87-46 123rd Street

Queens, NEW YORK

Remedial Action Work Plan

NYC VCP Project Number 16TEMP077Q

Prepared For:

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Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
HASP	Health and Safety Plan
COC	Certificate of Completion
QAP	Quality Assurance Plan
CSOP	Contractors Site Operation Plan
CUSCO	Commercial Use Soil Cleanup Objective
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
E-SSDS	Enhanced Sub-Slab Depressurization System
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IRM	Interim Remedial Measure
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYS DEC	New York State Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYC VCP	New York City Voluntary Cleanup Program
NYCRR	New York Codes Rules and Regulations
NYS DEC	New York State Department of Environmental Conservation

Acronym	Definition
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
USGS	United States Geological Survey
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

CERTIFICATION

I, Philip Bell, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the 87-46 123rd Street, Borough of Queens, New York, site number 16TEMP077Q. I certify to the following:

- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

_____
Name

_____
PE License Number

_____
Signature

_____
Date

PE Stamp

I, Paul H. Ciminello, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 87-46 123rd Street, Borough of Queens site, site number 16TEMP077Q. I certify to the following:

- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

_____
QEP Name

_____
QEP Signature

_____
Date

EXECUTIVE SUMMARY

On behalf of 123rd Street Holding Corporation, Ecosystems Strategies, Inc. (ESI) is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 95,123-square foot site located at 87-46 123rd Street in Queens, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Background

The Site is located at 87-46 123rd Street in the Richmond Hill section in Queens, New York and is identified as Block 9331 and Lot 30 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 95,123-square feet and is bounded by residential and commercial properties (a storage yard) to the north, 89th Avenue to the south, 123rd Street to the east, and the Long Island Railroad (LIRR) Richmond Hill Line and 121st Street to the west. A survey map indicating the site boundary is shown in Figure 2. Currently, the Site is used for commercial purposes and is the location of GRM Information Management, a document storage repository. The Site contains 12 buildings including several one-story metal and one- to three-story masonry buildings, and four distinct outdoor areas including a parking lot along 123rd Street, central basement-level courtyard, and two exterior areas adjoining the LIRR to the west.

Summary of Redevelopment Plan

The proposed future use of the Site will consist of commercial use including light manufacturing for the visually-impaired and offices. No significant changes in the existing 138,000 square foot building area structures or buildings layout are anticipated (relatively minor interior renovations will occur, including upgrades to stairwells, replacement of a freight elevator, and installation of new bathrooms and a passenger elevator). Site Survey and Fieldwork maps, depicting selected site features, are presented as Figures 2 through 5, respectively. The current zoning designation is M1-1, for manufacturing use. The proposed use is consistent with existing zoning for the property. Currently, the only excavation anticipated is for remedial purposes including installation of the enhanced SSDS and hotspot removals. The remedial action contemplated under this RAWP will be implemented prior to the proposed change of ownership.

Summary of Surrounding Property

The Site is bounded by residential and commercial properties (a storage yard) to the north, 89th Avenue to the south, 123rd Street to the east, and the Long Island Railroad (LIRR) Richmond Hill Line and 121st Street to the west. A survey map indicating the site boundary is shown in Figure 2. Currently, the Site is used for commercial purposes and is the location of GRM Information Management, a document storage repository. The Site contains two one-story metal and several contiguous one- to three-story masonry buildings, with four distinct outdoor areas (parking lot along 123rd Street, central basement-level courtyard, and two exterior areas adjoining the LIRR to the west).

Summary of Past Site Uses and Areas of Concern

Based upon review of a draft Phase I Environmental Site Assessment conducted by PVE Sheffler, LLC & Lawrence Environmental Group, LLC in December of 2015, and information provided by the Site's current owner, the following Site history was established. The first known Site development consists of four residential structures located at the northeastern portion of the property in 1896. The Site was subsequently used for industrial purposes, including the following manufacturing facilities: Keiner Williams Stamping Company (circa 1911 to 1965); Dynamic Electronics New York Inc. (after 1965); and, Dependable Knitwear (after 1965). The Site has been used as a document repository since 1982.

The AOCs identified for this site include:

1. Poor quality urban fill of unknown volume.
2. Potential discharges to eleven (11) floor drains.
3. Potential releases from an on-site aboveground storage tank and two underground storage tanks (one suspected and one historical).
4. Potential for soil vapor intrusion.
5. Potential groundwater contamination from documented on-site contamination as well as off-site sources.

Summary of Work Performed Under Previous Environmental Investigations

Environmental sampling was conducted by PVE Sheffler in January 2016 and Walden Environmental Engineering, PLLC in March 2016. The Site Investigation Report (SIR) prepared by Walden documented the following scope of work.

1. Installed twenty-one soil borings at the Site, and collected soil samples from each boring for chemical analysis;
2. Installed one temporary groundwater monitoring well at the northern portion of the Site (near the parking lot area) and collected one groundwater sample for chemical analysis;
3. Installed twelve soil vapor probes (3 exterior and 9 interior) at the Site and collected twelve sub-slab vapor samples for chemical analysis; and,
4. Collected two indoor-air samples for chemical analysis.

Summary of Work Performed under the Remedial Investigation

On behalf of 123rd Street Holding Corporation, ESI performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Conducted a Geophysical Survey to identify presence of underground utilities, potential USTs;
3. Installed twenty-eight soil borings across the entire project Site, and collected twenty-nine (including one field duplicate sample) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three groundwater monitoring wells throughout the Site to establish groundwater flow and collected four groundwater samples (including one field duplicate sample) for chemical analysis to evaluate groundwater quality; and,
5. Installed four soil vapor probes around the Site perimeter and collected four vapor samples for chemical analysis.

Summary of Findings of Remedial Investigation

1. Elevation of the property ranges from 48.94 to 60.30 feet.

2. Depth to groundwater ranges from 39.80 to 45.93 feet at the Site.

3. Groundwater flow is generally from northeast to southwest beneath the Site.

4. Depth to bedrock is unknown (refusal on dense soil and/or rock was encountered at a maximum depth of 10 feet). Available USGS data indicate likely bedrock elevations at approximately 300 to 400 feet in this portion of Queens.

5. The stratigraphy of the site, from the surface down, generally consists of variable texture sands with gravel, silt and some clay loam (the upper 4 to 6 feet are considered to be likely fill). Refusal was encountered below this interval, indicating a layer of dense soil and/or rocks.

6. May-June 2016 (Remedial Investigation): Twenty-eight (28) representative soil/fill samples were collected for laboratory analysis during the RI. Soil/fill samples were compared to the New York State Department of Environmental Conservation (NYSDEC) 6NYCRR Part 375 Section 6.8 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Commercial Use Soil Cleanup Objectives (CUSCOs). No VOCs were detected above Unrestricted Use SCOs in any soil samples. Trace levels of PCE and TCE were detected in four and five soil samples, respectively. SVOCs, pesticides, and PCBs were found at concentrations above Unrestricted Use SCOs, but below Commercial Use SCOs. Although several metals were detected above Unrestricted Use SCOs, only one metal, arsenic (max. 16.1 mg/kg) in one sample, was detected at concentrations slightly above Restricted Commercial Use SCOs. These findings are consistent with the presence of poor-quality urban fill materials. Overall, soil chemistry is unremarkable and is similar to sites with historical fill in New York City. In order to identify the presence or absence of subsurface impacts associated with releases from on-site floor drains, nine (9) of the soil samples collected during the RI were collected from locations adjacent to the estimated invert of each interior floor drain. Pesticides and/or metals were detected at concentrations above Unrestricted Use SCOs, but below Commercial Use SCOs at four (4) locations. No information regarding the integrity of floor drain piping or discharge points is available; however, these findings suggest a lack of subsurface impacts within the immediate vicinity of the drains.

7. January-March 2016 (Previous Investigations): Sediment was sampled from eight (8) floor drains. No VOCs were detected above Restricted Commercial Use SCOs. The SVOCs (all polycyclic aromatic hydrocarbons [PAHs]) benzo(a)pyrene (max. 6.6 mg/kg), benzo(a)anthracene (max. 8.1 mg/kg), benzo(b)fluoranthene (max 8.4 mg/kg), and dibenzo(a,h)anthracene (max. 1.2 mg/kg) were detected above Restricted Commercial Use SCOs. PCBs including Aroclor 1248 (max. 12 mg/kg) and total PCBs (13.5 mg/kg) were detected above Restricted Commercial Use SCOs. Several metals were detected above Unrestricted Use SCOs including silver (max 118 mg/kg), selenium (max. 26.2 mg/kg), and zinc (max. 2,750 mg/kg). Arsenic (max. 19.7 mg/kg), lead (max. 5,180 mg/kg), copper (max. 7,170 mg/kg), cadmium (max. 76.8 mg/kg), mercury (max. 15.0 mg/kg), cyanide (max. 97.9 mg/kg), nickel (max. 1,700 mg/kg), and trivalent chromium (max. 1,630 mg/kg) were detected exceeding Restricted Commercial Use SCOs. Twenty-one (21) representative soil/fill samples were collected for laboratory analysis. No VOCs were detected above Unrestricted Use SCOs. Three samples contained trace and/or low-level concentrations of PCE and TCE. Several SVOCs (all PAHs) were detected above Restricted Commercial Use SCOs including benzo(a)pyrene (max. 4.3 mg/kg), benzo(a)anthracene (max. 5.5 mg/kg), and dibenzo(a,h)anthracene (max. 0.69 mg/kg). Other SVOCs including indeno(1,2,3-c,d)pyrene (max. 0.61 mg/kg), phenol (max 0.48 mg/kg), and chrysene (1.1 mg/kg) were detected above their Unrestricted Use SCOs only. No PCBs were detected above Restricted Commercial Use SCOs. PCBs including Aroclor 1248 (max. 0.16 mg/kg) and Aroclor 1254 (max. 0.11 mg/kg) were detected above Unrestricted Use SCOs. Lead (max. 19,300 mg/kg) and copper (max. 450 mg/kg) were detected exceeding Restricted Commercial Use SCOs. Several metals were detected above Unrestricted Use SCOs including cadmium (max 9.77 mg/kg), trivalent chromium (max. 68.5 mg/kg), mercury (0.364 mg/kg), nickel (max 30.3 mg/kg), selenium (max. 9.87 mg/kg), and zinc (max. 888 mg/kg).

8. May-June 2016 (Remedial Investigation): Groundwater samples collected during the RI were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). The results showed elevated concentrations of chloroform (max. 42 ug/kg) above its GQS. Trace to low-level concentrations of several other VOCs, including chlorinated solvents, were identified below GQS. TCE was detected in all three groundwater samples (max. of 0.56 ug/L). PCE was detected in one sample at a

concentration of 0.91 ug/L. Detected concentrations of TCE were highest in samples collected at upgradient well locations (indicating an off-site source of groundwater contamination). PCE was only detected at the downgradient well. Contamination from dissolved metals is limited to antimony (max. 8 ug/L), manganese (max. 427 ug/L), and sodium (max. 65,100 ug/L). Elevated levels of total chromium and iron were also identified. No pesticides or PCBs were detected in any groundwater sample. RI findings are consistent with previous site investigations, which did not document significant dissolved contamination in groundwater.

9. March 2016 (Previous Investigations): The laboratory analytical results for the one representative groundwater sample showed an elevated concentration of methylene chloride (5.4 µg/kg) above the GQS. No chlorinated solvents (including PCE and TCE) or PCBs were detected and no SVOCs were detected above the GQS. Elevated concentrations of total metals including chromium (460 µg/L), cobalt (84.1 µg/L), copper (438 µg/L), iron (32,000 µg/L), lead (140 µg/L), magnesium (51,600 µg/L), manganese (11,200 µg/L), nickel (421 µg/L), sodium (29,500 µg/L), thallium (27.5 µg/L), vanadium (332 µg/L), and zinc (2,130 µg/L) as well as dissolved sodium (30,200 µg/kg) were detected above GQS.

10. May-June 2016 (Remedial Investigation): Four (4) representative soil vapor samples were collected for laboratory analysis during the RI. Soil vapor samples were compared to the compounds listed in the New York State Department of Health (NYSDOH) Final Guidance for Evaluation Soil Vapor Intrusion matrices dated October 2006. The results showed elevated concentrations of TCE (max. 690 ug/m^3) in three out of the four samples collected. PCE (max. 97 ug/m^3) was detected in two out of the four samples. Low-grade concentrations from solvents and petroleum related compounds, including 2-butanone, 2-hexanone, acetone, benzene and toluene were detected, as well as one detection of 1,1,1-Tricholroethane (12 ug/m^3). PCE/TCE breakdown products (cis-DCE, trans-DCE and vinyl chloride) and carbon tetrachloride were not detected in any samples. The concentrations of PCE and TCE are above mitigation levels established by the NYSDOH vapor intrusion matrices.

11. January 2016 (Previous Investigation): The laboratory analytical results for seven (7) soil vapor samples indicated moderate to severe vapor intrusion concerns. 1,1,1-Trichloroethane was detected in 4 out of 7 samples with a maximum concentration of 55

ug/m^3. Carbon tetrachloride was detected in 3 out of 7 samples with a maximum concentration of 27 ug/m^3. Both tetrachloroethylene (PCE) and Trichloroethylene (TCE) were detected in concentrations exceeding the guidance values across the site. PCE and TCE were detected in the highest concentrations in soil vapor sample SV06 at 680 ug/m^3 and 2100 ug/m^3 respectively.

Summary of the Remedial Action

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. Evaluation of floor drains to determine relevant construction details and dye testing to identify discharge points for each drain. All sediment (and any liquids) will be removed from on-Site drains by a licensed or permitted waste disposal service provider in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan.
7. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs.
   A portion of the southeastern exterior yard area (where elevated metals contamination was identified) will be excavated to a depth of at least 5 feet below grade in order to achieve Track 4 SCOs.

Excavation activities performed during SSDS construction will result in the generation of a limited volume of soil. This soil will be managed as a regulated waste.

