

Appendix F: Phase II Environmental Site
Investigation Volume I

(Phase II Environmental Site Investigation
Appendices available at the Offices of the
Lead Agency)

**PHASE II ENVIRONMENTAL SITE INVESTIGATION
REPORT
OF
THREE PARCELS
EAST 125TH STREET DEVELOPMENT PROJECT
NEW YORK, NY**

CONSULTANT PROJECT NO.: 4012846-0003

JULY 6, 2007

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EXECUTIVE SUMMARY

The New York City Economic Development Corporation (NYCEDC) requested that STV Incorporated (STV) conduct a Phase II Environmental Site Investigation (ESI) of three parcels identified as Block 1791, Lots 1, 25, and 34 (Parcel A), Block 1790, all lots (Parcel B), and Block 1789, Lot 46 (Parcel C). These parcels are located from just south of East 125th Street to East 127th Street between Second and Third Avenues in East Harlem, New York, New York (hereafter referred to as the "Site"). The Site is approximately 241,000 square feet (6 acres) in area. The Site consists of 15 vacant lots, three lots that are reported as vacant but utilized for parking, and nine mixed use commercial/retail businesses, three of which are located on the ground floor below currently or formerly occupied loft apartments. The mixed used parcels include manufacturing, auto body repair, retail petroleum, and surface parking uses. The surrounding area is developed with residential homes, apartment buildings, commercial retail stores, a public library, and a bus storage facility. The NYCEDC is considering disposition of the Site for a mixed use development of housing, retail/entertainment space, media/office space, not-for-profit performing /media arts space, hotel and public open space. The proposed action would replace an existing, at-grade bus storage facility with an underground replacement facility for those operations.

The Phase II ESI was completed to assess Recognized Environmental Conditions (RECs) identified during the Phase I Environmental Site Assessment (ESA) which was completed by Metcalf & Eddy, Inc. and dated November 2006. The Phase I ESA identified RECs pertaining to the potential presence of petroleum underground storage tanks identified at the Site through visual observations and historical records, two open NYSDEC spill cases and offsite (adjacent) areas of concern including an adjacent service/gasoline station, several service/gasoline stations hydraulically upgradient and cross gradient to the Site and an adjacent dry cleaning establishment.

Phase II ESI field activities were performed on May 2 through 15, 2007, and included a geophysical survey, advancement of soil borings and collection of soil, sub-surface soil vapor and groundwater samples for laboratory analysis.

Findings from the geophysical survey performed on May 2 through 8, 2007 identified the presence of two (2) anomalies which appeared to be consistent in size to 1,000 gallon underground storage tanks (USTs), located at the northeast corner lot at Third Avenue and 126th Street. Additionally, multiple anomalies were identified through the Site and are likely the result of metal pipes/plates and former concrete/brick foundation walls.

Soil sample analytical results indicated concentrations of semi-volatile organic compounds (SVOCs) and metals in exceedance of both the New York State Department of Environmental Conservation (NYSDEC) Recommended Soil Cleanup Objectives (RSCOs) and NYSDEC Brownfields Cleanup Program (BCP) Track 1 Soil Cleanup Objectives (SCOs) and/or NYSDEC eastern background concentrations (metals only). SVOCs exceeding NYSDEC RSCOs and NYSDEC BCP Track 1 SCOs consisted of the following compounds: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene. Metals exceeding NYSDEC RSCOs, NYSDEC BCP Track 1 SCOs and eastern background levels consisted of the following compounds: barium, calcium, chromium, copper, lead, magnesium, mercury, nickel and zinc. The elevated concentrations of these compounds are attributed to the historic fill material present. Although one volatile organic compound (VOC), acetone, was detected in exceedance of the RSCO and BCP Track 1 values, this is attributed as a common laboratory contaminant.

Groundwater sample analytical results indicated concentrations of several VOCs, SVOCS and metals in exceedance of NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Class GA Standards or Guidance Values. The following compounds were in exceedance of

TOGS: cis-1,2-dichloroethene, tetrachloroethene, benzene, ethylbenzene, m/p-xylenes, isopropylbenzene, benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, aluminum (total), antimony (total), iron (total), lead (total) magnesium (total), manganese (total), mercury (total) and sodium (total), aluminum (dissolved), antimony (dissolved), iron (dissolved), lead (dissolved), magnesium (dissolved), manganese (dissolved), selenium (dissolved) and sodium (dissolved). No detectable concentrations of PCBs or pesticides were identified in the groundwater samples.

Sub-surface soil vapor sample analytical results indicated elevated concentrations of several VOCs including: tetrachloroethene (PCE) and trichloroethene (TCE) above the New York State Department of Health (NYSDOH) Air Guidance Values (AGVs) in sub-surface soil vapor. The source of these chlorinated VOCs is likely attributed to dry cleaner operations. In addition, petroleum related compounds including benzene, ethylbenzene, toluene, and xylene were detected at concentrations above expected background values published by NYSDOH. The source of these petroleum-related VOCs is likely attributed to nearby gasoline stations.

Three general areas of environmental concern have been identified as a result of this Phase II ESI as follows:

- Environmental impacts to the Site due to the known petroleum spill associated with an active gasoline station at 255 East 125th Street (Block 1790, Lot 24);
- Presence of two former gasoline USTs at the northeast corner lot of Third Avenue and 126th Street (southwest corner of Block 1791); and
- Presence of soil vapor attributed in part to the dry cleaners at 2315 Third Avenue (Block 1790, Lot 46), the gasoline station at 255 East 125th Street and any other similar off-site nearby potential sources.

For future Site development, the following actions are recommended:

- Additional soil and groundwater investigations, followed by remediation of the gasoline station property area located at 255 East 125th Street (Block 1790, Lot 24);
- Removal of the former gasoline USTs at the northeast corner lot of Third Avenue and 126th Street (southwest corner of Block 1791) in accordance with NYSDEC tank closure regulations; and
- New buildings constructed in the area should consider incorporating soil vapor barriers or other vapor mitigation procedures in accordance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

Additionally, in accordance with industry practice, the following is recommended:

- If shallow soils at the site are excavated during renovations or construction activities, it is recommended that the soils be characterized to identify material handling requirements and for material reuse, handling and/or waste disposal requirements and be managed in accordance with federal, state and local regulations.
- If landscaped areas are incorporated into the development of the Site, then at least two foot thick certified clean fill cap should be placed over on-site soils in these areas.

