitor and/or mitigate for the southeastern and central parts of the site.

- In localized areas where human exposure to contaminated soil, groundwater, and sub-slab vapor is possible, the potential exposure pathways will be controlled through the implementation of a HASP.

7.7.2 Remediation Activities

During the remedial excavation and foundation construction/renovation stage of redevelopment, points of exposure include disturbed and exposed soil and groundwater during excavation and possible dewatering, and dust and potential organic vapors generated during excavation. Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of potential organic vapors arising from contaminated groundwater and soil, and inhalation of dust originating from contaminated soil. The receptor population includes construction and remediation workers. The community adjacent to the site will be protected via the implementation of the HASP, CAMP, and other dust control measures to prevent off-site impacts.

The potential for completed on-site exposure pathways is present since all five elements exist; however, the risk can be avoided or minimized by applying appropriate health and safety measures during construction and remediation, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, cleaning truck undercarriages and securing tarp covers before they leave the site to prevent off-site soil tracking, maintaining site security, and wearing the appropriate personal protective equipment. These measures are also designed to prevent off-site impacts.

A RAWP with a HASP and a CAMP that include measures such as conducting a community air-monitoring program, donning personal protective equipment, covering soil stockpiles, altering work sequencing, restricting eating and drinking on-site, maintaining a secure construction entrance, proper housekeeping, and applying vapor and dust suppression measures to prevent off-site migration of vapors and particulates during construction will be implemented. Such measures will prevent the completion of exposure pathways for soil, groundwater, and soil vapor contaminants.

7.7.3 Proposed Future Conditions

Under the proposed future conditions, contaminants may remain beneath the portion of the existing building to remain on-site, and would, to a lesser extent, include those listed under current conditions. If residual impacts exist and engineering/institutional controls are not implemented, points of exposure could include potential cracks in the foundation of the proposed building, exposure during future ground-intrusive work, or inhalation of vapors entering the building. The receptor population includes community members who frequent the community

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service center at the site, employees, and the adjacent community. The possible routes of exposure can be avoided or mitigated by removal of contaminated media from the site, installation of vapor mitigation, enhancement of the site capping system, remedial excavation and a waterproofing/vapor barrier as a general construction element in the new, residential building, and implementation of a Site Management Plan (SMP), depending on the remedy.

7.7.4 Human Health Exposure Assessment Conclusions

1. Human exposure to site contaminants is currently limited because about 95 percent of the site is covered with an impermeable surface. The primary exposure pathways are dermal contact, ingestion, and/or inhalation of soil and/or soil vapor by site workers and site visitors. The exposure risks can be avoided or minimized by following the appropriate HASP and vapor and dust suppression measures, and by implementing a CAMP during any soil disturbance.
2. In the absence of mitigation measures and controls, there is potential for exposure during remediation. The primary exposure pathways are:
   a. Dermal contact, ingestion, and inhalation of contaminated soil, groundwater, and/or soil vapor by construction and remediation workers
   b. Dermal contact, ingestion, and inhalation of soil (dust) and inhalation of soil vapor by the community in the vicinity of the site

   These contacts can be avoided or minimized by implementing CAMP and by following the appropriate HASP, vapor and dust suppression, soil erosion and sediment control, and site security measures, and following a NYSDEC-approved RAWP.
3. The existence of a complete exposure pathway for site contaminants to human receptors during the proposed future use condition is unlikely, as most contaminated soil would be excavated and transported to an off-site disposal facility, and residual contaminated media will be capped.
4. Regional groundwater is not used as a potable water source in Manhattan; therefore, exposure to regional groundwater contaminants is unlikely.
5. Potential soil vapor intrusion in the portion of the building to remain will be mitigated.
6. A complete exposure pathway may exist for the migration of site contaminants to off-site human receptors during current and remediation conditions, but such potential exposure will be prevented or mitigated by the implementation of monitoring and control measures. Monitoring and control measures have been and will continue to be used during investigation and remediation to prevent completion of this pathway. Under future conditions, the site would be remediated, and engineering and institutional controls will be implemented, as necessary, to prevent completion of this pathway.

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8.0 NATURE AND EXTENT OF CONTAMINATION

This section evaluates the nature and extent of soil, groundwater, and soil vapor contamination. The nature and extent of the contamination are derived from a combination of field observations and analytical data that were discussed in Section 5.0.