8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
9. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
10. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
11. No tank removal activities are anticipated. One closed-in-place UST and one active fuel AST will remain at the property. Any other USTs that are encountered during soil/fill removal actions will be closed as part of the remedial action. Registration of tanks, reporting of any petroleum spills associated with UST's, and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations will be performed.
12. Collection and analysis of end-point samples (including as warranted the collection and analysis of end-point samples under drains determined to have an inadequate floor) to determine the performance of the remedy with respect to attainment of Track 4 SCOs.
13. Demarcation of residual soil/fill in landscaped areas.
14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
15. Evaluation of the integrity of all building slabs to document their effectiveness as a cover over documented contaminated soil as well as their ability to function as the upper layer of the SSD systems. Cracks, seams, or other conditions that significantly diminish these abilities will be identified and repaired by a competent contractor and all repair work will be represented in the RAR. Building slabs removed for installation of the SSDS extraction points will be replaced after sub-slab system components are installed.
16. Installation of an enhanced sub-slab depressurization systems (e-SSDS) at each on-site building consisting of suction pits and a series of suction points located throughout the buildings with the vertical piping plumbed to fans located outside of the buildings to ensure that the entirety of the interior portion of this engineering control is under negative

pressure (vacuum). Air emissions will be treated with activated carbon to remove PCE, TCE, and other VOCs as warranted based on chemical testing of the air flow. Vapor monitoring points will be located throughout the building to confirm adequate negative pressure. The e-SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the e-SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building. Four (4) suction points and seventeen (17) suction pits will be installed. Each suction point/pit will be attached to a vertical pipe. Manifold piping (for riser pipes connected to multiple extraction points) will be equipped with four-inch butterfly valves located as to allow easy access to the valve. Butterfly valves will allow for isolation of each vertical pipe (SSDS leg) for testing and balancing purposes. An overhead horizontal piping system will connect vertical pipes (and extraction points) to the vertical exhaust stacks. Installation of an enhanced sub-slab depressurization systems (e-SSDS) at each on-site building consisting of suction pits and a series of suction points located throughout the buildings with the vertical piping plumbed to fans located outside of the buildings to ensure that the entirety of the interior portion of this engineering control is under negative pressure (vacuum). Air emissions will be treated with activated carbon to remove PCE, TCE, and other VOCs as warranted based on chemical testing of the air flow. Vapor monitoring points will be located throughout the building to confirm adequate negative pressure. The e-SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the e-SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building. Subject to as a result of modification of additional information gathered during the design stage it is anticipated that four (4) suction points and seventeen (17) suction pits will be installed. Each suction point/pit will be attached to a vertical pipe. Manifold piping (for riser pipes connected to multiple extraction points) will be equipped with four-inch butterfly valves located as to allow easy access to the valve. Butterfly valves will allow for isolation of each vertical pipe (SSDS leg) for testing and balancing purposes. An overhead horizontal piping system will connect vertical pipes (and extraction points) to the vertical exhaust stacks. The subgrade portion of the e-SSDS will be constructed of Schedule 40 PVC (both slotted and solid piping) surrounded by engineered material

sufficient to permit vapor movement into the piping.

Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements.

17. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
18. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
19. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
20. Recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and Institutional Controls and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The NYC Office of Environmental Remediation (OER) provides governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan ("cleanup plan") describes the findings of prior environmental studies, shows the location of identified contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a very high level of protection for neighboring communities and also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Project Information:

- Site Address: 87-46 123rd Street, Queens, New York
- NYC Voluntary Cleanup Program Project Number: 16TEMP077Q

Project Contacts:

- OER Project Manager: Noel Anderson, 212-788-8841
- Site Project Manager: Paul H. Ciminello, 845-452-1658
- Site Safety Officer: Paul H. Ciminello, 845-452-1658
- Online Document Repository: http://www.nyc.gov/html/oer/html/document-repository/document-repository.shtml

Remedial Investigation and Cleanup Plan: Under the oversight of the NYC OER, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses: Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care facilities, hospitals and residential areas. The cleanup program was then tailored to address the special conditions of this community.

Qualitative Human Health Exposure Assessment: An important part of the cleanup planning for the Site is a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan: This cleanup plan includes a Health and Safety Plan (HASP) that is designed to protect community residents and on-Site workers. The elements of this RAWP are in compliance with applicable safety requirements of the United States Occupational Safety and Health Administration (OSHA). This RAWP includes many protective elements including those discussed below.

Site Safety Coordinator: This project has a designated Site safety coordinator to implement the CHASP. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is identified at the beginning of this Community Protection Statement.

Worker Training: Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan: Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community

Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a 'Contingency Plan').

Odor, Dust and Noise Control: This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and include steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with applicable NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager or NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document.

Quality Assurance: This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

Stormwater Management: To limit the potential for soil erosion and discharge, this cleanup plan has provisions for stormwater management. The main elements of the stormwater management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation: The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation will conform to requirements of the NYC Department of Buildings.

Signage: While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program and provides project contact names and numbers, and a link to the document repository where project documents can be viewed.

Complaint Management: The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager or the NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

Utility Mark-outs: To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and remedial work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal: All soil and liquid material removed from the Site as part of the cleanup will be transported and disposed of in accordance with all applicable City, State and Federal regulations, and required permits will be obtained.

Soil Chemical Testing and Screening: All excavations will be supervised by a trained and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Stockpile Management: Soil stockpiles will be kept covered with tarps to prevent dust, odor and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed, to protect storm water catch basins and other discharge points.

Trucks and Covers: Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with applicable laws and regulations.

Imported Material: All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on the Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination: All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping: Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing: Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report: The results of all cleanup work will be fully documented in a final report (called the Remedial Action Report) that will be available for public review online. A link to the online document repository and the public library with Internet access nearest the Site are listed on the first page of this Community Protection Statement document.

Long-Term Site Management: If long-term protection is needed after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined either in the property's deed or established through a city environmental designation registered with the Department of Buildings. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 Project Background

123rd Street Holding Corporation is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program and/or in the "E" Designation Program to investigate and remediate a property located at 87-46 123rd Street in the Richmond Hill section of Queens, New York (the "Site"). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 87-46 123rd Street in the Richmond Hill section in Queens, New York and is identified as Block 9331 and Lot 30 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 95,123-square feet and is bounded by residential and commercial properties (a storage yard) to the north, 89th Avenue to the south, 123rd Street to the east, and the Long Island Railroad (LIRR) Richmond Hill Line and 121st Street to the west. A survey map indicating the site boundary is shown in Figure 2. Currently, the Site is used for commercial purposes and is the location of GRM Information Management, a document storage repository. The Site contains 12 buildings including several one-story metal and one- to three-story masonry buildings, and four distinct outdoor areas including a parking lot along 123rd Street, central basement-level courtyard, and two exterior areas adjoining the LIRR to the west.

1.2 Redevelopment Plan

The proposed future use of the Site will consist of commercial use including light manufacturing for the visually-impaired and offices. No significant changes in the existing 138,000 square foot building area structures or buildings layout are anticipated (relatively minor interior renovations will occur, including upgrades to stairwells, replacement of a freight elevator, and installation of new bathrooms and a passenger elevator). Site Survey and Fieldwork maps, depicting selected site features, are presented as Figures 2 through 5, respectively. The current zoning designation is M1-1, for manufacturing use. The proposed use is consistent with existing zoning for the property. Currently, the only excavation anticipated is for remedial purposes including installation of the enhanced SSDS and hotspot removals. The remedial action contemplated under this RAWP will be implemented prior to the proposed change of ownership. Post-purchase excavation associated the Site redevelopment will be subject to the procedures laid out with the Site Management Plan.

The remedial action contemplated under this RAWP will be implemented prior to the proposed change of ownership.

1.3 Description of Surrounding Property

The Site and the immediate surrounding areas to the south and west are zoned M1-1, for manufacturing use. The adjoining property to the south (across 89th Avenue) contains a Long Island Railroad (LIRR) rail yard, the adjoining properties to the west and northwest (across 121st Street) contain LIRR train tracks (Richmond Hill Line) and a one-story warehouse building, respectively. Immediate surrounding areas to the north and east are zoned R-5, for residential use and contain both single and multi-family residences. The surrounding area is generally developed residential and mixed-use structures.

Figure 3 shows the surrounding land usage.

1.4 Summary of Past Site Uses and Areas of Concern

Based upon review of a draft Phase I Environmental Site Assessment conducted by PVE Sheffler, LLC & Lawrence Environmental Group, LLC in December of 2015, and information provided by the Site's current owner, the following Site history was established. The first known Site development consists of four residential structures located at the northeastern portion of the property in 1896. The Site was subsequently used for industrial purposes, including the

following manufacturing facilities: Keiner Williams Stamping Company (circa 1911 to 1965); Dynamic Electronics New York Inc. (after 1965); and, Dependable Knitwear (after 1965). The Site has been used as a document repository since 1982.

The draft Phase I ESA by PVE & Lawrence identified the following environmental concerns:

1. Poor quality urban fill of unknown volume.
2. Potential discharges to eleven (11) floor drains.
3. Potential releases from an on-site aboveground storage tank and two underground storage tanks (one suspected and one historical).
4. Potential for soil vapor intrusion.
5. Potential groundwater contamination from documented on-site contamination as well as off-site sources.

Environmental sampling was conducted by PVE Sheffler in January 2016 and Walden Environmental Engineering, PLLC in March 2016. The following environmental findings were reported in a Site Investigation Report (SIR) prepared by Walden. [Note: SIR presentation of the work conducted by PVE Sheffler includes copies of draft data tables for soil and soil vapor, and corresponding summary data (spider diagrams) on figures, as well as general notes regarding sample collection submission.]

Soil

Soil was collected at 21 locations (15 exterior and 6 interior). Sediment was collected from floor and stormwater drains at 4 exterior locations and at 4 interior locations. Samples were analyzed for VOCs, SVOCs and TAL metals, and samples collected by Walden were additionally analyzed for PCBs, cyanide and hexavalent chromium.

- Lead (max. 19,300 mg/kg) was detected above the Restricted Commercial Use SCO in exterior soils in the southwest corner of the Site (SB-11 at approximately 3 feet). Nearby soil testing documented an absence of significant metal concentrations, implying a limited condition (less than 100 cubic yards of impacted soil). Elevated dibenzo(a,h)anthracene (max. 0.69 mg/kg) was detected in interior sub-slab soils in the northern corner of the Site (SS-6). No elevated VOCs, SVOCs and/or PCBs were detected in any other soil samples, including samples collected near the 2,000-gallon, closed-in-place UST.

- Elevated metals, PCBs and/or PAHs were detected in 6 of 8 drain sediment samples. The SVOCs (all PAHs) benzo(a)pyrene (max. 6.6 mg/kg), benzo(a)anthracene (max. 8.1 mg/kg), benzo(b)fluoranthene (max 8.4 mg/kg), and dibenzo(a,h)anthracene (max. 1.2 mg/kg) were detected above Restricted Commercial Use SCOs. PCBs including Aroclor 1248 (max. 12 mg/kg) and total PCBs (13.5 mg/kg) were detected above Restricted Commercial Use SCOs. Arsenic (max. 19.7 mg/kg), lead (max. 5,180 mg/kg), copper (max. 7,170 mg/kg), cadmium (max. 76.8 mg/kg), mercury (max. 15.0 mg/kg), cyanide (max. 97.9 mg/kg), nickel (max. 1,700 mg/kg), and trivalent chromium (max. 1,630 mg/kg) were detected exceeding Restricted Commercial Use SCOs.

Groundwater

Groundwater was collected from 1 exterior soil boring at the northern portion of the Site (near the parking lot area; Walden boring SB-01). The sample was collected using direct-push methods (a permanent well was not installed) at approximately 47-51 feet below grade (the water table was reported at approximately 45 feet). A water sample was analyzed for VOCs, SVOCs, TAL metals, PCBs, cyanide and hexavalent chromium.

- Elevated dissolved sodium (30.2 ppm) was detected. No VOCs, SVOCs, PCBs, cyanide or hexavalent chromium were detected in the groundwater sample.

Soil Vapor and Indoor Air

Soil vapor was collected at 12 locations (3 exterior and 9 interior). Air samples were collected from 2 indoor locations. Samples were analyzed for VOCs.

- VOCs were detected in sub-slab soil vapor samples collected throughout the buildings. Elevated concentrations of 1,1,1-trichloroethane (max 98.7 $\mu g/m^3$), carbon tetrachloride (max 27 $\mu g/m^3$), PCE (max 680 $\mu g/m^3$), TCE (max 2,100 $\mu g/m^3$), 1,2,4-trimethylbenzene (max 311 $\mu g/m^3$), 1,3,5-trimethylebenzne (max 83.5 $\mu g/m^3$), and BTEX (max 409.76 $\mu g/m^3$) were detected above guidance levels provided in New York State Department of Health (NYSDOH) Final Guidance for Evaluation Soil Vapor Intrusion matrices dated October 2006. Peak levels were detected under the southern half of the building.

- In order to identify the presence or absence of subsurface impacts associated with releases from on-site floor drains, nine (9) of the soil samples collected during the RI were collected from locations adjacent to the estimated invert of each interior floor drain.

Pesticides and/or metals were detected at concentrations above Unrestricted Use SCOs, but below Commercial Use SCOs at four (4) locations. No information regarding the integrity of floor drain piping or discharge points is available; however, these findings suggest a lack of subsurface impacts within the immediate vicinity of the drains.

- Significant concentrations of VOCs were not detected during indoor and ambient air quality testing. Low-grade contamination (solvents and total BTEX) was detected in indoor air, including PCE at 7.9 $\mu g/m^3$.

1.5 Summary of Work Performed under the Remedial Investigation

On behalf of 123rd Street Holding Corporation, ESI performed the following scope of work consistent with an OER-approved Work Plans:

On behalf of 123rd Street Holding Corporation, ESI performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Conducted a Geophysical Survey to identify presence of underground utilities, potential USTs;
3. Installed twenty-eight soil borings across the entire project Site, and collected twenty-nine (including one field duplicate sample) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three groundwater monitoring wells throughout the Site to establish groundwater flow and collected four groundwater samples (including one field duplicate sample) for chemical analysis to evaluate groundwater quality; and,
5. Installed four soil vapor probes around the Site perimeter and collected four vapor samples for chemical analysis.

1.6 Summary of Findings of Remedial Investigation

1. Elevation of the property ranges from 48.94 to 60.30 feet.
2. Depth to groundwater ranges from 39.80 to 45.93 feet at the Site.
3. Groundwater flow is generally from northeast to southwest beneath the Site.

4. Depth to bedrock is unknown (refusal on dense soil and/or rock was encountered at a maximum depth of 10 feet). Available USGS data indicate likely bedrock elevations at approximately 300 to 400 feet in this portion of Queens.

5. The stratigraphy of the site, from the surface down, generally consists of variable texture sands with gravel, silt and some clay loam (the upper 4 to 6 feet are considered to be likely fill). Refusal was encountered below this interval, indicating a layer of dense soil and/or rocks.

6. May-June 2016 (Remedial Investigation): Twenty-eight (28) representative soil/fill samples were collected for laboratory analysis during the RI. Soil/fill samples were compared to the New York State Department of Environmental Conservation (NYSDEC) 6NYCRR Part 375 Section 6.8 Unrestricted Use Soil Cleanup Objectives (SCOs) and Restricted Commercial Use SCOs. No VOCs were detected above Unrestricted Use SCOs in any soil samples. Trace levels of PCE and TCE were detected in four and five soil samples, respectively. SVOCs, pesticides, and PCBs were found at concentrations above Unrestricted Use SCOs, but below Commercial Use SCOs. Although several metals were detected above Unrestricted Use SCOs, only one metal, arsenic (max. 16.1 mg/kg) in one sample, was detected at concentrations slightly above Restricted Commercial Use SCOs. These findings are consistent with the presence of poor-quality urban fill materials. Overall, soil chemistry is unremarkable and is similar to sites with historical fill in New York City.