- If dewatering is required for construction activities, then groundwater at the locations of dewatering should be sampled and the need for pretreatment assessed prior to discharge to the NYC sewer.

The total cost of environmental remediation at the Site is difficult to assess given the large area covered by the Site, limits of environmental investigation activities, and lack of detailed development plans for the Site at this time. However, for planning purposes, order-of-magnitude estimates of environmental remediation costs are provided herein ranging from approximately \$2 to \$4 million. This estimate is based on assumptions that there are two significant source areas of petroleum contamination (the active gasoline station at 255 East 125th Street and the northeast corner lot at Third Avenue and 126th Street) that may cost approximately \$1 to 2 million to remediate, assuming that on-site soil is contaminated to a depth of 10 to 20 feet and that groundwater is also contaminated. This estimate also assumes that there is a source area of chlorinated VOCs at the dry cleaners at 2315 Third Avenue that may cost approximately \$0.5 million to remediate; and that mitigation measures for soil vapor intrusion, consisting of passive vapor barriers for new buildings, are implemented across approximately half the Site at a cost of approximately \$0.5 to \$1 million. The cost of handling and disposal of fill material from the Site is not included in these costs. The actual cost will vary based upon final design, market conditions at the time the work is performed and the competitive bidding process used.

1.0 INTRODUCTION

1.1 Purpose

The New York City Economic Development Corporation (NYCEDC) requested that STV Incorporated (STV) conduct a Phase II Environmental Site Investigation (ESI) associated with the three parcels identified as Block 1791, Lots 1, 25, and 34 (Parcel A), Block 1790, all lots (Parcel B), and Block 1789, Lot 46 (Parcel C). These parcels are located from just south of East 125th Street to East 127th Street between Second and Third Avenues in East Harlem, New York, New York (hereafter referred to as the "Site"). The Site is approximately 241,000 square feet (6 acres) in area. The Site consists of 15 vacant lots, three lots that are reported as vacant but utilized for parking, and nine mixed use commercial/retail businesses, three of which are located on the ground floor below currently or formerly occupied loft apartments. The mixed used parcels include manufacturing, auto body repair, retail petroleum, and surface parking uses. The surrounding area is developed with residential homes, apartment buildings, commercial retail stores, public library, and a bus storage facility.

Figure 1 presents a Site Location Map and Figure 2 presents a Soil, Groundwater, Soil Vapor and Ambient Air Sampling Location Plan.

The Phase II ESI was completed to assess Recognized Environmental Conditions (RECs) identified during the Phase I ESA, completed by Metcalf & Eddy, Inc. and dated November 2006.

1.2 Recognized Environmental Conditions

The Phase I ESA Report identified two on-site and three off-site RECs and provided recommendations for further environmental site assessment to better define areas of potential environmental liability associated with the Site. Based on the results of the Phase I ESA, the following RECs were identified:

- Two open NYSDEC spill cases: 1) On-Site NYSDEC Spill Case No. 9711337 for Block 1790, Lot 25 (reported 1/9/98) and 2) NYSDEC Spill Case No. 0306147 for Block 1791, Lot 25 (reported 9/10/03) which is adjacent to the NYC Transit lot;
- Service/gasoline station at 255 East 125th St. (Block 1790, Lot 24);
- Several off-Site service/gasoline stations hydraulically upgradient and cross gradient to the Site;
- Dry cleaning establishment at 2315 Third Ave, (Block 1790, Lot 46);
- Demolition of structures may have left in-place petroleum underground storage tanks (USTs); and
- On-Site potential presence of petroleum underground storage tanks identified at the Site through visual observations and historical records.

2.0 SITE SETTING

2.1 Current Facility Description

The Site is approximately 241,000 square feet (6 acres) in area. The Site consists of three parcels identified as Block 1791, Lots 1, 25, and 34 (Parcel A), Block 1790, all lots (Parcel B), and Block 1789, Lot 46 (Parcel C) which are located from East 127th Street to just south of East 125th Street between Second and Third Avenues in East Harlem, New York, New York (hereafter referred to as the "Site"). The Site consists of 15 vacant lots, three lots that are reported as vacant but utilized for parking, and nine mixed use commercial/retail businesses, three of which are located on the ground floor below currently or formerly occupied loft apartments. The mixed used parcels include manufacturing, auto body repair, retail petroleum, parking areas and the currently or formerly occupied residential uses.

2.2 Site Physical Characteristics

2.2.1 Topography

According to a review of the United States Geological Survey (USGS) 7.5-Minute Quadrangle Map, Central Park, NY, dated 1966, the elevation of the Site area is approximately 15 feet above mean sea level. The topography within the immediate area is relatively flat with a slight slope to the east. A copy of the topographic map is presented as Figure 1.

2.2.2 Geology

Manhattan is underlain by high-grade metamorphic bedrock consisting of a sequence of Cambrian and Ordovician age gneiss, schistose-gneiss, and marble. The bedrock is characterized by numerous faults and fractures, many of which are transmissive and contain groundwater. Unconsolidated sediments overlie the bedrock and consist of Pleistocene aged sand, gravel and silty clays, deposited by glacial-fluvial activity.

2.2.3 Soils

The soils beneath the Site are classified as Urban Land Complex. Urban Land refers to soils that have been altered by human activities thus making them unidentifiable. Typically, these soils have been mixed with other materials, such as brick and concrete, and characteristics can only be determined by on-site investigation.

2.2.4 Hydrology

Groundwater generally occurs within the unconsolidated sediments at average depths of 10 to 20 feet below ground surface. Groundwater also occurs in bedrock within secondary permeability zones such as fractures, faults and foliation planes. Regional groundwater flow direction is generally controlled by regional topography with groundwater flow from higher to lower elevations. According to the USGS 7.5-minute Quadrangle map, Central Park, NY, dated 1966, groundwater is inferred to flow in an easterly direction towards the East River, which is located approximately ¼ of a mile to the east of the Site.

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Groundwater in the vicinity of the Site is not known to be used for human consumption, as most potable water in the area is derived from upstate reservoirs. Estimated groundwater levels and/or flow direction(s) may vary due to seasonal fluctuations in precipitation, local usage demands, geology, underground structures, or dewatering operations.