8.1 Soil Contamination

Fill predominantly consisting of gray to orangish brown fine- to medium-grained sand with varying amounts of silt, gravel, vegetation, and anthropogenic materials (brick, concrete, glass, slag, and ash), was encountered across the site from below the approximately 1-foot-thick concrete building cellar slab to depths up to 6.5 feet below the top of cellar slab (about 9 to 14.5 feet bsg) within the building footprint and from below the surface cover to 15 feet bsg outside of the building footprint. Concentrations of SVOCs and metals were detected in fill across the site at concentrations exceeding the UU, RURR, and/or CU SCOs in samples collected from depths between 0 and 10 feet bsg; exceedances for one metal (hexavalent chromium) extended to a depth of 10 feet below the top of cellar slab (about 18 feet bsg) in one sample collected from within the building footprint and 12 feet bsg in one sample collected from outside the building footprint. Metal and SVOC impacts are attributed to historical site use as a coal yard and/or anthropogenic materials comingled in the soil.

Petroleum- or tar-like staining, odors, elevated PID readings, and/or a positive sheen test were encountered in soil borings located within the building footprint. The petroleum- or tar-impacted area is estimated to be an approximately 14,500-square-foot area including the portion of the building to undergo renovations and the northern part of the building to be demolished at depths between about 8 and 18 feet bsg. The petroleum- and/or tar-impacts are attributed to the historical site operations, including petroleum bulk storage and the use of two 10,000-gallon No. 2 fuel oil ASTs, and the suspected presence of waterproofing tar.

The PFAS compounds PFOS and PFOA were detected above UU SCOs, but below RURR SCOs in one soil sample. A source of PFAS was not identified.

8.2 Groundwater Contamination

PID headspace readings during the Phase II and RI were recorded above background levels at four monitoring wells located in or directly adjacent to AOC 1. Three of the four wells coincide with boring locations were tar-like material (presumed waterproofing) was observed below the cellar slab. On-site monitoring wells were gauged for NAPL with an oil-water interface probe between March 18 and April 15, 2025. No NAPL was observed; however, a petroleum-like odor and tar-like sheen were observed at MW22.

One petroleum-related VOC, naphthalene, was detected above the SGV in one groundwater sample and its duplicate collected from monitoring well MW04 and its duplicate during the Phase II ESI. One or more of the seven SVOCs, including benzo(a)anthracene, benzo(a)pyrene,

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benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and naphthalene, were detected at concentrations exceeding the SGVs in samples collected from monitoring wells MW03, MW04, MW07, MW16, MW18, and MW22, located within or adjacent to AOC 1.

The metals identified above SGVs in groundwater include iron, lead, magnesium, manganese, and sodium, most of which are typical of regional groundwater and not indicative of a contamination source. Lead exceeded the SGV in the total metals analysis; however, lead was not detected in the dissolved phase above the SGV and is therefore attributed to entrained sediment within the water column. SVOCs, in particular PAHs, were observed in groundwater throughout the site.

The PFAS compounds PFOS and PFOA were detected above SGVs in nine of the eleven monitoring wells throughout the site, including monitoring wells MW03, MW04, MW07, MW12, MW14, MW16, MW18, MW22, and MW23. Based on publicly available data for nearby NYSDEC remediation sites, PFOS and PFOA concentrations detected in groundwater at the site appear to be consistent with background and regional concentrations. A source of PFAS was not identified.

8.3 Soil Vapor Contamination

The chlorinated VOC, PCE, was reported at concentrations ranging from 2.9 µg/m^3 to 580 µg/m^3 in sub-slab samples collected within the portion of the building to undergo renovations (SS19, SS20, and SS21); however, when compared with the co-located indoor air samples to the NYSDOH Decision Matrices, recommendations are 'no further action'. Petroleum-related VOCs were identified in sub-slab soil vapor and indoor air samples collected from the portion of the building to undergo renovations at concentrations which yielded NYSDOH Matrix recommendations to monitor and/or mitigate for the southeastern and central parts of the site.

PCE was reported in subsurface samples collected from within the proposed residential building footprint (SV09, SV10, and SV13) at concentrations ranging from 220 µg/m^3 to 320 µg/m^3. Petroleum-related VOCs were also identified in these subsurface soil vapor samples.

PCE was not detected in soil or groundwater samples and an on-site source of chlorinated solvents was not identified; therefore, the elevated concentrations of PCE observed in soil vapor during the RI may be attributed to an off-site source. The source of the petroleum- or tar-related impacts is attributed to historical site operations, including petroleum bulk storage and the use of two 10,000-gallon No. 2 fuel oil ASTs, and the suspected presence of waterproofing tar beneath the building.