7. January-March 2016 (Previous Investigations): Sediment was sampled from eight (8) floor drains. No VOCs were detected above Restricted Commercial Use SCOs. The SVOCs (all polycyclic aromatic hydrocarbons [PAHs]) benzo(a)pyrene (max. 6.6 mg/kg), benzo(a)anthracene (max. 8.1 mg/kg), benzo(b)fluoranthene (max 8.4 mg/kg), and dibenzo(a,h)anthracene (max. 1.2 mg/kg) were detected above Restricted Commercial Use SCOs. PCBs including Aroclor 1248 (max. 12 mg/kg) and total PCBs (13.5 mg/kg) were detected above Restricted Commercial Use SCOs. Several metals were detected above Unrestricted Use SCOs including silver (max 118 mg/kg), selenium (max. 26.2 mg/kg), and zinc (max. 2,750 mg/kg). Arsenic (max. 19.7 mg/kg), lead (max. 5,180 mg/kg), copper (max. 7,170 mg/kg), cadmium (max. 76.8 mg/kg), mercury (max. 15.0 mg/kg), cyanide (max. 97.9 mg/kg), nickel (max. 1,700 mg/kg), and trivalent chromium (max. 1,630 mg/kg) were detected exceeding Restricted Commercial Use

SCOs. Twenty-one (21) representative soil/fill samples were collected for laboratory analysis. No VOCs were detected above Unrestricted Use SCOs. Three samples contained trace and/or low-level concentrations of PCE and TCE. Several SVOCs (all PAHs) were detected above Restricted Commercial Use SCOs including benzo(a)pyrene (max. 4.3 mg/kg), benzo(a)anthracene (max. 5.5 mg/kg), and dibenzo(a,h)anthracene (max. 0.69 mg/kg). Other SVOCs including indeno(1,2,3-c,d)pyrene (max. 0.61 mg/kg), phenol (max 0.48 mg/kg), and chrysene (1.1 mg/kg) were detected above their Unrestricted Use SCOs only. No PCBs were detected above Restricted Commercial Use SCOs. PCBs including Aroclor 1248 (max. 0.16 mg/kg) and Aroclor 1254 (max. 0.11 mg/kg) were detected above Unrestricted Use SCOs. Lead (max. 19,300 mg/kg) and copper (max. 450 mg/kg) were detected exceeding Restricted Commercial Use SCOs. Several metals were detected above Unrestricted Use SCOs including cadmium (max 9.77 mg/kg), trivalent chromium (max. 68.5 mg/kg), mercury (0.364 mg/kg), nickel (max 30.3 mg/kg), selenium (max. 9.87 mg/kg), and zinc (max. 888 mg/kg).

8. May-June 2016 (Remedial Investigation): Groundwater samples collected during the RI were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). The results showed elevated concentrations of chloroform (max. 42 µg/kg) above its GQS. Trace to low-level concentrations of several other VOCs, including chlorinated solvents, were identified below GQS. TCE was detected in all three groundwater samples (max. 0.56 µg/L). PCE was detected in one sample at a concentration of 0.91 µg/L. Detected concentrations of TCE were highest in samples collected at upgradient well locations (indicating an off-site source of groundwater contamination). PCE was only detected at the downgradient well. Contamination from dissolved metals is limited to antimony (max. 8 µg/L), manganese (max. 427 µg/L), and sodium (max. 65,100 µg/L). Elevated levels of total chromium and iron were also identified. No pesticides or PCBs were detected in any groundwater sample. RI findings are consistent with previous site investigations, which did not document significant dissolved contamination in groundwater.

9. January 2016: The laboratory analytical results for the fourteen (14) representative soil samples collected indicate that no VOCs were detected exceeding UUSCOs. The samples were not analyzed for pesticides or PCBs. SVOCs including chrysene (max. 1,100 ug/kg), and indeno(1,2,3-c,d)pyrene (max. 610 ug/kg) were detected in one sample SB04

exceeding UUSCOs. Several metals were detected above UUSCOs including selenium (max. 5.42 mg/kg), and zinc (max. 888 mg/kg). Lead (max. 19,300 mg/kg), and copper (max. 450 mg/kg) were detected exceeding CUSCOs.

10. March 2016 (Previous Investigations): The laboratory analytical results for the one representative groundwater sample showed an elevated concentration of methylene chloride (5.4 µg/kg) above the GQS. No chlorinated solvents (including PCE and TCE) or PCBs were detected and no SVOCs were detected above the GQS. Elevated concentrations of total metals including chromium (460 µg/L), cobalt (84.1 µg/L), copper (438 µg/L), iron (32,000 µg/L), lead (140 µg/L), magnesium (51,600 µg/L), manganese (11,200 µg/L), nickel (421 µg/L), sodium (29,500 µg/L), thallium (27.5 µg/L), vanadium (332 µg/L), and zinc (2,130 µg/L) as well as dissolved sodium (30,200 µg/kg) were detected above GQS.

11. May-June 2016 (Remedial Investigation): Four (4) representative soil vapor samples were collected for laboratory analysis during the RI. Soil vapor samples were compared to the compounds listed in the New York State Department of Health (NYSDOH) Final Guidance for Evaluation Soil Vapor Intrusion matrices dated October 2006. The results showed elevated concentrations of TCE (max. 690 µg/m^3) in three out of the four samples collected. PCE (max. 97 µg/m^3) was detected in two out of the four samples. Low-grade concentrations from solvents and petroleum related compounds, including 2-butanone, 2-hexanone, acetone, benzene and toluene were detected, as well as one detection of 1,1,1-Tricholroethane (12 µg/m^3). PCE/TCE breakdown products (cis-DCE, trans-DCE and vinyl chloride) and carbon tetrachloride were not detected in any samples. The concentrations of PCE and TCE are above mitigation levels established by the NYSDOH vapor intrusion matrices.

12. January 2016 (Previous Investigations): The laboratory analytical results for seven soil vapor samples indicated moderate to elevated vapor intrusion concerns. 1,1,1-Trichloroethane was detected in 4 out of 7 samples with a maximum concentration of 55 µg/m^3. Carbon tetrachloride was detected in 3 out of 7 samples with a maximum concentration of 27 µg/m^3. Both tetrachloroethylene (PCE) and Trichloroethylene (TCE) were detected in concentrations exceeding the mitigation values established by NYSDOH vapor intrusion matrices across the site. PCE and TCE were detected in the highest concentrations in soil vapor sample SV06 at 680 µg/m^3 and 2,100 µg/m^3 respectively.

2.0 Remedial Action Objectives

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified for this Site:

Soil

- Prevent direct contact with contaminated soil/fill and sediment
- Prevent exposure to contaminants volatilizing from contaminated soil/fill and sediment.
- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Groundwater

- Manage contaminant sources having the potential to impact groundwater quality.
- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

Soil Vapor

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into dwelling and other occupied structures.

3.0 Remedial Alternatives Analysis

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the following ten criteria:

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

As required, a Track 1 Unrestricted Use scenario is evaluated for the remedial action. The following is a detailed description of the alternatives analyzed to address impacted media at the Site:

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill and floor drain sediment exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would be achieved by excavating the entire Site to an average depth of approximately 6 feet below grade to remove all historic fill. It is estimated that approximately 15,000 cubic yards of soil would be removed. To achieve Track 1 UUSCOs, building demolition would be required. Subsequent to removal of soil/fill beneath the buildings, clean fill material

would be imported and the buildings would be reconstructed. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation after soil removal is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering or Institutional Controls would be required for a Track 1 cleanup, but a vapor barrier and sub-slab depressurization system (SSDS) would be installed as part of construction to prevent potential future exposures from soil vapor; and
- A final cover would be placed over the entire Site.

Alternative 2:

- Establishment of Site-Specific (Track 4) SCOs and removal of soil/fill and floor drain sediment that have contaminant concentrations above Track 4 Site-specific SCOs. Approximately 300-500 tons of soil, fill, and sediment would be removed from hotspot areas and an additional volume of contaminated sediment would be removed from floor drains where concentrations of metals and PCBs were identified in previous site investigations above Track 4 Site-specific SCOs. A vacuum truck would be utilized to remove contaminated materials from the stormwater and floor drains at the Site. Where drains are determined to connect to the sewer, water will subsequently be used to flush the piping network of residual sediment and water. If soil/fill containing analytes at concentrations above Track 4 Site-specific SCOs is still present at the base of the excavations after soil removal is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 4 Site-specific SCOs.
- Installation and operation of e-SSDS sufficient to reduce concentrations of VOCs (predominantly but not exclusively PCE and TCE) in subgrade soils and concurrently eliminating infiltration of VOC vapors into the on-site structure.
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval.

- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended. The SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP.
- Placement of a deed notice to record the ECs/ICs on the deed to ensure that future owners of the Site continue to comply with the SMP, as required.

3.1 Threshold Criteria Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. Protection of public health and the environment must be achieved for all approved remedial actions.

Alternative 1 would be protective of human health and the environment by removing all accessible soil/fill and drain sediment exceeding Track 1 Unrestricted Use SCO's and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill and sediment once remediation is complete and eliminating the risk of contaminants leaching into groundwater. Track 1 also provides measures to protect the health of future site users via the installation and operation of the e-SSDS.

Alternative 2 would achieve comparable protections of human health and the environment by: excavation and removal of historic fill containing elevated copper and lead concentrations at the hotspot area; by ensuring that remaining soil/fill in the vicinity of the excavation meets Track 4 Site-Specific SCOs; by maintaining the existing slabs and patching any evidence of slab disintegration (and thus a barrier layer to underlying soils that exceed SCOs); by removing sediment containing elevated SVOC, PCB, and/or metals concentrations from on-Site drains, and, by installing and operating a sub-slab depressurization system to remove organic vapors. Implementing Institutional Controls including a Site Management Plan and instituting a deed notice on the property would ensure that the engineering controls remain intact and protective of public health. Establishment of Track 4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater. Vapor intrusion would be managed through the installation and operation of the e-SSDS.

For both Alternatives, potential exposure to contaminated soils, sediment, or groundwater during remediation would be minimized by implementing a Health and Safety Plan, an approved Soil/Materials Management Plan, and Community Air Monitoring Plan (CAMP) during limited soil disturbance and/or removal. Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations.

3.2 Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

This evaluation criterion assesses the ability of the alternative to achieve applicable standards, criteria and guidance.

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCOs and Protection of Groundwater SCOs. Constituents in soil vapor would be effectively managed by the e-SSDS. Contaminants identified in sediments located within drains would be removed for off-Site disposal in accordance with applicable regulations.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil from the southeastern exterior to meet Track 4 Site-Specific SCO's, sediment from on-Site drains, and maintaining the building slabs as a cover layer over soils exceeding SCOs. Constituents in soil vapor would be effectively managed by the sub-slab depressurization system. A Site Management Plan would ensure that these controls remained protective for the long term.

Health and safety measures contained in the HASP and Community Air Monitoring Plan (CAMP) will be implemented during Site redevelopment under this RAWP. For both Alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-Term Effectiveness and Impacts

This evaluation criterion assesses the effects of the alternative during the implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their short term effects during the remedial action on public health and the

environment during implementation of the remedial action, including protection of the community, protection of onsite workers and environmental impacts.

Both Alternative 1 and 2 have similar short-term effectiveness during their implementation, as each requires the installation and operation of a sub-slab depressurization system, the excavation of historic fill material, and the removal of sediment from on-Site drains. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Both alternatives could result in discharges of SVOC, PCB, and/or metals to the municipal sewer system as floor drains are flushed of residual contamination (subsequent to sediment removal activities). Short-term impacts could potentially be higher for Alternative 1 since excavation of significantly greater amounts of historical fill material would take place. However, focused attention to means and methods during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize the overall impact of these activities.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic; however, implementation of Alternative 1 will result in significantly more truck traffic. Trucks will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

The potential adverse impact to the community, workers and the environment for both alternatives would be minimized through implementation of control plans including a Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Remediation workers operating under appropriate management procedures and a Health and Safety Plan (CHASP) would provide protection from on-Site contaminants by using personal protective equipment would be worn consistent with the documented risks within the respective work zones.

Long-Term Effectiveness And Permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of

remaining contamination, adequacy of controls including the adequacy and suitability of Engineering Controls/Institutional Controls (ECs/ICs) that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.
Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all accessible impacted soil/fill above Track 1 Unrestricted Use SCO's. Removal of on-Site contaminant sources in soil and sediment will also prevent future groundwater contamination.
As represented above, engineering and institutional controls would still be required under Alternative 1; as such, Alternative 1 may be no more effective in the long term than Alternative 2.
Alternative 2 would provide long-term effectiveness by removing the most significant on-Site soil contamination and attaining Track 4 Site-Specific SCOs; removing contaminated sediments within drains; installing an e-SSDS; maintaining use restrictions; and establishing an SMP to ensure long-term management of ICs and ECs to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy continue to provide the required level of protection.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.
Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing that percentage of on-site soils that is accessible and therefore removed.

However, because these soils do not represent a threat to human health and because these soils are not considered a source of groundwater contamination, the overall benefit of removal of soils exceeding Track 1 SCOs is considered minimal.

Alternative 2 would remove the most significantly contaminated soil at the Site, and all remaining on-Site soil/fill will meet Track 4 Site-Specific SCOs.

Both alternatives will permanently eliminate the toxicity, mobility, and volume of contaminants from sediments within floor drains.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

Alternative 1 has implementability concerns. The removal of limited volumes of soil in the building is feasible, but requires the destruction of building components (floor slabs) that are not otherwise slated for demolition for site development/site re-use. Some slab areas would remain in place in order to maintain the structural integrity of the buildings and inaccessible contaminated soil would therefore remain in place.

Alternative 2 is more implementable. The removal of historic fill containing elevated copper and lead concentrations at the hotspot area, ensuring that existing slabs provide a barrier layer to underlying soils that exceed SCOs; removing sediment containing elevated SVOC, PCB, and/or metals concentrations from on-Site drains, and installation/operation of an enhanced sub-slab depressurization system can be achieved without undue costs or compromising the structural integrity of the buildings.

Cost Effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as remediation costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remediation is complete) necessary to ensure the continued effectiveness of a remedial action.

Alternative 1 will be significantly higher than Alternative 2 due to the added expenses associated with destroying/replacing building slabs and the removal of soils under the building. These soils are currently encapsulated by the building and they do not represent a threat to public health or the environment; therefore, there is no reasonable justification for removal.
The remedial plan will also consider the selection of the most appropriate disposal facilities to reduce transportation and disposal costs during cleanup and redevelopment of the Site.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.
This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Appendix 1. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

Land Use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. Use of the Site will not change and therefore this criterion is not a factor in the decision.

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain. Both alternatives are equally protective of natural resources and cultural resources. Improvements in the current environmental condition of the property achieved by both alternatives considered in this plan are consistent with the City's goals for cleanup of contaminated land.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in PlaNYC: A Greener, Greater New York. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

There is no difference between Alternatives 1 and 2 with respect to this criterion.

Selection of the Preferred Remedy

The preferred remedy for the site is Alternative 2, a Track 4 Site-Specific SCOs remedy.

The Alternative 2 remedy addresses all environmental concerns on the Site in a cost-effective manner that is protective of human health and the environment. Soil/fill removal will be limited to a portion of the southeastern exterior yard area (where the most significant contamination was identified) in order to achieve Track 4 SCOs for the entire Site. Contaminated sediment will be removed for off-Site disposal in accordance with applicable regulations.

Engineering and Institutional Controls are required for vapor management for the Alternative 2 remedy. Post-remediation air quality testing will confirm the effectiveness of the e-SSDS.