3.0 DESCRIPTION OF PHASE II FIELD ACTIVITIES

To address the recognized environmental conditions (RECs) identified during the Phase I Environmental Site Assessment, STV completed a focused subsurface investigation on May 2, 3, 4, 7, 8, 9, 10, 11, 14 and 15, 2007, which included the following efforts:

- Geophysical survey to clear locations of proposed boring from buried utilities and to determine if USTs were located throughout the Site.
- Advancement of fourteen soil borings to approximately 15 ft-bgs or depth of refusal.
- Collection of soil samples from each boring for laboratory analyses.
- Installation of six (6) temporary well points (TWPs).
- Collection of groundwater samples from each TWP for laboratory analyses.
- Collection of six (6) sub-surface vapor samples for laboratory analysis.
- Collection of one (1) ambient air sample for laboratory analysis.

The scope and methods used for the various field activities are documented below.

3.1 Geophysical Survey

A geophysical survey was performed between May 2 and 8, 2007 by NOVA Geophysical Services (NOVA), of Forest Hills, New York. The survey was done to determine if USTs were located at the Site and the proposed soil boring locations conflicted with subsurface structures or utilities. The geophysical survey consisted of ground penetrating radar (GPR) and precision utility location (PUL) methods. The surveyed areas included accessible areas within the Site. Boring locations were established in areas that did not conflict with subsurface structures or utilities which were identified and marked out. NOVA's geophysical survey report is provided in Appendix A.

3.2 Subsurface Soils Investigation

A soil sampling program was conducted as part of this Phase II ESI. Soil samples were collected to assess the RECs identified during the Phase I ESA and to determine the nature of soils to be encountered during Site demolition and construction activities. Figure 2 depicts the soil boring locations.

As part of this Phase II ESI, a subsurface soil sampling program was completed between May 9 and 15, 2007 utilizing Aquifer Drilling and Testing, Inc. (ADT), of New Hyde Park, New York. Direct push drilling methods utilizing a Geoprobe rig were used to retrieve soil samples from fourteen borings using 5-foot long, 2-inch diameter Macro Cores® lined with acetate sleeves that were advanced continuously from grade to the depth of the last required soil sample, refusal and/or the soil groundwater interface. Upon completion of soil sampling, direct push drilling methods continued to a depth of approximately 15-

20 feet below grade surface (ft bgs) for installation of temporary well points (TWPs) at boring locations B1, B4, B8, B9, B13 and B16.

A total of fourteen (14) borings (B1, and B4 through B16), were advanced at strategic locations throughout the Site which would be representative of sub-surface Site soils. Borings B2 and B3 were omitted from the sampling analysis plan due to site access restrictions.

Soil samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), PCBs, pesticides and list of target analyte list (TAL) metals.

A description of the soils retained in each Geoprobe sampler was logged by a qualified scientist, and the soils were monitored in the field for the presence of VOCs with a photoionization detector (PID). PID headspace readings from eleven of the fourteen boring locations indicated no presence of volatiles, with readings of 0.0 or non-detect (ND). Three of the fourteen boring locations (B6, B13 and B15) had elevated PID headspace readings as follows: B6, located in the MTA Third Avenue parking lot facing East 126th Street, at 30 parts per million (ppm) (PID units); B13, located adjacent to the Dunkin' Donuts and BP Gas Station at the corner of 2nd Avenue and East 125th Street, at 591 ppm and B15, located next to the Lee Myles/Midas Muffler building facing East 125th Street, at 350 ppm. It was determined during the field activities that the Site is underlain by urban fill consisting of fine silts and medium sands, concrete and brick from an interval of 0 to approximately 10 feet below grade and overlying native materials consisting of fine to coarse sands with little or no fines. The soil boring logs are presented in Appendix B.

Upon completion of probing, each boring was backfilled to near grade surface. The borings were patched at the surface with concrete where necessary.

The soil sample analytical plan is presented as Table 1 and provides information on the sample identification, sample depth interval, boring depth, PID levels and the analytical parameters sampled for. An "X" indicates that the sample analysis was performed for that analytical parameter.

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Table 1

Soil Sample Analytical Plan

Sample Identification	Sample Interval Depth (ft bgs)	Boring Depth (ft bgs)	PID Levels (ppm)	TCL VOCs	TCL SVOCs	RCRA Metals	PCBs and Pesticides
B1(1-3')/ B1(2')	1 – 3	20	0.0	X	X	X	X
B4 (0-2')/ B4 (2')	0 – 2	20	0.0	X	X	X	X
B4 (12-14')/ B4 (13')	12 – 14	20	0.0	X	X	X	X
B5 (1-3')/ B5 (3')	1 – 3	15	0.0	X	X	X	X
B5 (12-14')/ B5 (13')	12 – 14	15	0.0	X	X	X	X
B6 (0-2')/ B6(2')	0 – 2	15	30	X	X	X	X
B6 (12-15')/ B6 (15')	12 – 15	15	0.0	X	X	X	X
B7 (7- 8)/ B7(6')	7 – 8	15	0.0	X	X	X	X
B7 (12-13')/ B7(11')	12 – 13	15	0.0	X	X	X	X
B8 (3-5')/ B8(2')	3 – 5	20	0.0	X	X	X	X
B8 (10-12')/ B8(10')	10 – 12	20	0.0	X	X	X	X
B9 (8-10')/ B9(6')	8 – 10	20	0.0	X	X	X	X
B9 (12-13')/ B9(11')	12 – 13	20	0.0	X	X	X	X
B10 (1-3')/ B10(2')	1 – 3	6	0.0	X	X	X	X
B11 (2-4')/ B11(2')	2 – 4	15	0.0	X	X	X	X
B11 (12-15')/ B11(14')	12 – 15	15	0.0	X	X	X	X
B12 (0-2')/ B12(1')	0 – 2	15	0.0	X	X	X	X
B12 (12-14')/ B12(14')	12 – 14	15	0.0	X	X	X	X
B13 (0.5-2')/ B13(1')	0.5 – 2	20	0.0	X	X	X	X
B13 (15-16')/ B13(15')	15 – 16	20	591	X	X	X	X
B14 (3-5')/ B14(2')	3 – 5	15	0.0	X	X	X	X
B14 (12-14')/ B14 (13')	12 – 14	15	0.0	X	X	X	X
B15(0.5-2')/ B15(1')	0.5 – 2	15	0.0	X	X	X	X
B15 (9-11')/ B15(10')	9 – 11	15	350	X	X	X	X
B16 (8-10')/ B16(6')	8 - 10	20	0.0	X	X	X	X
B16 (12-13')/ B16(11')	12 – 13	20	0.0	X	X	X	X
DUPLICATE @ B7 (9-10')/ B7(5')	9 - 10	15	0.0	X	X	X	X

The samples were collected, preserved as necessary, properly cooled and packaged to prevent breakage, and forwarded via courier to Chemtech of Mountainside, New Jersey, which is a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory. Standard chain-of-custody procedures were followed. Laboratory reports for soil analysis are provided in Appendix C.