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9.0 CONCLUSIONS

The conclusions are based on data collected during the Phase II ESI and the RI. The findings summarized herein are based on qualitative data (field observations and instrumental readings) and laboratory analytical soil, groundwater, and soil vapor sample results. Findings and conclusions are as follows:

1. Stratigraphy: Fill predominately consisting of gray to orangish brown fine- to medium sand with varying amounts of silt, gravel, vegetation, and anthropogenic materials (brick, concrete, glass, slag, and ash) was encountered from below the asphalt or concrete slab to depths ranging from 1 to 15 feet bsg. Gray to orange or red to brown silty fine- to medium-grained sand, with varying amounts of gravel and vegetation, was encountered beneath the fill.

2. Hydrogeology: Groundwater depths measured in on-site wells ranged from about 8.87 to 9.26 feet bsg, corresponding to el 2.19 to 2.73. Regional groundwater flow is estimated to the southeast towards the Harlem River.

3. Petroleum- and/or Tar-Impacted Soil, Groundwater, and Sub-Slab Soil Vapor: Petroleum- or tar-related impacts, including staining, odors, elevated PID readings, and/or positive sheen test in soil boings and on groundwater, appear limited to the central and southern parts of the site within the current building footprint. The noted impacts were generally limited to about 1 to 7 feet below cellar grade (about 9 to 15 feet bsg), which the exception of boring SB-18, where staining extended to 13 feet bsg and PID readings above background extended to 18 feet bsg. Petroleum-related VOCs and SVOCs in soil exceeded UU, RURR, and/or CU SCOs in soil samples collected throughout the building footprint.

   PID headspace readings above background, a petroleum-like odor, and a tar-like sheen were also observed in groundwater monitoring wells within or immediately adjacent to AOC 1. Petroleum-related VOCs detected in one groundwater sample (MW04) and SVOCs detected in wells MW03, MW04, MW07, MW12, MW16, MW18, and MW22 exceeded SGVs.

   Petroleum-related VOCs were also identified in sub-slab soil vapor and indoor air samples collected within AOC 1 at concentrations that yielded recommendations, including monitoring and/or mitigation for samples located within the original building footprint (portion of the building to be renovated) and auditorium (within the proposed open-air courtyard for the new residential building footprint). The noted petroleum- and tar-related impacts are attributed primarily to tar-like material (presumed waterproofing) and potential impacts from the on-site petroleum bulk storage, including two No. 2 fuel oil, 10,000-gallon ASTs located in the cellar boiler room.

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4. SVOC and Metals Impacts in Fill: SVOCs and metals were detected in fill across the site at concentrations exceeding the UU, RURR, and/or CU SCOs in samples collected from depths between 0 and 10 feet bsg; exceedances for one metal (hexavalent chromium) extended to a depth of 10 feet below the top of cellar slab (about 18 feet bsg) in one sample collected from within the building footprint and 12 feet bsg in one sample collected from outside the building footprint. Metal and SVOC impacts are attributed to historical site use as a coal yard and/or anthropogenic materials comingled in the soil.

5. Petroleum- and Chlorinated VOC-Impacts in Soil Vapor: PCE was reported in sub-slab soil vapor samples collected within the portion of the building to undergo renovations (SS19, SS20, and SS21); however, when compared with the co-located indoor air samples to the NYSDOH Decision Matrices, recommendations are 'no further action'. Petroleum-related VOCs were identified in sub-slab soil vapor and indoor air samples collected from the portion of the building to undergo renovations at concentrations which yielded NYSDOH Matrix recommendations to monitor and/or mitigate for the southeastern and central parts of the site. PCE and petroleum-related VOCs were reported in subsurface samples collected from within the proposed residential building footprint (SV09, SV10, and SV13). An on-site source of PCE was not identified via soil or groundwater sample results. The source of the petroleum-related VOCs is attributed to historical site operations, including petroleum bulk storage and the use of two 10,000-gallon No. 2 fuel oil ASTs, and the suspected presence of waterproofing tar beneath the building.

Sufficient analytical data were gathered during the Phase II ESI and the RI to establish site-specific soil cleanup levels and to develop a remedy. The remedy will address impacts to the soil, groundwater, and soil vapor described in this RIR. The remedy will be described and evaluated in the RAWP prepared in accordance with the NYSDEC BCP guidelines.

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