Use restrictions will be imposed on the site (including prohibitions on any use higher than Restricted Residential, e.g. the use of groundwater from the Site; prohibitions of restricted Site uses such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without NYSDEC approval). The property would receive a Covenants of Restrictions with the county clerk memorializing institutional controls.

4.0 Remedial Action

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is Alternative 2, the Track 4 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. Evaluation of floor drains to determine relevant construction details and dye testing to identify discharge points for each drain. All sediment (and any liquids) will be removed from on-Site drains by a licensed or permitted waste disposal service provider in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Determination of drain termini (e.g., central sewer system or dry wells) may result in the design and implementation of supplemental site investigations.

7. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs.
   A portion of the southeastern exterior yard area (where elevated metals contamination was identified) will be excavated to a depth of at least 5 feet below grade in order to achieve Track 4 SCOs.
   Managements of soils generated during excavation activities for SSDS construction. Excavations associated with any future site renovation activities will be managed as part of the Site Management Plan.
8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
9. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
10. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
11. No tank removal activities are anticipated. One closed-in-place UST and one active fuel AST will remain at the property. Any other USTs that are encountered during soil/fill removal actions will be closed as part of the remedial action. Registration of tanks, reporting of any petroleum spills associated with UST's, and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations will be performed.
12. Collection and analysis of end-point samples (including as warranted the collection and analysis of end-point samples under drains determined to have an inadequate floor) to determine the performance of the remedy with respect to attainment of Track 4 SCOs.
13. Demarcation of residual soil/fill in landscaped areas.
14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
15. Evaluation of the integrity of all building slabs to document their effectiveness as a cover over documented contaminated soil as well as their ability to function as the upper layer of the SSD systems. Cracks, seams, or other conditions that significantly diminish these abilities will be identified and repaired by a competent contractor and

all repair work will be presented in the RAR. Building slabs removed for installation of the SSDS extraction points will be replaced after sub-slab system components are installed.

16. Installation of an enhanced sub-slab depressurization systems (e-SSDS) at each on-site building consisting of suction pits and a series of suction points located throughout the buildings with the vertical piping plumbed to fans located outside of the buildings to ensure that the entirety of the interior portion of this engineering control is under negative pressure (vacuum). Air emissions will be treated with activated carbon to remove PCE, TCE, and other VOCs as warranted based on chemical testing of the air flow. Vapor monitoring points will be located throughout the building to confirm adequate negative pressure. The e-SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the e-SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building. Subject to as a result of modification of additional information gathered during the design stage it is anticipated that four (4) suction points and seventeen (17) suction pits will be installed. Each suction point/pit will be attached to a vertical pipe. Manifold piping (for riser pipes connected to multiple extraction points) will be equipped with four-inch butterfly valves located as to allow easy access to the valve. Butterfly valves will allow for isolation of each vertical pipe (SSDS leg) for testing and balancing purposes. An overhead horizontal piping system will connect vertical pipes (and extraction points) to the vertical exhaust stacks. The subgrade portion of the e-SSDS will be constructed of Schedule 40 PVC (both slotted and solid piping) surrounded by engineered material sufficient to permit vapor movement into the piping. Design drawings are provided in Appendix 4.

    All activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements will be performed.
17. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements.
18. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.

19. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
20. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
21. Recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and Institutional Controls and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/ Fill Management

The following Track 4 Site-Specific SCO's will be utilized for this project:

Contaminant	**Site-Specific SCO's**
Total SVOCs	100 ppm
Arsenic	18 ppm
Copper	270 ppm
Lead	1,000 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 2.

Soil/Fill Excavation and Removal

Soil/fill will be excavated from the hotspot in the southeastern exterior yard area (where peak concentrations of lead and copper were identified) and limited removal of soil for the e-SSDS extraction pit and extraction points is anticipated. The location of planned excavations is shown in Figure 4. The total quantity of soil/fill expected to be excavated and disposed off-Site is 300-500 tons. For each disposal facility to be used in the remedial action, a letter from the developer/QEP to the receiving facility requesting approval for disposal and a letter back to the developer/QEP providing approval for disposal will be submitted to OER prior to any transport and disposal of soil at a facility.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

Floor Drain Cleanout

Floor drains containing contaminated sediment and liquid will be evacuated and removed by a licensed or permitted waste disposal service provider in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. The location of all drains known (from previous testing) to contain sediment with elevated metals is provided on Figure 5 of this RAWP. A vacuum truck will be utilized to remove contaminated materials from the stormwater and floor drains at the Site. Upon completion of vacuum activities water will be used to flush drain piping of residual sediment and water. On-Site and off-Site management of materials removed from the drains, including evacuating, handling, and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 2.

Upon completion of this remedial work, each drain will be visually inspected to confirm the absence of residual sediment. A photographic record will be included in the RAR. The terminus to each on-site drain will be determined through either dye testing of visual scoping. The objective of this work is to document the presence of any drains discharging to structures other than the central sewer system. The terminus for drains not connected to the central system will be located and a separate sampling plan for these areas will be prepared and submitted to OER.

End-point Sampling

End-point samples will be analyzed for compounds and elements as described below utilizing the following methodology:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals by EPA Methods 6010 and 7473; and
- Pesticides/PCBs by EPA Method 8081/8082.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs performing end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values.

Hotspot End-point Sampling

End-point samples will be collected from the sidewalls and base of excavation the lead "hotspot" documented in the RIR. The evaluation of floor drain conditions and discharge points will be used to determine the need for additional end-point samples. Each floor drain (both the drains previously evaluated and those either not located or newly uncovered as a result of the current tenant vacating the space) will be cleaned of all sediment and the structural integrity of the drain will be assessed. Drains with confirmed floors and walls will not be the subject of any additional sampling. Additional end-point sampling will be performed at any floor drain directly discharging or otherwise releasing to the subsurface where no floor or walls can be confirmed or are not present and therefore where the potential for discharges exist. Sampling will proceed per the following schedule unless the structural inspection (post sediment removal) confirms such testing is unnecessary:

Hotspot Location	Proposed Excavation (if no solid base is confirmed)	Endpoint Sampling Analytes
FD-01	3 feet	TAL Metals, PCBs
FD-02	3 feet	TAL Metals, PCBs
FD-04	3 feet	TAL Metals, PCBs
FD-05	3 feet	Lead
FD-07 (no sampling necessary; will be removed with "hot spot" excavation)		
FD-08	3 feet	TAL Metals
FD-09	3 feet	TAL Metals
FD-10	3 feet	TAL Metals
FD-11	3 feet	TAL Metals
FD-12	3 feet	TAL Metals
FD-13	3 feet	TAL Metals
Note: Excavation depth is measured below the invert of the referenced drain.		

The hotspots includes soils located in the immediate vicinity of boring SB-11 (3-3.5'). list soil boring identification number, i.e. B1 for lead and arsenic; and B2 for SVOCs and lead. End-point samples will be analyzed for SCO trigger parameters including SVOCs, lead, and copper. End-point analyses for hotspots should always be based on trigger compounds, for example above, B-1 hotspot should be sampled for lead and arsenic:

For any hotspots identified during this remedial program, including any hotspots identified during the remedial action, hotspot removal actions will be performed to ensure that hotspots are fully removed and end-point samples will be collected at the following frequency:

For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.

For excavations 20 to 300 feet in perimeter:

For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.

For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.

For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor.

Samples taken after 24 hours should be taken at six to twelve inches.

For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation end-point sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and "finger print analysis" and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

One blind duplicate sample for every 20 samples collected will be submitted to the approved laboratory for analysis of the same parameters. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. One trip blank will be submitted to the laboratory with each shipment of soil samples. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or "cold-packs" to maintain a temperature of $4^{o}C$.

Dedicated disposable sampling materials will be used for the collection endpoint samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash with alconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Field blanks will be prepared by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs.

Import of Soils

Import of soils onto the property will be performed in conformance with the Soil/Materials Management Plan in Appendix 2. Imported soil will meet the lower of:

- Track 2 Restricted Residential or Commercial Use SCO's, and
- Groundwater Protection Standards in Part 375-6.8.

The estimated quantity of soil to be imported into the Site for backfill and cover soil is 300-500 tons. A limited volume of stone for the construction of the e-SSDS extraction pits is also anticipated. A map of soil backfill placement locations is shown in Figure 4.

Reuse of Onsite Soils

Soil reuse is not planned on this project.

4.3 Engineering Controls

Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site has two primary Engineering Control Systems. These are:

(1) Composite Cover System
(2) Enhanced Active Sub-Slab Depressurization System

4.4 Composite Cover System

Exposure to residual soil will be prevented by a composite cover system, which will cover the Site. The cover system will consist of the existing concrete slab that will remain covering the buildings' foundation.

The composite cover system will be a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the Remedial Action Report.

4.5 Enhanced Sub-Slab Depressurization System

Migration of soil vapor into the building will be mitigated with the installation and operation of an e-SSDS. The e-SSDS will consist of a series of extraction pits and points located throughout the lower level of each building, with vertical piping connected to a fans located outside of the building to ensure that all interior portions of the e-SSDS operate under negative pressure. The number of extraction pits and points will be determined by vacuum testing prior to system installation. Pits will be situated such that the entire subgrade of the building demonstrates (through measurements at monitoring points) adequate negative pressure. Upon completion of system installation, the existing and repaired concrete slab (including, as necessary, floor/wall interface) will be properly sealed to enhance system effectiveness.

Installation of an enhanced sub-slab depressurization systems (e-SSDS) at each on-site building consisting of suction pits and a series of suction points located throughout the buildings with the vertical piping plumbed to fans located outside of the buildings to ensure that the entirety of the interior portion of this engineering control is under negative pressure (vacuum). Air emissions will be treated with activated carbon to remove PCE, TCE, and other VOCs as warranted based on chemical testing of the air flow. Vapor monitoring points will be located throughout the building to confirm adequate negative pressure. The e-SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the e-SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into

the building. Subject to as a result of modification of additional information gathered during the design stage it is anticipated that four (4) suction points and seventeen (17) suction pits will be installed. Each suction point/pit will be attached to a vertical pipe. Manifold piping (for riser pipes connected to multiple extraction points) will be equipped with four-inch butterfly valves located as to allow easy access to the valve. Butterfly valves will allow for isolation of each vertical pipe (SSDS leg) for testing and balancing purposes. An overhead horizontal piping system will connect vertical pipes (and extraction points) to the vertical exhaust stacks. The subgrade portion of the e-SSDS will be constructed of Schedule 40 PVC (both slotted and solid piping) surrounded by engineered material sufficient to permit vapor movement into the piping. A schematic drawing of the preliminary e-SSDS design is provided as Appendix 4. Vacuum testing results and final design of the e-SSDS will be submitted for OER approval prior to system installation.

The SSDS is a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management Plan. Maintenance of this SSDS will be described in the Site Management Plan in the Remedial Action Report.

The effectiveness of the e-SSDS will be determined via field management of negative pressure at the monitoring points. Readings greater than -0.004 inches of water will be considered evidence of adequate negative pressure.

Upon construction and activation of the e-SSDS three (3) sub-slab soil vapor samples will be collected at locations on the eastern side of 123rd Street (i.e., across the street from the Site). Approximate locations are provided in Figure 2, Appendix 4. All samples will be collected on the public right of way (e.g., sidewalk). Samples will be collected in a manner consistent with the procedures followed in the Remedial Investigation Report and all samples will be analyzed for VOCs using USEPA method TO-15. Resulting data will be provided to OER under separate cover within 48 hours of receipt and will be presented in the RAR.

4.6 Institutional Controls

A series of Institutional Controls (ICs) are required under this Remedial Action to assure permanent protection of public health by elimination of exposure to residual materials. These IC's define the program to operate, maintain, inspect and certify the performance of Engineering Controls and Institutional Controls on this property. Institutional Controls would be implemented in accordance with a Site Management Plan included in the final Remedial Action

Report (RAR). Institutional Controls would be:

- Recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the SMP, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;
- Submittal of a SMP in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, inspection, and certification of ECs and IC's. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determine by OER in the SMP and will comply with RCNY §43-1407(l)(3).
- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for commercial use and will not be used for a higher level of use without prior approval by OER.

4.7 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an

independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place and all engineering controls, with particular focus on maintenance of the e-SSDS following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) operation and maintenance of EC's; (3) inspection and certification of IC's and EC's.

Site management activities and EC/IC certification will be scheduled by OER on a periodic basis to be established in the RAR and the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by July 30 of the year following the reporting period.

4.8 Qualitative Human Health Exposure Assessment

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

Data and information reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA) for this project. As part of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk under current and future conditions by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Contaminant Sources

Based on the results of the RIR and SIR, the contaminants of concern are:

Soil: A total of 29 soil samples (from 28 borings) were collected for chemical analysis during the

RI. One field duplicate was collected and analyzed for QA/QC purposes. All soil samples were analyzed for VOCs by EPA Method 8260C (rev. 2006); SVOCs by EPA Method 8270D (rev. 2007); pesticides by EPA Method 8081B (rev. 2000); PCBs by EPA Method 8082A (rev. 2000); and TAL metals by EPA Method 6010C (rev. 2007). [Note: four samples collected from the southeastern interior portions of the Site were analyzed for specific target compounds of concern, only (e.g., PCBs and/or lead).]

Soil was collected at 21 locations (15 exterior and 6 interior) during previous investigations. Sediment was collected from floor and stormwater drains at 4 exterior locations and at 4 interior locations. All samples were analyzed for VOCs, SVOCs and TAL metals, and 7 samples were additionally analyzed for PCBs, cyanide and hexavalent chromium.

Groundwater: Three groundwater samples were collected for chemical analysis. Samples were analyzed for; VOCs by EPA Method 8260C (rev. 2006); SVOCs by EPA Method 8270D (rev. 2007); Pesticides by EPA Method 8081B (rev. 2000); PCBs by EPA Method 8082A (rev. 2000); and, TAL Metals by EPA Method 6010C (rev. 2007). One field duplicate sample was also collected and analyzed for VOCs for QA/QC purposes.

Soil Vapor: Four soil vapor probes were installed and six soil vapor samples were collected for chemical analysis. Samples were analyzed for VOCs by TO-15 VOC parameters.

Nature, Extent, Fate and Transport of Contaminants

Soil: Lead and copper were detected above CUSCOs (at approximately 3 feet) in one sample collected from the hotspot (in the southeastern exterior yard area) during a previous environmental investigation. Nearby soil testing documented an absence of metal concentrations above SCOs, implying a limited condition. No likely exposure to these contaminants will occur so long as soils remain in-situ.

Arsenic and dibenzo(a,h)anthracene were detected above CUSCOs in sub-slab soil samples collected during the RI and the SIR, respectively. The SIR also documents elevated metals, PCBs and/or PAHs detected in 6 of 8 drain sediment samples. Low level contamination of metals and pesticides were documented in soil samples beneath the existing concrete slab during the RI. No likely exposure to these contaminants will occur so long as the existing concrete slab is maintained and soils/sediment remain within the drains.

Groundwater: No significant constituents of concern were identified in on-site groundwater during the RI or in the SIR. Dissolved metals including antimony, manganese, and sodium and total chromium and iron were identified above Groundwater Quality Standards

Soil Vapor: VOCs were detected in soil vapor samples collected throughout the Site. Peak levels of PCE and TCE detected beneath buildings at southern and eastern portions of the Site. Off-site sampling documents an absence of PCE in soil vapor. These concentrations of PCE represent a concern for indoor air quality.