3.3 Groundwater Investigation

A groundwater sampling program was conducted as part of the Phase II ESI. Groundwater samples were collected to assess the RECs identified in the Phase I ESA report and identify the nature of groundwater to be encountered during construction dewatering activities. Figure 2 indicates the location of Geoprobe-TWPs installed to collect groundwater samples from boring locations B1, B4, B8, B9, B13 and B16.

As part of this Phase II ESI, groundwater sampling was completed on May 9, 14 and 15, 2007. ADT provided the installation of TWPs by advancing a Geoprobe and installing PVC pipe with a ½” slotted screen to depth by ADT. The groundwater samples were then collected using a peristaltic pump with dedicated polyethylene tubing. The groundwater investigation included the following:

- Groundwater samples were collected from TWPs at six (6) boring locations (B1, B4, B8, B9, B13 and B16). When groundwater was encountered (approximately 15 ft bgs), borings were advanced an additional 5 feet to install the temporary well points.
- Groundwater samples were analyzed for TCL VOCs, TCL SVOCs, PCBs, Pesticides and TAL Metals (total and dissolved). The groundwater sample from B13 was additionally analyzed for NYCDEP Sewer Discharge Parameters. Trip blanks were analyzed for VOCs only.

The groundwater sampling analytical program is summarized in Table 2. Laboratory analysis was performed in accordance with USEPA Publication SW-848.

Table 2
Groundwater Sampling Analytical Plan

Sample Identification	Depth to GW (ft bgs)	TCL VOCs (ppm)	TCL SVOCs	RCRA Metals	PCBs and Pesticides	NYCDEP Sewer Discharge Parameters
B1	15	X	X	X	X	NA
B4	15	X	X	X	X	NA
B8	12	X	X	X	X	NA
B9	14	X	X	X	X	NA
B13	15	X	X	X	X	X
B16	14	X	X	X	X	NA
Duplicate (B8)	20	X	X	X	X	NA

X - indicates sample analysis performed

NA – Not Analyzed.

The samples were collected, preserved as necessary, properly cooled and packaged, and forwarded via courier to Chemtech of Mountainside, New Jersey, which is a NYSDOH ELAP-certified analytical laboratory. Standard chain-of-custody procedures were followed. Laboratory reports for groundwater analysis are provided in Appendix C.

3.4 Sub-Surface Soil Vapor Survey

A sub-surface soil vapor survey was completed to further assess the potential impact from off-site RECs identified during the Phase I ESA. The investigation was performed in accordance with the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006 (NYSDOH Final Guidance). Sub-slab vapor sample locations are shown on Figure 2.

The following suite of 26 volatile organic compounds (VOCs) parameters were selected for reporting from the TO-15 expanded list to evaluate the soil vapor conditions at the Site.

	Compound	Rationale for Including in Parameter Suite
1	Benzene	Petroleum constituent
2	Carbon Tetrachloride	Historically used at dry cleaners
3	Chlorobenzene	Petroleum constituent
4	Chloroethane	Breakdown product of 1,1,1 TCA
5	Chloromethane	Breakdown product of carbon tetrachloride
6	1,2 Dichlorobenzene	Petroleum constituent
7	1,3 Dichlorobenzene	Petroleum constituent
8	1,1-Dichloroethane	Breakdown product of 1,1,1 TCA
9	1,2-Dichloroethane	Breakdown product of PCE and TCE
10	1,1-Dichloroethene	Breakdown product of PCE and TCE
11	<i>Cis</i> -1,2-Dichloroethene	Breakdown product of PCE and TCE
12	<i>trans</i> -1,2-Dichloroethene	Breakdown product of PCE and TCE
13	1,2-Dichloropropane	Unleaded gasoline additive
14	Ethyl Benzene	Petroleum constituent
15	Methyl <i>tert</i> -butyl Ether	Gasoline additive
16	Methylene Chloride	Breakdown product of carbon tetrachloride, paint stripper and cleaning component
17	Naphthalene	Petroleum constituent
18	Tetrachloroethene (PCE)	Dry cleaning solvent
19	Toluene	Petroleum constituent
20	1,1,1 – Trichloroethane	Common degreasing solvent
21	Trichloroethene (TCE)	Dry cleaning solvent
22	1,2,4-Trimethylbenzene	Petroleum constituent
23	1,3,5- Trimethylbenzene	Petroleum constituent
24	Vinyl Chloride	Breakdown product of PCE & TCE, used in PVC
25	m,p-Xylenes	Petroleum constituent
26	o-Xylene	Petroleum constituent

Six sub-surface soil vapor samples at locations B1, B4, B8, B9, B13 and B16 were collected on May 10, 11 and 14, 2007 as part of the sub-surface soil vapor survey. ADT provided drill holes extending approximately 4-5 ft into the subsoil. Sub-surface soil vapor sampling was completed through the advancement of one 3/8" dedicated polyethylene tubing to a depth of approximately 4.5 feet below grade, backfilled and sealed with a bentonite slurry from 3 ft bg to grade. The above-grade end of the polyethylene tubing was connected and sealed to the Summa canister by way of Teflon tape and modeling clay. Three volumes of air were purged from the soil and tubing and PID measurements were taken to confirm free flow of sub-surface soil vapor was taking place. A one hour sampling period was then initiated as recommended by Con-Test Analytical Laboratory (Con-Test) for sufficient volume of air for sample analysis.

The table below presents the PID measurements detected at each bore hole and the locations of the SUMMA Canisters.

Table 3
Sub-Surface Vapor Sampling Summary

Sample Identification	Sample Location	PID Levels (ppm)
B1	South side of E. 127th St. between Manhattan Coach Works (auto repair) and Suzuki.	ND
B4	MTA lease - New Lot	ND
B8	East side of Third Ave next to dry cleaners	ND
B9	South side of East 126th St.; Second lot E/O Third Ave. and next to corner dry cleaners	ND
B13	Second Ave. between E. 125th and 126th; lot is next to the corner gas station and adjacent to a Dunkin' Donuts.	ND
B16	South side of East 125th St.; SE corner lot at Third Ave.	ND

After collection, the SUMMA Canisters were submitted for analysis to Con-Test Analytical Laboratory of East Long Meadow, Massachusetts (ELAP/NELAP # 10899) and analyzed using United States Environmental Protection Agency (USEPA) Method TO-15. Standard chain-of-custody procedures were followed. Laboratory reports for soil vapor analysis are provided in Appendix D.