Receptor Populations

On-Site Receptors: The site is currently commercial. Onsite receptors are limited to workers, site representatives, and visitors granted access to the property.

Off-Site Receptors: No off-site receptors are likely to be affected by Site conditions, based on existing soil vapor and groundwater testing.

Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

- Ingestion of groundwater or fill/ soil;
- Inhalation of vapors or particulates; and
- Dermal absorption of groundwater or fill/ soil.

Potential Exposure Points

Current Conditions: The majority of the site is currently capped with asphalt and buildings. Exterior yard areas are sounded by buildings, chain-link fence, and/or concrete walls. Under existing conditions, potential exposure pathways from ingestion or inhalation of soil/ fill are limited to soil disturbance by workers, site representatives, authorized visitors, or trespassers. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. Vapor intrusion may occur.

Remediation Conditions: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of excavation activities performed at the hotspot and during construction of the e-SSDS suction pits. On-Site workers potentially could ingest, inhale or have dermal contact with exposed impacted soil and fill. Similarly, off-Site

receptors could be exposed to dust and vapors from on-Site activities. Due to the depth of groundwater, direct contact with groundwater is not expected. During remediation, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program.

Proposed Future Conditions: Under future remediated conditions, all soils in excess of Track 4 SCOs will be removed and engineering controls (e-SSDS) will prevent any potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water supply, and groundwater is not used at the site. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

Overall Human Health Exposure Assessment

There are potential complete exposure pathways for the current site condition. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There are no complete exposure pathways under future conditions after implementation of the remedy. This assessment takes into consideration the reasonably anticipated use of the site, which includes commercial structures, surface cover provided by buildings and paved areas, and the operation of an e-SSDS. Under current conditions, on-Site exposure pathways exist for those with access to the Site. During remedial activities, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Health and Safety Plan, and the Soil/Materials Management Plan. Potential post-remedial use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened. Under existing conditions, vapors (PCE and TCE) documented under the slab have the potential to enter the building and become a threat to the health of occupants. Current indoor air quality data confirm the presence of elevated PCE and TCE in indoor air. The operation of an e-SSDS (proposed remedial action) will effectively eliminate vapor intrusion concerns at the Site.

5.0 Remedial Action Management

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Paul H. Ciminello, Ecosystems Strategies, Inc. Qualified Environmental Professionals (QEP). The remedial engineer who will participate in the remedial action is Phil Bell, representing Bell Engineering, PLLC.

5.2 Site Security

Site access will be controlled by locked entrances; only project personnel will be permitted entry

5.3 Work Hours

The hours for operation of cleanup will comply with the NYC Department of Buildings code requirements or according to specific variances issued by that agency. The hours of operation will be conveyed to OER during the pre-remediation meeting.

5.4 Health and Safety Plan

The Health and Safety Plan is included in Appendix 3. The Site Safety Coordinator will be Paul H. Ciminello. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records. Personnel entering any exclusion zone will be trained in the provisions of the HASP and will comply with all requirements of 29 CFR 1910.120. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work

begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use in case of emergency.

5.5 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedances of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate

surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review.

5.6 Agency Approvals

All permits or government approvals required for remediation have been or will be obtained prior to the start of remediation. Approval of this RAWP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

5.7 Site Preparation

Pre-Remediation Meeting

OER will be invited to attend the pre-remediation meeting at the Site with all parties involved in the remedial process prior to the start of remediation activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed incompliance with applicable laws and regulations including NYC Building Code to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-Out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Dewatering

Dewatering is not anticipated during remediation.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete pads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and clean water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures, equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions

will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Stormwater control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of site access by the property owner. Impacted offsite areas may require characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362 within statutory defined timelines. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

A site inspection report will be submitted to OER at the completion of site inspection. An inspection report established by OER is available on OER's website (www.nyc.gov/oer) and will be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the OER project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from

the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

5.8 Traffic Control

Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the Site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is as follows:

- Exit Site – Go South 0.1miles on 123rd Street to 89th Avenue
- Go East on 89th Avenue to 129th Street
- Go North 124th Street to Jamaica Avenue
- Go East on Jamaica Avenue to 678

The truck route is presented as Figure 6.

5.9 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.10 Reporting and Record Keeping

Daily reports

Daily reports providing a general summary of activities for each day of active remedial work will be emailed to the OER Project Manager by the end of the following business day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP results noting all excursions. CAMP data may be reported;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

Record Keeping and Photo Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.11 Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the

nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations From The Remedial Action Work Plan

All changes to the RAWP will be reported to, and approved by, the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination with basis that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 Remedial Action Report

A Remedial Action Report (RAR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- Text description with thorough detail of all engineering and institutional controls;
- As-built drawings for all constructed remedial elements;
- Manifests for all soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan;
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results (including all soil test results from the remedial investigation for soil that will remain on site) and all soil/fill waste characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;
- Full accounting of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Recorded Declaration of Covenants and Restrictions. OR Continue registration of the property with an E-Designation by the NYC Department of Buildings;
- The RAWP and Remedial Investigation Report will be included as appendices to the RAR; and

- Reports and supporting material will be submitted in digital form and final PDFs will include bookmarks for each appendix.

Remedial Action Report Certification

I, Philip Bell, am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the 87-46 123rd Street, Queens, site number 16TEMP077Q. I certify to the following:

- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial Action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The OER-approved Remedial Action Work Plan dated [date] and Stipulations in a letter dated [date] were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name

PE License Number

Signature

Date

PE Stamp

I, Paul H. Ciminello, am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the 87-46 123rd Street, Queens site, site number 16TEMP077Q. I certify to the following:

- The OER-approved Remedial Action Work Plan dated August 15, 2012 and Stipulations in a letter dated September 10, 2014 were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

QEP Name

QEP Signature

Date

7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 3-month remediation period is anticipated.

Schedule Milestone	**Weeks from Remedial Action Start**	**Duration (weeks)**
OER Approval of RAWP	0	0
Fact Sheet 2 announcing start of remedy	1	1
SVE Design	1-3	3
System Installation	4-7	3
System Testing/IAQ	8-10	2
Remedial Excavation	2-4	2
Post-Excavation Confirmation Sampling	5-7	3
Drain Cleanout	2-4	3
Submit Remedial Action Report	10-12	3

Figures

Ecosystems Strategies, Inc.

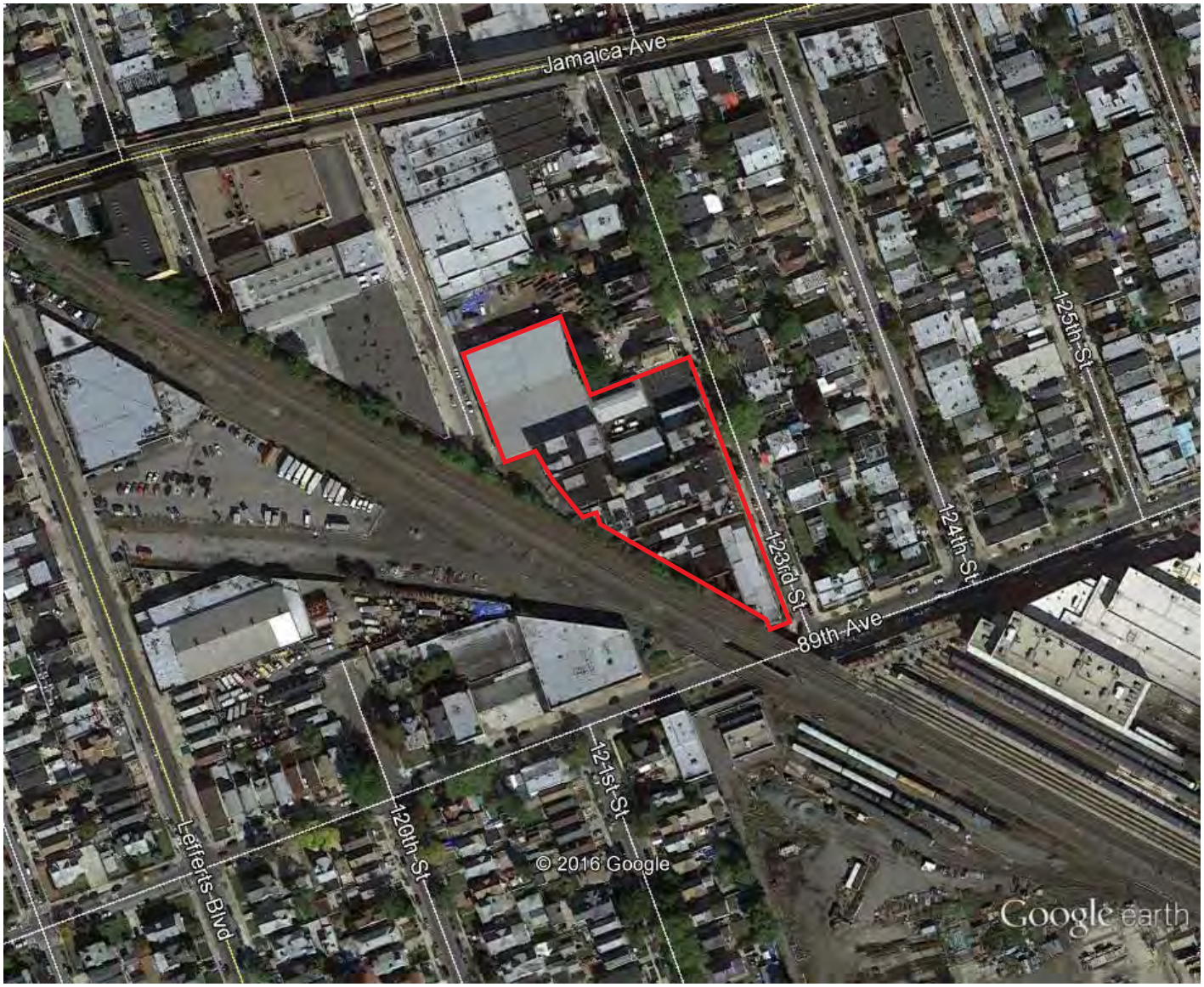
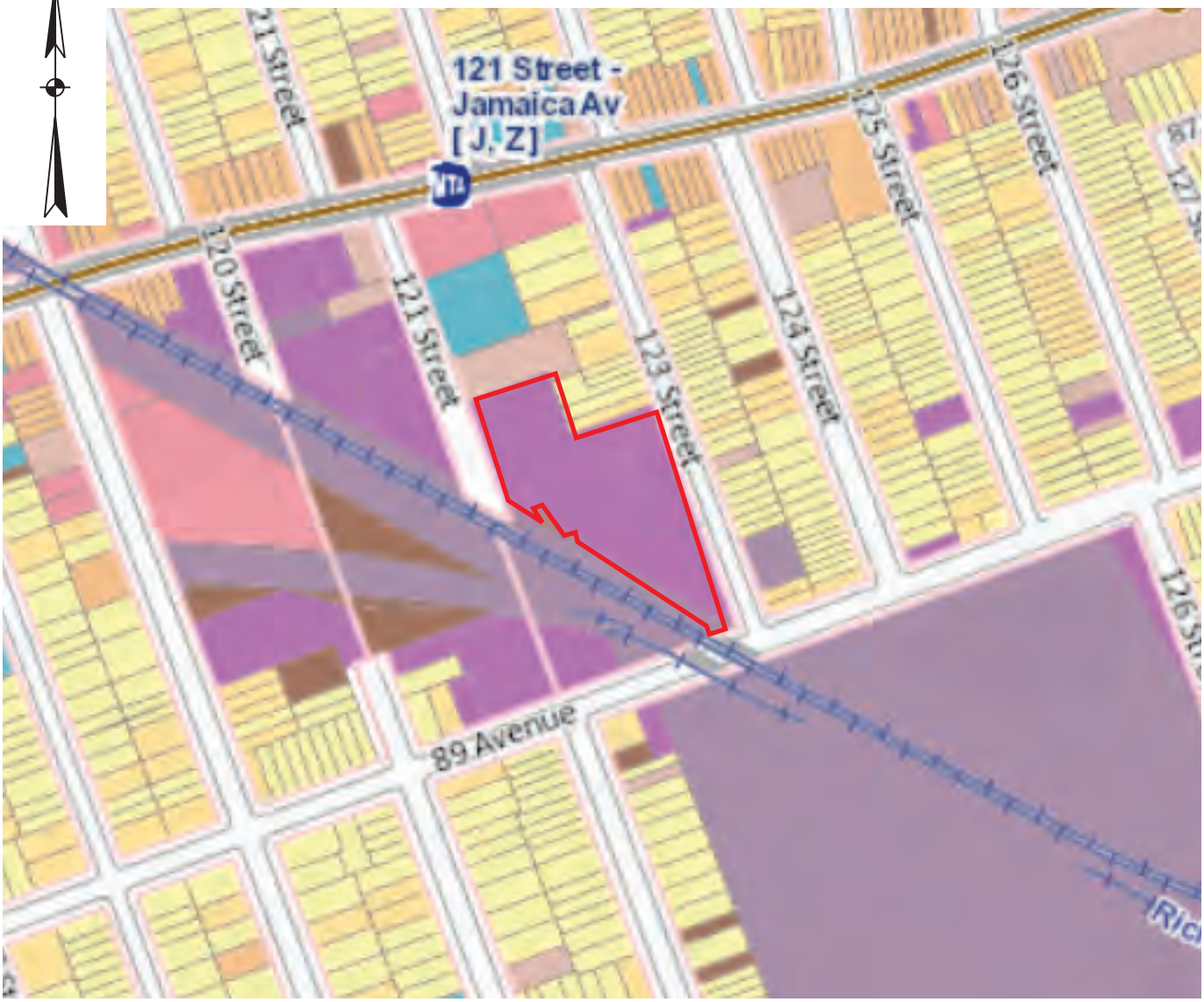


Figure 1 - Site Location Map 87-46 123rd Street Jamaica Queens, New York	N	ESI File: SQ16016.40 September 2016 Figures

FIGURE 2 - SITE SURVEY MAP



Legend:

- 1 & 2 Family Residential
- Multi-familly Residential
- Mixed Use
- Open space & outdoor recreation
- Commercial
- Institutions
- Industrial
- Parking
- Transporation/Utilities
- Vacant Lots

Subject Property

0 200 400

SCALE IN FEET
(APPROXIMATELY)

Source Map provided by http://www.oasisnyc.net/map.aspx.

Figure 3: Surrounding Land Use Map

87-46 123rd Street
Jamaica
Borough of Queens, New York

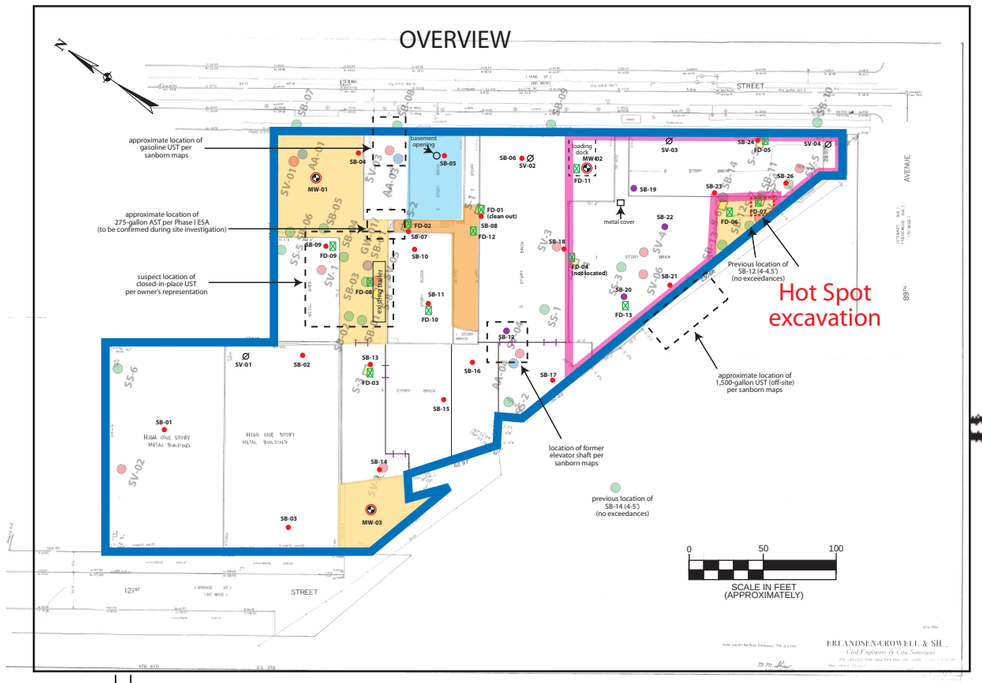
ESI File: SQ16016.40

September 2016

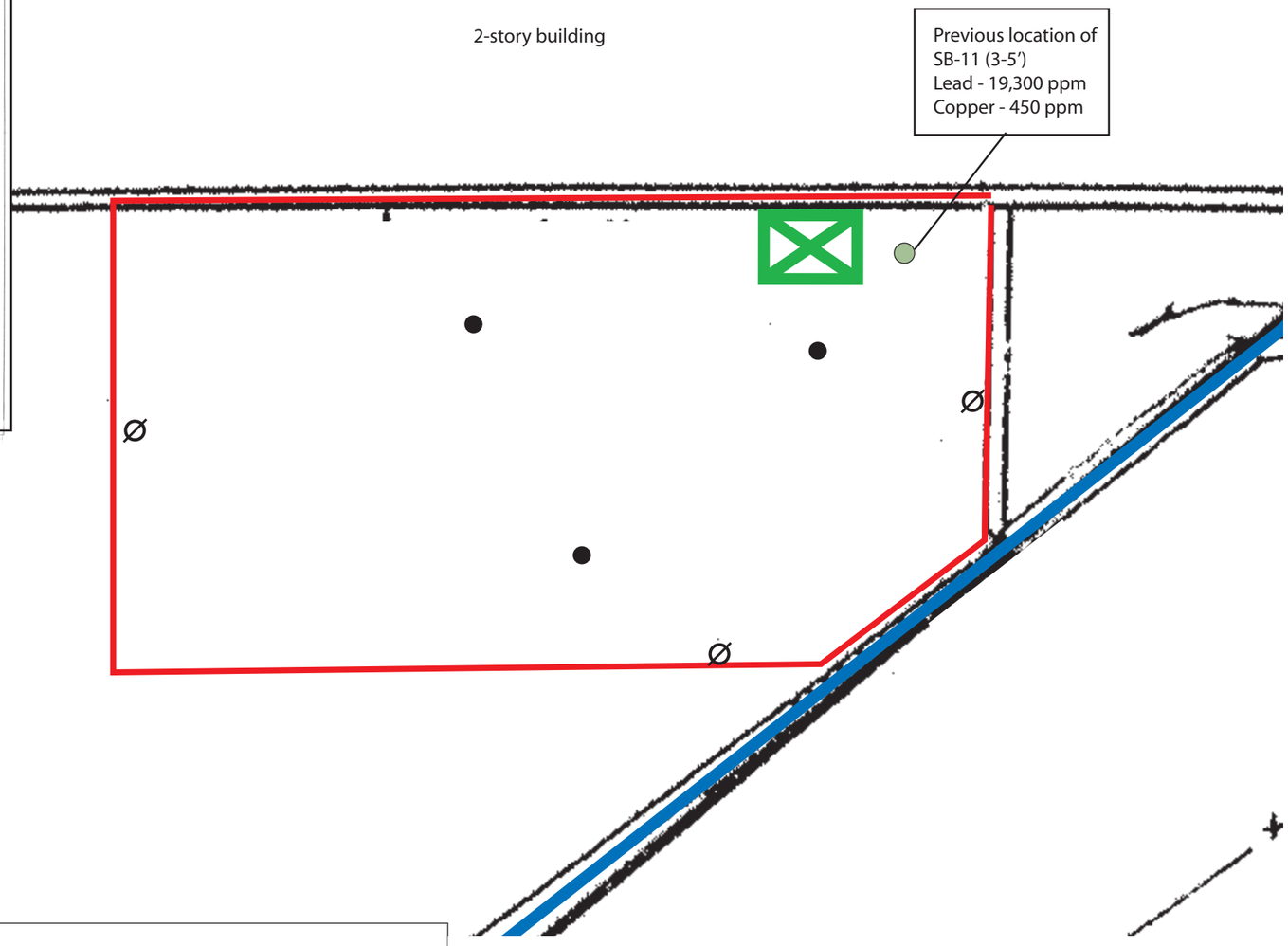
Figures

Ecosystems Strategies, Inc.

OVERVIEW



INSET



Legend:

- Site boundary
- Approximate area of hot spot excavation
- Floor drain location
- ● Proposed end-point base sample location
  Note: One (1) end-point wall sample will be collected for every 20 linear feet of excavation
- Ø Proposed end-point wall samples
  (no wall sample anticipated on the eastern wall)

Base map provided by Erlandsen-Crowell & Shaw dated, February 8, 2006. All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report.

Figure 4 - Hot Spot Excavation Fieldwork Map

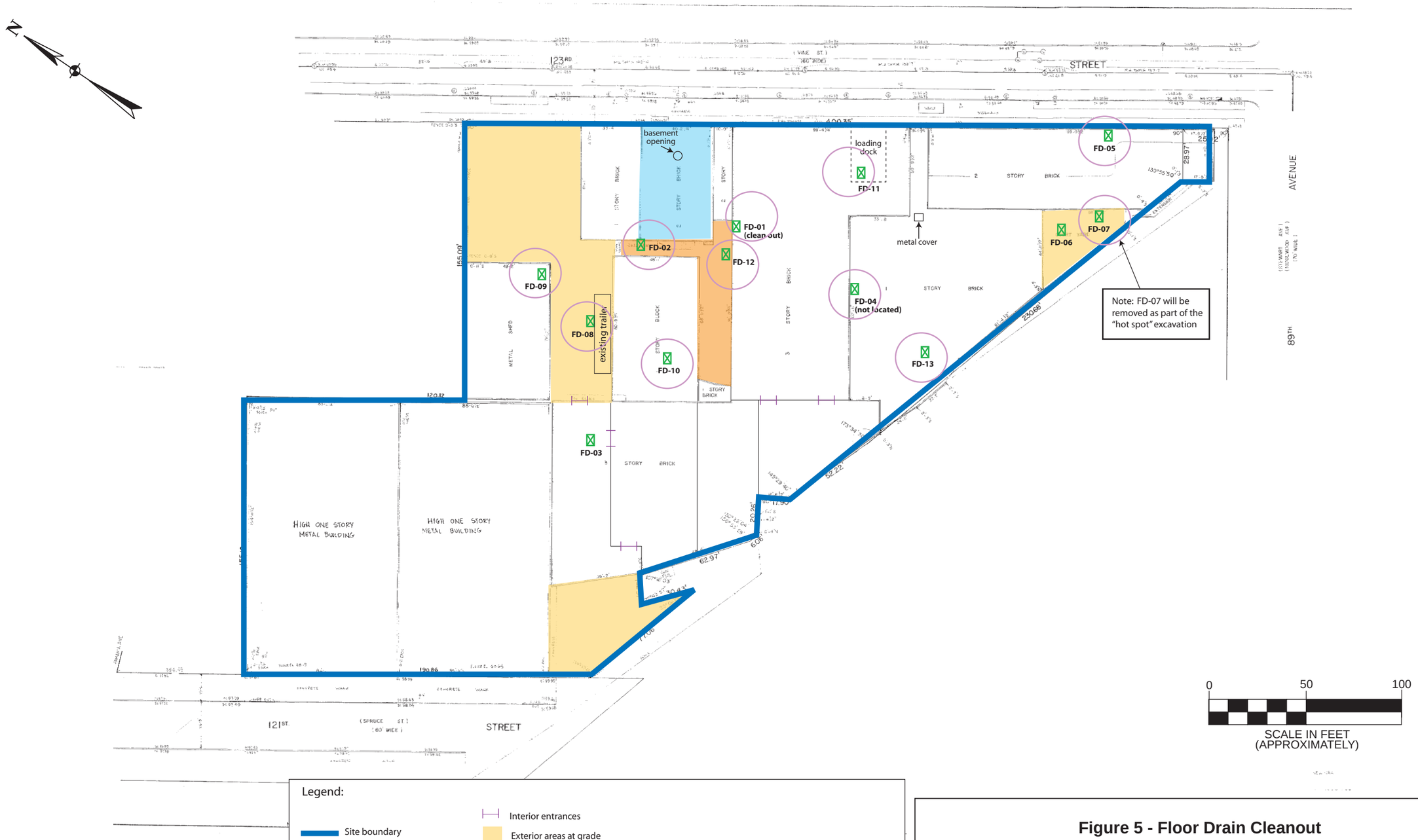
87-46 123rd Street
Jamaica
Borough of Queens, New York

ESI File: SQ16016.40

Scale as shown

September 2016 | Figures

Ecosystems Strategies, Inc.



Legend:

- Site boundary
- Floor drain location
- Floor drains subject to cleanout
- Interior entrances
- Exterior areas at grade
- Basement
- Exterior area at cellar grade

Base map provided by Erlandsen-Crowell & Shaw dated, February 8, 2006. All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report.

Figure 5 - Floor Drain Cleanout

87-46 123rd Street
Jamaica
Borough of Queens, New York

ESI File: SQ16016.40

Scale as shown

September 2016 | Figures

All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

Figure 6 - Truck Route Map

87-46 123rd Street
Queens, New York

Legend:

Truck Route

ESI File: SQ16016.50

September 2016

Figures

APPENDIX 1

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and 123rd Street Holding Corporation have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, 123rd Street Holding Corporation will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Noel Anderson, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

Project Contact List: OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the

Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at brownfields@cityhall.nyc.gov.

Repositories: A document repository is maintained online. Internet access to view OER's document repositories is available at public libraries. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. The library nearest the Site is:
Richmond Hill Library
118-14 Hillside Avenue
(718) 849-7150
Monday and Thursday: 12:00 pm – 8:00 pm
Tuesday: 1:00 pm – 6:00 pm
Wednesday and Friday: 10:00 am – 6:00 pm
Saturday 10:00 am – 5:00 pm
Sunday: Closed

Digital Documentation: NYC OER requires the use of digital documents in our repository as a means of minimizing paper use while also increasing convenience in access and ease of use.

Issues of Public Concern: The documented on-site presence of elevated levels of PCE and TCE in subgrade soil vapor as well as elevated PCBs and metals in sub-surface soils represent potential issues of public concern.

Public Notice and Public Comment: Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be reviewed and approved by OER prior to distribution and mailed by the Enrollee. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup

Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

Citizen Participation Milestones: Public notice and public comment activities occur at several steps during a typical NYC VCP project. These steps include:

- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.

- **Public Notice announcing the approval of the RAWP and the start of remediation:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.

- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

APPENDIX 2

SOIL/MATERIALS MANAGEMENT PLAN

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the final remedial report. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of final signoff by OER.

1.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hotspots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.
All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 Materials Excavation, Load-Out, and Departure

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior OER approval.

1.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

Outbound truck transport routes are described in the remedial report. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the final remedial report.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the final remedial report.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the final remedial report. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the final remedial report. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by OER with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

1.7 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the Soil Cleanup Objectives (SCOs) established in this plan may be reused on-Site. The SCOs for on-Site reuse are listed in Section 4.2 of this cleanup plan. 'Reuse on-Site' means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on land with comparable levels of contaminants in soil/fill material, compliant with applicable laws and regulations, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this remedial plan are followed. The expected location for placement of reused material is shown in Section 4.2.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

1.9 Import of Backfill Soil From Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. Imported soils will not exceed groundwater protection standards established in Part 375. Imported soils for Track 1 remedial action projects will not exceed Track 1 SCO's.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;

- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC;
- All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this remedial plan. The final remedial report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed;
- All material will be subject to source screening and chemical testing.
- Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:
- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.
Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the final remedial report. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 Stormwater Pollution Prevention

Applicable laws and regulations pertaining to stormwater pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this remedial plan (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 Contingency Plan for Unknown Contamination Sources

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's

Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

1.13 Odor, Dust, and Nuisance Control

Odor Control

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

This odor control plan is capable of controlling emissions of nuisance odors. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. OER will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying this remedial plan.

Dust Control

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying this remedial plan.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided during Site clearing and grubbing and during the remedial program, as necessary, to prevent nuisances.

APPENDIX 3

CONSTRUCTION HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

FOR

SITE REMEDIATION

(INCORPORATING COMMUNITY HEALTH AND SAFETY PLAN)

87-4 123rd Street

Queens, New York

ESI File: SQ16016

September 2016

Prepared By:

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1.0 INTRODUCTION

1.1 Purpose

This Health and Safety Plan for Site Remediation (HASP) has been developed to provide the requirements and general procedures to be followed by Jansen Engineering, PLLC, Ecosystems Strategies, Inc. (ESI), and designated subcontractors while performing investigative services at the property located at 87-46 123rd Street in the Richmond Hill section of Queens, New York.

This HASP incorporates policies, guidelines and procedures that have the objective of protecting the public health of the community during the performance of fieldwork activities, and therefore serves as a Community Health and Safety Plan. The objectives of the HASP are met by establishing guidelines to minimize community exposure to hazards during fieldwork, and by planning for and responding to emergencies affecting the public adjacent to the site.

This HASP describes the responsibilities, training requirements, protective equipment and standard operating procedures to be utilized by all personnel while on the Site. All on-site personnel and visitors shall follow the guidelines, rules, and procedures contained in this safety plan. The Project Manager or Site Health and Safety Officer (SHSO) may impose any other procedures or prohibitions believed to be necessary for safe operations. This HASP incorporates by reference the applicable Occupational Safety and Health Administration (OSHA) requirements in 29 CFR 1910 and 29 CFR 1926.

The requirements and guidelines in this HASP are based on a review of available information and evaluation of potential on-site hazards. This HASP will be discussed with Site personnel and will be available on-site for review while work is underway. On-site personnel will report to the Site Health and Safety Officer (SHSO) in matters of health and safety. The on-site project supervisor(s) are responsible for enforcement and implementation of this HASP, which is applicable to all field personnel, including contractors and subcontractors.