3.5 Ambient Air Survey

One ambient air sample was collected on May 11, 2007 utilizing a certified clean Summa canister for quality assurance/quality control (QA/QC) purposes. The sample was collected at a height of approximately three (3) feet above grade to simulate breathing zone conditions. The investigation was performed in accordance with the NYSDOH Final Guidance. The ambient air sample location is shown on Figure 2.

The sample was collected for a 4-hour period. The four hour period was selected to overlap with the collection of subsurface soil vapor samples taken on the same day. Table 4, below, denotes the sample location and PID reading.

Table 4
Ambient Air Sampling Summary

Sample Identification	Sample Location	PID Levels (ppm)
Ambient	South side of East 126th St.; 6th lot E/O Third Ave. (NW corner of lot)	ND

After collection, the SUMMA Canister was submitted for analysis to Con-Test Analytical Laboratory of East Long Meadow, Massachusetts (ELAP/NELAP # 10899) a certified laboratory and analyzed using USEPA Method TO-15. Standard chain-of-custody procedures were followed. Laboratory reports for ambient air analysis are provided in Appendix D.

4.0 DISCUSSION OF PHASE II FINDINGS

This section discusses the Phase II analytical data and findings. The complete laboratory analytical data reports are included in Appendices C and D for environmental samples. Tabulated detected compounds in the various environmental media sampled are presented in Appendix E.

4.1 Applicable Regulatory Standards and Guidelines

This subsection discusses the NYSDEC regulatory standards and guidelines used to interpret the soil and groundwater analytical results. New York State has not promulgated soil standards, but soil guidance values have been established under various NYSDEC regulatory programs. The particular standards and guidelines used to evaluate the data are described individually below.

4.1.1 *Recommended Soil Cleanup Objectives (RSCOs)*

New York State has not promulgated soil standards, but Recommended Soil Cleanup Objectives (RSCOs) have been established under the NYSDEC Technical and Administrative Guidance Memorandum HWR-4046 (TAGM) Determination of Soil Cleanup Objectives and Cleanup Levels,” dated January 1994 and amended on December 20, 2000. Soils analytical results were compared to the TAGM RSCOs. These criteria aided in the assessment of soils that were potentially impacted by former activities at the Site. The results of the metals analysis were also compared to the Eastern USA Background concentrations included in TAGM.

4.1.2 *Brownfields Cleanup Program (Subpart 375)*

Analytical results for soil samples were also compared to Track 1 of the NYSDEC Brownfields Cleanup Program (BCP) multi-track remedial programs and site use-based soil cleanup objectives (SCOs) as promulgated in the 6 NYCRR § 375 regulations effective December 14, 2006. Soil cleanup objectives are based on protection of public health and protection of ecological resources.

4.1.3 *Technical and Operational Guidance Series (TOGS)*

Groundwater sample results were compared against the NYSDEC ground water quality standards and guidance values provided in 6 NYCRR § 700 – 705 and described in Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.

4.1.4 *NYCDEP Sewer Discharge Parameters*

Groundwater sample results from boring B13 were compared against New York City Department of Environmental Protection (NYCDEP) Bureau of Wastewater Treatment: Limitations for Effluent to Sanitary or Combined Sewers standards, effective May 1, 2005.

4.1.5 *Sub-Surface Soil Vapor Guidelines*

Analytical results for sub-surface soil vapor samples were compared to the NYSDOH Air Guideline Values (AGVs) and to three background databases for indoor and outdoor air published in the NYSDOH Final Guidance, Summary of Background Levels (NYSDOH BGL). These include the NYSDOH 2003 Study of VOCs in Air of Fuel Oil Heated Homes, which included indoor and outdoor samples from 104 fuel oil-heated homes in New York State; the USEPA 2001 Building Assessment and Survey Evaluation (BASE) database, which included concentrations of VOCs from 100 randomly selected public and commercial buildings; and, the Health Effects Institute (HEI) Relationship of Indoor, Outdoor, and Personal Air (RIOPA) study, which includes data collected from 100 homes in 3 cities between 1999 and 2001.

4.1.6 *Ambient Air Guidelines*

Analytical results for ambient air samples were compared to the nearest New York State Department of Environmental Conservation (NYSDEC) Ambient Air Monitoring Station located at Intermediate School (I.S.) 52 in the Bronx, located approximately 2.2 miles northeast of the Site, which is the closest air monitoring station to the Site.

4.2 *Geophysical Survey Findings*

Findings from the geophysical survey performed between May 2 and 8, 2007 identified the presence of two (2) anomalies which appeared to be consistent in size to 1,000 gallon USTs and are located at the northeast corner lot of Third Avenue and 126th Street. Additionally, multiple anomalies were identified throughout the Site and are likely the result of metal pipes/plates and former concrete/brick foundation walls. The geophysical findings report is provided in Appendix A.

4.3 *Sub-Surface Soil Sampling Findings*

4.3.1 *Volatile Organic Compounds (VOCs) in Soil*

Soil sample analytical results identified detectable concentrations of acetone, methylene chloride, 2-butanone, trichlorofluoromethane, benzene, toluene, tetrachloroethene and carbon disulfide. Only one VOC (acetone, at 0.21 mg/kg; location B-16 (6') and 0.37 mg/kg; location B16 (11')), exceeded both NYSDEC RSCOs (0.2 mg/kg) and NYSDEC BCP Track 1 SCO (0.05 mg/kg). Acetone is a common laboratory contaminant and the detection of this constituent can be attributed to its use in the laboratory. All remaining detected VOCs were detected below their respective regulatory levels. The analytical data summary table is presented in Table E-1 in Appendix E. The analytical data report is provided in Appendix C.

4.3.2 *Semi-Volatile Organic Compounds (SVOCs) in Soil*

Laboratory analytical results indicated that detectable concentrations of targeted TCL SVOCs were present at all boring locations. The analytical data summary table is presented in Appendix E and the analytical data report is provided in Appendix C.