This HASP is specifically intended for the conduct of activities within the defined scope of work in specified areas of the Site. Changes in site conditions and future actions that may be conducted at the Site may necessitate the modification of the requirements of the HASP. Although this HASP can be made available to interested persons for informational purposes, ESI has no responsibility over the interpretations or activities of any other persons or entities other than employees of ESI or ESI's subcontractors.

1.2 Site Location and Description

The Site consists of a 95,123-square foot, irregular-shaped parcel located at 87-46 123rd Street, Borough of Queens, New York City, New York, identified as New York City tax lot parcel: Block 9331, Lot 30. The Site has 400 feet of frontage on the western side of 123rd Street and extends approximately 300 feet to the west. The Site contains twelve, commercial buildings, a paved parking area, and maintained yard areas. A Site Location Map is provided as an Attachment.

1.3 Work Activities

Environmental remediation activities are detailed in the Remedial Action Work Plan (RAWP), dated September 2016. The specific tasks detailed in the RAWP are wholly incorporated by reference into this

HASP. Documented environmental conditions at the Site include the presence of metals contamination associated with on-site fill materials and drain sediments and elevated concentrations of sub-slab soil vapor.

The following field tasks will be performed:

- Excavation and removal of urban fill soils;
- Backfill the excavated area with certified clean soil;
- Installation of an enhanced sub-slab depressurization system (e-SSDS); and,
- Removal of sediment from on-site drains.

Any excavated soil/sediment removed from the Site must be disposed of in accordance with all applicable NYSDEC regulations. A Floor Drain Cleanout Map is provided as an Attachment.

2.0 HEALTH AND SAFETY HAZARDS

2.1 Hazard Overview for On-Site Personnel

Elevated levels of metals and SVOCs and low levels of VOCs and PCBs (likely to be associated with on-site urban fill and/or historical utilization of the property) are present in on-site soils. Elevated levels of SVOCs, metals, and/or PCBs are also present in sediments located within drains at the Site. The documented contaminant concentrations in soils are typically encountered in urban settings. These substances are present at levels that may present a health risk during soil disturbance and air-quality sampling activities. General precautions, such as air monitoring for dust and the use of gloves during sampling collection, will be sufficient protective actions.

During excavation activities and the installation of the e-SSDS the possibility exists for on-site personnel to contact contaminated soils, dust, and vapor. Contact with contaminated substances may present a skin contact, inhalation, and/or ingestion hazard. Additional potential hazards are addressed in Sections 3.0 through 11.0, and below.

Metals and SVOCs (consisting of polycyclic aromatic hydrocarbons [PAHs]) associated with poor quality fill materials are known to be present in surface and near surface soils. PAHs are compounds that generally occur as complex mixtures and are derived from both natural and non-natural sources, including forest fires, vehicle exhaust, plastics, and building products such as roofing tar and asphalt. They are found throughout the environment in the air, water, and soil. They can occur in the air as vapors or attached to dust particles, in water in a dissolved state or attached to solid particles, or as solids in soil or sediment. The short-term health effects of exposure to PAHs are not well defined. Long-term exposure may lead to the development of cancer. PAHs in Site soils are at levels typically encountered in urban settings but occur at concentrations somewhat above applicable NYSDEC guidance levels.

Elevated levels of metals and PAHs are known to be present in surface and near surface soils and in sediments within drains at the Site. Metals are compounds that occur naturally in soils and are widespread throughout the man-made environment. Most metals are present in quantities and forms that present minimal health risks. Typical materials that present significant potential risks are chips of lead-based paint, lead dust from deteriorated paint and automobile exhaust, and soil impacted by industrial discharges (e.g., sediment in floor drains). They can occur in the air attached to dust particles (or as

vapors in specific circumstances), in water in a dissolved state or attached to solid particles, or as solids in soil or sediment. Health effects are variable, are generally dose dependent, and occur over both the short term and the long term. With the exception of soils located within the hotspot (as described in the RAWP), metal concentrations in Site soils are at levels typically encountered in urban settings; several metals, however, occur at concentrations somewhat above applicable NYSDEC guidance levels.

Routes of exposure for VOCs, PAHs, PCBs, and metals are potentially through inhalation and ingestion during soil disturbance activities. Proper protective actions include:

- Air monitoring for dust and vapors, where appropriate;
- Use of particulate masks and/or air-purifying respirators (if warranted); and,
- Use of gloves for field technicians handling soil.

2.2 Potential Hazards to the Public from Fieldwork Activities

The potential exists for the public to be exposed to contaminated soils, dust, and vapor, which may present a skin contact, inhalation, and/or ingestion hazard. Additional potential hazards to the public that are associated with fieldwork activities include mechanical/physical hazards, traffic hazards from fieldwork vehicles, and noise impacts associated with operation of mechanical equipment.

Impacts to public health and safety are expected to be limited to hazards that could directly affect on-site visitors and/or trespassers. These effects will be mitigated through site access and control measures (see Section 6.0, below). Specific actions will be taken to protect the public health (presented in Sections 3.0 through 11, below) to minimize any potential off-site impacts from contaminant migration, noise, and traffic hazards.

3.0 PERSONAL PROTECTIVE EQUIPMENT

The levels of protection identified for the services specified in the RAWP represent a best estimate of exposure potential and protective equipment needed for that exposure. Determination of levels was based on data provided by previous studies of the Site and information reviewed on current and past Site usage. The SHSO may recommend revisions to these levels based on an assessment of actual exposures and may at any time require Site workers, supervisors and/or visitors to use specific safety equipment.

The level of protective clothing and equipment selected for this project is Level D. Level D PPE provides minimal skin protection and no respiratory protection, and is used when the atmosphere contains no known hazard, oxygen concentrations are not less than 19.5%, and work activities exclude splashes, immersion or the potential for unexpected inhalation or contact with hazardous levels of chemicals. Workers will wear Level D protective clothing including, but not limited to, a hard hat, steel-toed boots, nitrile gloves (when handling soils and/or groundwater), hearing protection (foam ear plugs or ear muffs, as required), and safety goggles (in areas of exposed groundwater and when decontaminating equipment). Personal protective equipment (PPE) will be worn at all times, as designated by this HASP.

Disposable gloves will be changed immediately following the handling of contaminated soils, water, or equipment. Tyvek suits will be worn during activities likely to excessively expose work clothing to

contaminated dust or soil (chemically-resistant over garments will be required in situations where exposures could lead to penetration of clothing and direct dermal contact by contaminants).

The requirement for the use of PPE by official on-site visitors shall be determined by the SHSO, based on the most restrictive PPE requirement for a particular Work Zones (see Section 6 for Work Zone definitions). All on-site visitors shall, at a minimum, be required to wear an approved hardhat and be provided with appropriate hearing protection as necessary.

The need for an upgrade in PPE will be determined based upon encountered Site conditions, including measurements taken in the breathing zone of the work area using a photo-ionization detector (PID). An upgrade to a higher level of protection (Level C) will begin when specific action levels are reached (see Section 5.0, below), or as otherwise required by the SHSO. Level C PPE includes a full-face or half-mask air-purifying respirator (NIOSH approved for the compound[s] of concern), hooded chemical-resistant clothing, outer and inner chemical-resistant gloves, and (as needed) coveralls, outer boots/boot covers, escape mask, and face shield. Level C PPE may be used only when: oxygen concentrations are not less than 19.5%; contaminant contact will not adversely affect any exposed skin; types of air contaminants have been identified, concentrations measured, and a cartridge or canister is available that can remove the contaminant; atmospheric contaminant concentrations do not exceed immediately dangerous to life or health (IDLH) levels; and job functions do not require self-contained breathing apparatus (SCBAs). The need for Level B or Level A PPE is not anticipated for the planned remedial activities at this Site.

If any equipment fails and/or any employee experiences a failure or other alteration of their protective equipment that may affect its protective ability, that person will immediately leave the work area. The Project Manager and the SHSO will be notified and, after reviewing the situation, determine the effect of the failure on the continuation of on-going operations. If the failure affects the safety of personnel, the work site, or the surrounding environment, personnel will be evacuated until appropriate corrective actions have been taken.

4.0 CONTAMINANT CONTROL

Precautions will be taken during dry weather (e.g., wetting or covering exposed soils) to avoid generating and breathing dust-generated from soils. A PID (or equivalent equipment) will be used to monitor potential contaminant levels. Response to the monitoring will be in accordance with the action levels provided in Section 5.0.

5.0 MONITORING AND ACTION LEVELS

Concentrations of petroleum compounds in the air are expected to be below the OSHA Permissible Exposure Limits (PELs). Air monitoring will be conducted for VOCs and dust according to the NYSDOH Generic Community Air Monitoring Plan (CAMP). Monitoring will be conducted at all times that fieldwork activities which are likely to generate emissions are occurring. PID and dust readings consistently in excess of CAMP limits will be used as an indication of the need to initiate personnel monitoring, increase worker protective measures, and/or modify or cease on-site operations in order to mitigate off-site community exposure.

PID readings that consistently exceed background in the breathing zone (during any of the proposed tasks) will necessitate moving away from the source or implementing a higher PPE level.

6.0 SITE CONTROL/WORK ZONES

Site control procedures will be established to reduce the possibility of worker/visitor contact with compounds present in the soil, to protect the public in the area surrounding the Site and to limit access to the Site to only those persons required to be in the work zone. Notices will be placed near the Site warning the public not to enter fieldwork areas and directing visitors to report to the Project Manager or SHSO. Measures will be taken to limit the entry of unauthorized personnel into the specific areas of field activity and to safely direct and control all vehicular traffic in and near the Site (e.g., placement of traffic cones and warning tape).

The following Work Zone will be established:

Exclusion Zone ("Hot Zone") - The exclusion zone will be that area immediately surrounding the work being performed for remediation purposes (i.e. the area where contaminated media are being handled). It is anticipated that much of the work will be accomplished with heavy equipment in the exclusion zone. Only individuals with appropriate PPE and training are allowed into this zone. It is the responsibility of the Site Health and Safety Officer to prevent unauthorized personnel from entering the exclusion zone. When necessary, such as in high traffic areas, the exclusion zone will be delineated with barricade tape, cones and/or barricades.

Decontamination Area - A decontamination area for personnel and equipment is not anticipated being required during completion of the RAWP; however, care will be taken to remove gloves, excess soil from boots, and soiled clothing (if necessary) before entering the Intermediate Zone.

Contamination Reduction Zone and Support Zone - Not anticipated being required during the completion of the RAWP.

Intermediate Zone (Decontamination Zone) - The intermediate zone, also known as the decontamination zone, is where patient decontamination should take place, if necessary. A degree of contamination still is found in this zone; thus, some PPE is required, although it is usually of a lesser degree than that required for the hot zone.

Command Zone - The command zone is located outside the decontamination zone. All exposed individuals and equipment from the "hot zone" and decontamination zone should be decontaminated before entering the command zone. Access to all zones must be controlled. Keeping the media and onlookers well away from the Site is critical and will be the responsibility of both the SSHO and the Project Manager, and other Site personnel as appropriate.

7.0 NOISE CONTROL

All fieldwork activities will be conducted in a manner designed to reduce unnecessary noise generation, and to minimize the potential for both on-site and off-site harmful noise levels. The Project Manager and SHSO will establish noise reduction procedures (as appropriate to the Site and the work) to meet these requirements.

8.0 PERSONNEL TRAINING

Work zones that will accomplish the general objective stated above will be established by the Project Manager and the SHSO. Site access will be monitored by the SHSO, who will maintain a log-in sheet for

personnel that will include, at the minimum, personnel on the Site, their arrival and departure times and their destination on the Site. All workers will be properly trained in accordance with OSHA requirements (29 CFR 1910). Personnel exiting the work zone(s) will be decontaminated prior to exiting the Site.

Site-specific training will be provided to each employee. Personnel will be briefed by the SHSO as to the potential hazards to be encountered. Topics will include:

- Availability of this HASP;
- General site hazards and specific hazards in the work areas, including those attributable to known of suspect on-site contaminants;
- Selection, use, testing, and care of the body, eye, hand, and foot protection being worn, with the limitations of each;
- Decontamination procedures for personnel, their personal protective equipment, and other equipment used on the Site;
- Emergency response procedures and requirements;
- Emergency alarm systems and other forms of notification, and evacuation routes to be followed; and,
- Methods to obtain emergency assistance and medical attention.

9.0 DECONTAMINATION

The SHSO will establish a decontamination system and decontamination procedures (appropriate to the Site and the work) that will prevent potentially hazardous materials from leaving the Site. Trucks will be brushed to remove materials adhering to their surfaces. Sampling equipment will be segregated and, after decontamination, stored separately from splash protection equipment. Decontaminated or clean sampling equipment not in use will be covered with plastic and stored in a designated storage area in the work zone.

10.0 EMERGENCY RESPONSE

10.1 Notification of Site Emergencies

In the event of an emergency, the SHSO will be immediately notified of the nature and extent of the emergency (the names and contact information for key site safety and management personnel, as well as other site safety contact telephone numbers, shall be posted at the Site).

Table 1 in this HASP contains Emergency Response Telephone Numbers, and immediately following is a map detailing the directions to the nearest hospital emergency room. This information will be maintained at the work Site by the SHSO. The location of the nearest telephone will be determined prior to the initiation of on-site activities. In addition to any permanent phone lines, a cellular phone will be in the possession of the SHSO, or an authorized designee, at all times.

10.2 Responsibilities

Prior to the initiation of on-site work activities, the SHSO will:

- Notify individuals, authorities and/or health care facilities of the potentially hazardous activities and potential wastes that may develop as a result of the remedial activities.
- Confirm that first aid supplies and a fire extinguisher are available on-site.
- Have a working knowledge of safety equipment available.
- Confirm that a map detailing the most direct route to the hospital is prominently posted with the emergency telephone numbers.

The SHSO will be responsible for directing notification, response and follow-up actions and for contacting outside response personnel (ambulance, fire department, or others). In the case of an evacuation, the SHSO will account for personnel. A log of individuals entering and leaving the Site will be kept so that everyone can be accounted for in an emergency.

Upon notification of an exposure incident, the SHSO will contact the appropriate emergency response personnel for recommended medical diagnosis and, if necessary, treatment. The SHSO will determine whether and at what levels exposure actually occurred, the cause of such exposure, and the means to prevent similar incidents from occurring.

10.3 Accidents and Injuries

In the event of an accident or injury, measures will be taken to assist those who have been injured or exposed and to protect others from hazards. If an individual is transported to a hospital or doctor, a copy of the HASP will accompany the individual.

The SHSO will be notified and will respond according to the severity of the incident. The SHSO will perform an investigation of the incident and prepare a signed and dated report documenting the investigation. An exposure-incident report will also be completed by the SHSO and the exposed individual. The form will be filed with the employee's medical and safety records to serve as documentation of the incident and the actions taken.

10.4 Communication

No special hand signals will be utilized within the work zone. Field personnel will utilize standard hand signals during the operation of heavy equipment.

10.5 Safe Refuge

Vehicles and on-site structures will serve as the immediate place of refuge in the event of an emergency. If evacuation from the area is necessary, project vehicles will be used to transport on-site personnel to safety.