Exceedances of NYSDEC RSCOs and NYSDEC BCP Part 375 SCOs were encountered at twelve sample intervals and at a duplicate location (boring locations B4(0-2), B5(1-3), B6(0-2), B7(7-8), B9(8-10), B8(10-12), B11(2-4), B12(0-2), B13(0-2), B14(3-5), B16(8-10), B16(12-13) and Duplicate at B7) and included the following TCL SVOCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene) and Indeno(1,2,3-cd)pyrene. Exceedances of SVOCs in soil are summarized in Table 5. The exceedances of these compounds are attributed to the presence of historical urban fill materials and any combusted materials therein.

Table 5
SVOCs in Soil - Exceedances Summary

SVOC	NYSDEC TAGM 4046 RSCOs (ppm)	Track 1 Unrestricted Use Part 375-6.8 (ppm)	B4 0-2 ft-bgs	B5 1-3 ft-bgs	B6 0-2 ft-bgs	B7 7-8 ft-bgs	B8 10-12 ft-bgs	B9 8-10 ft-bgs	B11 2-4 ft-bgs	B12 0-2 ft-bgs	B13 0-2 ft-bgs	B14 3-5 ft-bgs	B16 8-10 ft-bgs	B16 12-13 ft-bgs	DUP (B7) 9-10 ft-bgs
Benz(a)anthracene	0.224 or MDL	1	2.7J	NE	2.6	2.5	NE	NE	41D	NE	14	NE	2J	2J	NE
Benzo(a)pyrene	0.061 or MDL	1	4.1J	1.4J	5.5	3.3	NE	NE	49D	1.6J	21	2.8J	2.8J	2.7J	1.5
Benzo(b)fluoranthene	1.1	1	5J	1.7J	7.1	4	1.3	1.2J	66D	3J	30D	1.5J	3.7J	3.3J	2.3
Benzo(k)fluoranthene	1.1	0.8	1.9J	NE	2.5	ND	NE	NE	22D	1.3J	10	ND	ND	ND	NE
Chrysene	0.4	1	2.6J	NE	2.8	2.2	NE	NE	35D	1.1J	15	NE	2.2J	2J	NE
Dibenzo(a,h)anthracene	0.014 or MDL	0.33	ND	ND	0.36J	ND	NE	NE	2.1	ND	ND	NE	ND	ND	NE
Indeno(1,2,3-cd)pyrene	3.2	0.5	NE	NE	NE	NE	NE	NE	5.5	ND	NE	NE	ND	ND	0.92

ND – not detected; NE – detected but does not exceed the regulatory levels; J-estimated value below the method detection level; D-diluted.

4.3.3 TAL Metals in Soil

A review of the analytical results indicates that the following metals: aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium and silver were detected in the samples. Detected concentrations of barium, calcium, chromium, copper, lead, magnesium, mercury, nickel and zinc exceeded the NYSDEC TAGM RSCOs, Eastern USA Background Concentrations and NYSDEC BCP Track 1 SCOs.

Barium was detected in sample locations B12(0-2) at 1,020 mg/kg, B13(0-2) at 765 mg/kg and Dup-B7(9-10) at 605 mg/kg and exceeded the NYSDEC RSCO level of 300 mg/kg, maximum eastern background level of 600 mg/kg and NYSDEC BCP Track 1 SCO level of 350 mg/kg.

Calcium was detected at multiple locations [B5(1-3), B6(0-2), B7(7-8), B9(12-15), B12(0-2), B13(0-2), B15(1-3), B16(8-10), B16(12-13) and Dup-B7(9-10)] with exceedances ranging from 35,300 mg/kg to 79,400 mg/kg which exceed the maximum eastern background level of 35,000 mg/kg. NYSDEC RSCOs use background levels for regulatory purposes and no NYSDEC BCP Track 1 SCOs are available for calcium.

Chromium was detected at sample location B13(0-2) at a concentration of 45.1 mg/kg which exceeded the NYSDEC RSCO level of 10 mg/kg or site background and above maximum eastern background level of 40 mg/kg. No NYSDEC BCP Track 1 SCOs are available for chromium.

Copper was detected at sample locations B6(0-2) at 63.9 mg/kg and B9(8-10) at 101 mg/kg exceeding NYSDEC RSCO level of 25 mg/kg, maximum eastern background level of 50 mg/kg and NYSDEC BCP Track 1 SCO level of 50 mg/kg.

Lead was detected at multiple sample locations with exceedances ranging from 112 mg/kg to 4,170 mg/kg which exceed the maximum eastern background level of 500 mg/kg and NYSDEC BCP Track 1 SCO level of 63 mg/kg. Site background levels are used for NYSDEC RSCOs.

Magnesium was detected at multiple sample locations with exceedances ranging from 5,540 mg/kg to 14,000 mg/kg which exceed the maximum eastern background level of 5,000 mg/kg. Site background levels are used for NYSDEC RSCOs and no NYSDEC BCP Track 1 SCOs are available for magnesium.

Mercury was detected at multiple sample locations ranging from 0.215 mg/kg to 2.8 mg/kg which all exceed NYSDEC RSCO level of 0.1 mg/kg, maximum eastern background level of 0.2 mg/kg and NYSDEC BCP Track 1 SCO level of 0.18 mg/kg.

Nickel was detected at sample location B11(12-15) at 30.7 mg/kg and exceeding NYSDEC RSCO level of 13 mg/kg or site background, maximum eastern background level of 25 mg/kg and NYSDEC BCP Track 1 SCO level of 30 mg/kg.

Zinc was detected at multiple sample locations ranging from 111 mg/kg to 1,240 mg/kg which all exceed NYSDEC RSCO level of 20 mg/kg or site background, maximum eastern background level of 50 mg/kg and NYSDEC BCP Track 1 SCO level of 109 mg/kg.

Elevated metals concentrations are attributed to historic fill/demolition material. The analytical data summary table is presented in Appendix B and the analytical data report is provided in Appendix C.

4.3.4 Polychlorinated Biphenyls (PCBs) in Soil

The laboratory results indicate that no detectable concentrations of PCBs were present in the soil samples collected. The analytical data is summarized in Appendix E and the analytical data report is provided in Appendix C.

4.3.5 Pesticides in Soil

The laboratory results indicate that detectable concentrations of the following pesticides were detected on Site: aldrin, dieldrin, 4,4-DDE, 4,4-DDD, 4,4-DDT, endrin, alpha-chlordane and gamma chlordane. None of the detected pesticides were above NYSDEC RSCOs or NYSDEC BCP Track 1 SCOs. The presence of these pesticides is likely to be the result of historic urban fill materials. The analytical data is summarized in Appendix E and the analytical data report is provided in Appendix C.

4.4 Groundwater Sampling Findings

Groundwater samples were collected from six (6) TWP's installed at boring locations B1, B4, B8, B9, B13 and B16.

4.4.1 Volatile Organic Compounds (VOCs) in Groundwater

The laboratory results indicated that detectable concentrations of TCL VOCs were present in three of the six groundwater samples collected (locations: B1, B9 and B13). Exceedances of NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards Guidance Values were present in groundwater samples B1 and B13. Compounds in exceedance of TOGS guidance and standard values included: cis-1,2-dichloroethene (6 ug/L) and tetrachloroethene (16 ug/L) at TWP B1, and benzene (5.2 ug/L), ethyl benzene (470 ug/L), m/p-xylenes (39 ug/L) and isopropylbenzene (140 ug/L) at TWP B13. The presence of compounds in exceedance of TOGS at location B13 are hydrocarbons consistent with gasoline additives and can be attributed to the nearby retail petroleum station and is likely the result of historic filling and pumping activities. The presence of chlorinated VOCs is likely attributed to dry cleaner operations. The analytical data summary table is presented in Appendix E and the analytical data report is provided in Appendix C.

4.4.2 Semi-Volatile Organic Compounds (SVOCs) in Groundwater

The laboratory results indicated that detectable concentrations of TCL SVOCs were present in four of the six groundwater samples collected (locations: B1, B8, B13 and B16). Exceedances of NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards Guidance Values were present in one groundwater sample at location B13. Compounds in exceedance of TOGS guidance and standard values included: benz(a)anthracene (0.76 ug/L), chrysene (0.67 ug/L), benzo(b)fluoranthene (0.84 ug/L) and benzo(k)fluoranthene (0.58 ug/L). The presence of compounds in exceedance of TOGS at location B13 can be attributed to the nearby retail petroleum station and is likely the result of historic filling and pumping activities. The analytical data summary table is presented in Appendix E and the analytical data report is provided in Appendix C.

4.4.3 TAL Metals (Total) in Groundwater

The laboratory results indicated that detectable concentrations of Target Analyte List (TAL) total metals were present at all TWP sample locations. The following total metals: aluminum, antimony, iron, lead, magnesium, manganese, mercury and sodium were detected.

Exceedances of aluminum were detected at all sample locations with the exception of B13 and concentrations ranged from 247 ug/L to 9,520 ug/L, all in exceedance of TOGS standard or guidance value of 100 ug/L. A duplicate (B8) detection of 1,290 ug/L was also found.

Antimony was detected in exceedance of TOGS standard or guidance value of 3 ug/L at the following locations: B1 (26.6 ug/L), B4 (10.3 ug/L) and B9 (4.36 ug/L).

Iron was detected in exceedance of TOGS standard or guidance value of 300 ug/L at all sample locations, with concentrations ranging from: 380 ug/L at B4 to 11,900 ug/L at B8. A duplicate (B8) detection of 1,700 ug/L was also found.

Lead was detected in exceedance of TOGS standard or guidance value of 25 ug/L at two locations: B8 (37.7 ug/L) and B9 (79.4 ug/L).

Magnesium was detected in exceedance of TOGS standard or guidance value of 35,000 ug/L at four locations: B1 (57,300 ug/L), B4 (278,000 ug/L), B9 (81,700 ug/L) and B16 (190,000).

Manganese was detected in exceedance of TOGS standard or guidance value of 300 ug/L at four locations: B8 (952 ug/L), B9 (616 ug/L), B13 (1,250 ug/L) and B16 (3,860 ug/L). A duplicate (B8) detection of 441 ug/L was also found.

Mercury was detected in exceedance of TOGS standard or guidance value of 0.7 ug/L at sample location B13, with a concentration of 0.11 ug/L.

Sodium was detected in exceedance of TOGS standard or guidance value of 20,000 ug/L at all sample locations, with concentrations ranging from: 56,500 ug/L at B9 to 464,000 ug/L at B1.

4.4.4 TAL Metals (Dissolved) in Groundwater

The laboratory results indicated that detectable concentrations of TAL dissolved metals were present at all sample locations. The following total metals: aluminum, antimony, iron, lead, magnesium, manganese, selenium and sodium were detected.

Exceedances of aluminum were detected at sample locations B8 and B13 with concentrations 383 ug/L and 135 ug/L respectively, which exceed TOGS standard or guidance value of 100 ug/L.

Exceedances of antimony were detected at sample locations B4 and B9 with concentrations 30.5 ug/L and 80.2 ug/L respectively, which exceed TOGS standard or guidance value of 3 ug/L.

Iron was detected in exceedance of TOGS standard or guidance value of 300 ug/L at sample locations B8, B13 and B16, with concentrations 661 ug/L, 967 ug/L and 914 ug/L respectively.

Lead was detected in exceedance of TOGS standard or guidance value of 25 ug/L at sample location B8 with concentration 33.9 ug/L.

Magnesium was detected in exceedance of TOGS standard or guidance value of 35,000 ug/L at four locations: B1 (56,100 ug/L), B4 (253,000 ug/L), B9 (89,900 ug/L) and B16 (175,000).

Manganese was detected in exceedance of TOGS standard or guidance value of 300 ug/L at three locations: B8 (479 ug/L), B13 (1,310 ug/L) and B16 (3,910 ug/L). A duplicate (B8) detection of 340 ug/L is also noted.

Selenium was detected in exceedance of TOGS standard or guidance value of 10 ug/L at sample location B1, with a concentration of 15.5 ug/L.

Sodium was detected in exceedance of TOGS standard or guidance value of 20,000 ug/L at all sample locations, with concentrations ranging from: 63,700 ug/L at B9 to 451,000 ug/L at B1.

4.4.5 Polychlorinated Biphenyls (PCBs) in Groundwater

The laboratory results indicate that no detectable concentrations of PCBs were present in groundwater samples collected. The analytical data is summarized in Appendix E and the analytical data report is provided in Appendix C.

4.4.6 Pesticides in Groundwater

The laboratory results indicate that no detectable concentrations of pesticides were present in groundwater samples collected. The analytical data is summarized in Appendix E and the analytical data report is provided in Appendix C.

4.4.7 NYCDEP Sewer Discharge Parameters

The laboratory results indicated four exceedances of sewer discharge parameters. Groundwater temperature exceeded sewer discharge limits by approximately 10⁰ Fahrenheit. This exceedance is due to a rise in temperature during sample handling in the laboratory. The remaining three exceedances consist of mercury, zinc and ethylbenzene. The presence of ethylbenzene, a component of gasoline, can be attributed to the nearby retail petroleum station. The presence of the metals can be attributed to historic fill. The analytical data summary table is presented in Appendix E and the analytical data report is provided in Appendix C.

4.5 Sub-Surface Soil Vapor Findings

The results of the investigation identified seventeen compounds above laboratory detection limits in all sub-surface soil vapor samples collected; eleven of which are above expected background values published by NYSDOH. Elevated concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, m,p-xylene, o-xylene, tetrachloroethene (PCE) and toluene were identified in all sub-surface soil vapor sample locations (B1, B4, B8, B9, B13 and B16). Additional elevated concentrations of: benzene (locations: B4, B8, B9, B13 and B16); cis-1,2-dichloroethene (DCE) (locations B4 and B16); trichloroethene (TCE) (locations: B4, B9 and B16) and vinyl chloride (B16) were detected and exceeded NYSDOH AGVs, NYSDOH Fuel Oil Upper Fence Limits, USEPA BASE Data Values, or HEI RIOPA Values. Table 5 below denotes sample locations with elevated VOC concentrations in exceedance of NYSDOH AGVs.

The source of the chlorinated VOCs (PCE, TCE, DCE and vinyl chloride) is likely attributed to dry cleaner operations. In addition, petroleum-related VOCs (benzene, ethylbenzene, toluene, and xylene) is likely attributed to nearby gasoline stations.

Table 6

Detected VOCs in Soil Vapor Above NYSDOH AGVs

Soil Boring Number	VOC	Reported Concentration (µg/m ³)	NYSDOH AGV (µg/m ³)
B9	PCE	450	100
B4	TCE	7.4	5
B9	TCE	5.1	5
B16	TCE	11	5

TCE was detected at a concentrations ranging from 5.1 ug/m³ to 11 ug/m³, which exceeds the NYSDOH AGV of 5 ug/m³. PCE was detected at a concentration of 450 ug/m³, which exceeds the AGV of 100 ug/m³. Concentrations of TCE and PCE detected could require monitoring or mitigation dependant on indoor air concentrations according to decision Matrices 1 and 2 published in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

A summary of the analytical results for VOCs in sub-surface soil vapor samples is presented in Appendix E and the analytical data report is provided in Appendix D.

4.6 Ambient Air Sample Findings

The ambient air sample laboratory analytical results revealed that all detected compounds were below anticipated background concentrations recorded from a nearby NYSDEC air monitoring station located at I.S. 52 in Bronx, NY and listed as air monitoring station 7094-07. A summary of the analytical results for VOCs in the ambient air sample is presented in Appendix E and the analytical data report is provided in Appendix D.

5.0 RECOMMENDATIONS

Three general areas of environmental concern have been identified as a result of this Phase II ESI as follows:

- Environmental impacts to the Site due to the known petroleum spill associated with an active gasoline station at 255 East 125th Street (Block 1790, Lot 24);
- Presence of two former gasoline USTs at the northeast corner lot of Third Avenue and 126th Street (southwest corner of Block 1791); and
- Presence of soil vapor attributed in part to the dry cleaners at 2315 Third Avenue (Block 1790, Lot 46), the gasoline station at 255 East 125th Street and any other similar off-site nearby potential sources.

For future Site development, the following actions are recommended:

- Additional soil and groundwater investigations, followed by remediation of the gasoline station property area located at 255 East 125th Street (Block 1790, Lot 24);
- Removal of the former gasoline USTs at the northeast corner lot of Third Avenue and 126th Street (southwest corner of Block 1791) in accordance with NYSDEC tank closure regulations; and
- New buildings constructed in the area should consider incorporating soil vapor barriers or other vapor mitigation procedures in accordance with the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.

Additionally, in accordance with industry practice, the following is recommended:

- If shallow soils at the site are excavated during renovations or construction activities, it is recommended that the soils be characterized to identify material handling requirements and for material reuse, handling and/or waste disposal requirements and be managed in accordance with federal, state and local regulations.
- If landscaped areas are incorporated into the development of the Site, then at least two foot thick certified clean fill cap should be placed over on-site soils in these areas.
- If dewatering is required for construction activities, then groundwater at the locations of dewatering should be sampled and the need for pretreatment assessed prior to discharge to the NYC sewer.

The total cost of environmental remediation at the Site is difficult to assess given the large area covered by the Site, limits of environmental investigation activities, and lack of detailed development plans for the Site at this time. However, for planning purposes, order-of-magnitude estimates of environmental remediation costs are provided herein ranging from approximately \$2 to \$4 million. This estimate is based on assumptions that there are two significant source areas of petroleum contamination (the active gasoline station at 255 East 125th Street and the northeast corner lot at Third Avenue and 126th Street)

that may cost approximately \$1 to 2 million to remediate, assuming that on-site soil is contaminated to a depth of 10 to 20 feet and that groundwater is also contaminated. This estimate also assumes that there is a source area of chlorinated VOCs at the dry cleaners at 2315 Third Avenue that may cost approximately \$0.5 million to remediate; and that mitigation measures for soil vapor intrusion, consisting of passive vapor barriers for new buildings, are implemented across approximately half the Site at a cost of approximately \$0.5 to \$1 million. The cost of handling and disposal of fill material from the Site is not included in these costs. The actual cost will vary based upon final design, market conditions at the time the work is performed and the competitive bidding process used.

FIGURES

Figure 1 Site Location Map

Figure 2 Soil, Groundwater, Soil Vapor and Ambient Air Sampling Location Plan

APPENDIX A

GEOPHYSICAL SURVEY – REPORT FINDINGS AND FIGURES

APPENDIX B
SOIL BORING LOGS

APPENDIX C

**ENVIRONMENTAL SAMPLES – SOIL AND GROUNDWATER
LABORATORY ANALYTICAL DATA REPORT**

APPENDIX D

**ENVIRONMENTAL SAMPLES – SOIL VAPOR AND AMBIENT AIR
LABORATORY ANALYTICAL DATA REPORT**

APPENDIX E

ENVIRONMENTAL SAMPLING RESULTS SUMMARY TABLES