10.6 Site Security and Control

Site security and control during emergencies, accidents and incidents will be monitored by the SHSO. The SHSO is responsible for limiting access to the Site to authorized personnel and for oversight of reaction activities.

10.7 Emergency Evacuation

In case of an emergency, personnel will evacuate to the safe refuge identified by the SHSO, both for their personal safety and to prevent the hampering of response/rescue efforts.

10.8 Resuming Work

A determination that it is safe to return to work will be made by the SHSO and/or any personnel assisting in the emergency, e.g., fire department, police department, utility company, etc. No personnel will be allowed to return to the work areas until a full determination has been made by the above-identified personnel that all field activities can continue unobstructed. Such a determination will depend upon the nature of the emergency (e.g., downed power lines -- removal of all lines from the property; fire -- extinguished fire; injury -- safe transport of the injured party to a medical facility with either assurance of acceptable medical care present or completion of medical care; etc.). Before on-site work is resumed following an emergency, necessary emergency equipment will be recharged, refilled or replaced. Government agencies will be notified as appropriate. An Incident Report Form will be filed.

10.9 Fire Fighting Procedures

A fire extinguisher will be available in the work zone during on-site activities. This extinguisher is intended for small fires. When a fire cannot be controlled with the extinguisher, the area will be evacuated immediately. The SHSO will be responsible for directing notification, response and follow-up actions and for contacting ambulance and fire department personnel.

10.10 Emergency Decontamination Procedure

The extent of emergency decontamination depends on the severity of the injury or illness and the nature of the contamination. Whenever possible, minimum decontamination will consist of washing, rinsing and/or removal of contaminated outer clothing and equipment. If time does not permit decontamination, the person will be given first aid treatment and then wrapped in plastic or a blanket prior to transport.

10.11 Emergency Equipment

The following on-site equipment for safety and emergency response will be maintained in the on-site vehicle of the SHSO:

- Fire extinguisher;
- First-aid kit; and,
- Extra copy of this Health and Safety Plan.

11.0 SPECIAL PRECAUTIONS AND PROCEDURES

The activities associated with this remediation may involve potential risks of exposure to both chemical and physical hazards. The potential for chemical exposure to hazardous or regulated substances will be significantly reduced through the use of monitoring, personal protective clothing, engineering controls, and implementation of safe work practices.

11.1 Heat/Cold Stress

Training in prevention of heat/cold stress will be provided as part of the site-specific training. The timing of this project is such that heat/cold stress may pose a threat to the health and safety of personnel. Work/rest regimens will be employed, as necessary, so that personnel do not suffer adverse effects from heat/cold stress. Special clothing and appropriate diet and fluid intake regimens will be recommended to personnel to further reduce this temperature-related hazard. Rest periods will be recommended in the event of high/low temperatures and/or humidity to counter the negative effects of heat/cold stress.

11.2 Heavy Equipment

Working in the vicinity of heavy equipment is the primary safety hazard at the Site. Physical hazards in working near heavy construction equipment include the following: overhead hazards, slips/trip/falls, hand and foot injuries, moving part hazards, improper lifting/back injuries and noise. All workers will be properly trained in accordance with OSHA requirements (29 CFR 1910). No workers will be permitted within any excavated areas without proper personal protective equipment (PPE), including, as warranted, any necessary Level C equipment (e.g., respirators and protective suits). Air monitoring in excavation areas will be conducted for VOCs in accordance with Section 5.0.

11.3 Additional Safety Practices

The following are important safety precautions which will be enforced during the remedial activities:

- Medicine and alcohol can aggravate the effect of exposure to certain compounds. Controlled substances and alcoholic beverages will not be consumed during remedial activities. Consumption of prescribed drugs will only be at the discretion of a physician familiar with the person's work.
- Eating, drinking, chewing gum or tobacco, smoking, or other practices that increase the probability of hand-to-mouth transfer and ingestion of material is prohibited except in areas designated by the SHSO.
- Contact with potentially contaminated surfaces will be avoided whenever possible. Workers will not unnecessarily walk through puddles, mud or other discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, vehicles, or the ground.
- Personnel and equipment in the work areas will be minimized, consistent with effective site operations.
- Unsafe equipment left unattended will be identified by a "DANGER, DO NOT OPERATE" tag.
- Work areas for various operational activities will be established.

11.4 Daily Log Contents

The SHSO will establish a system appropriate to the Site, the work and the work zones that will record, at a minimum, the following information:

- Personnel on the Site, their arrival and departure times and their destination on the Site.

- Incidents and unusual activities that occur on the Site such as, but not limited to, accidents, spills, breaches of security, injuries, equipment failures and weather-related problems.
- Changes to the HASP.
- Daily information generated such as: changes to work and health and safety plans; work accomplished and the current Site status; and monitoring results.

12.0 TABLE AND FIGURES

Table 1: Emergency Contact Information

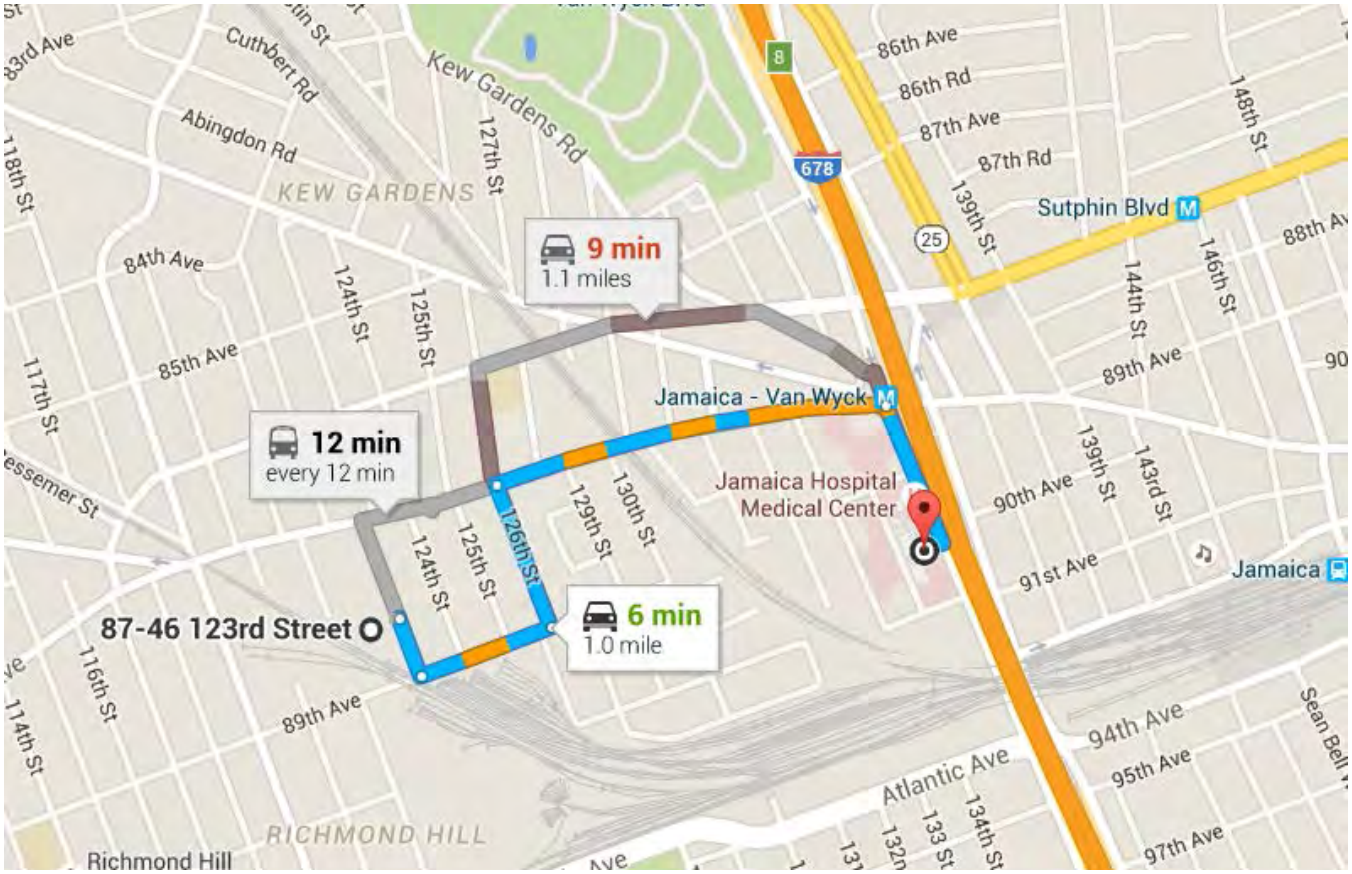
Emergency Agencies	**Phone Numbers**
EMERGENCY	**911**
Jamaica Hospital 8900 Van Wyck Expressway, Queens, New York 11418	(718) 206-6000 or **911**
NYC Police Department	(718) 805-3200 or **911**
NYC Fire Department	911
City Hall	(212) 788-3000
Main Water and Sewer	(212) 315-2101
Site Health and Safety Officer, Paul Ciminello, ESI	(845) 452-1658
Remedial Engineer, Philip Bell, PE	(845) 565-3802
Construction Manager	TBD

Figure 1: Directions to Hospital (approximately 10-15 minutes travel time)

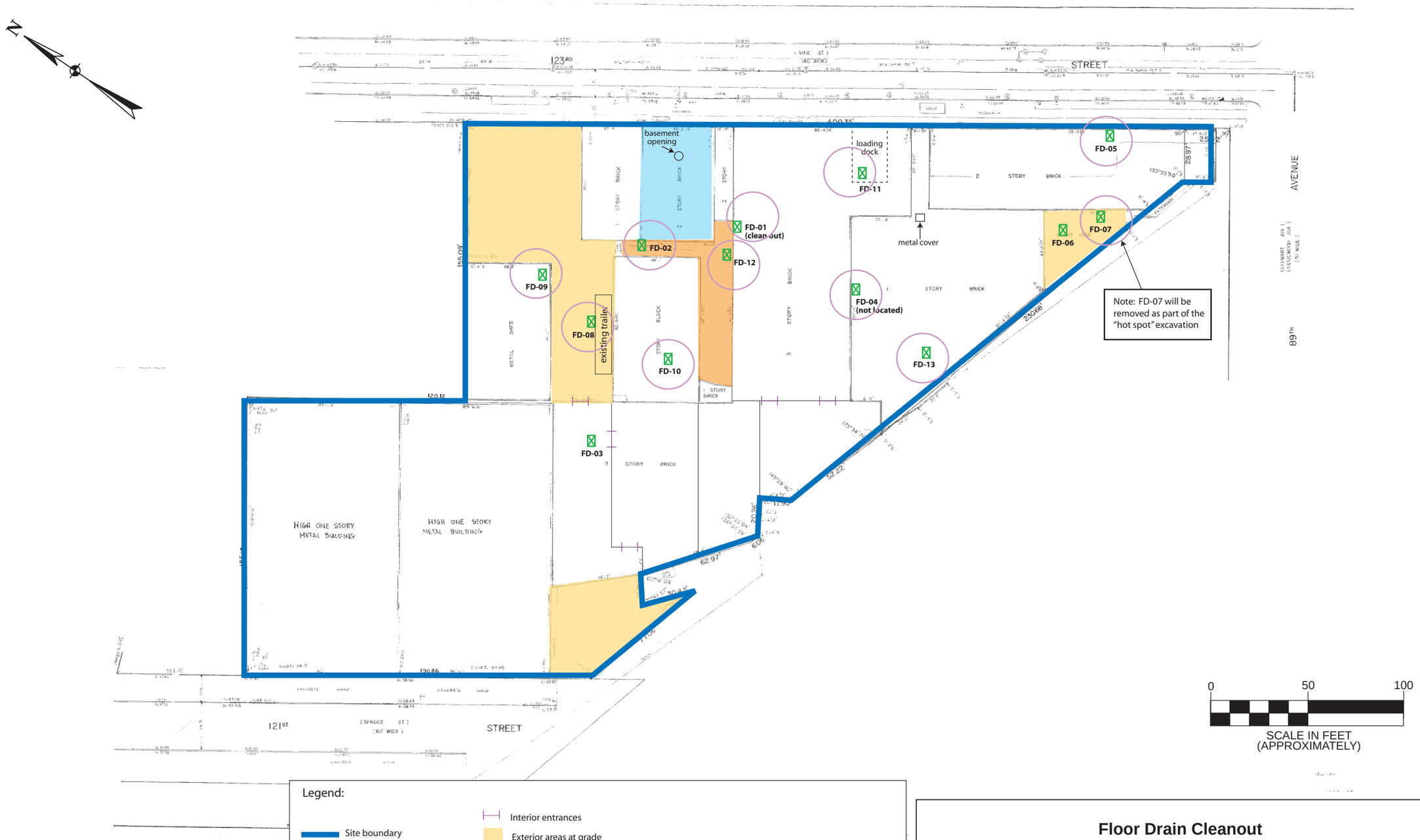
1. 87-46 123rd Street, Queens, NY 11418
2. Head south on 123rd Street- 348 feet
3. Turn left onto 89th Avenue- 0.1 mi
4. Turn left onto 126th Street- 0.2 mi
5. Turn right onto Jamaica Avenue - 0.4 mi

Turn right onto Van Wyck Expressway - Destination on the right

Figure 2: Map to Hospital (overview)



Ecosystems Strategies, Inc.



Legend:

- Site boundary
- Floor drain location
- Floor drains subject to cleanout
- Interior entrances
- Exterior areas at grade
- Basement
- Exterior area at cellar grade

Base map provided by Erlandsen-Crowell & Shaw dated, February 8, 2006. All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report.

Floor Drain Cleanout

87-46 123rd Street
Jamaica
Borough of Queens, New York

ESI File: SQ16016.40

Scale as shown

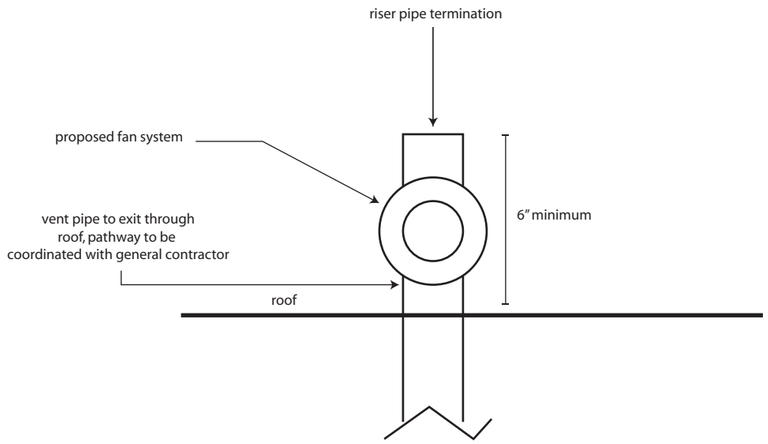
September 2016 | Figures

APPENDIX 4

e-SSDS Specifications

Ecosystems Strategies, Inc.

DETAIL #1 - ROOF PENETRATION AND RISER PIPE TERMINATION



DETAIL #2 - SUB-SLAB SUCTION POINT - CROSS-SECTION

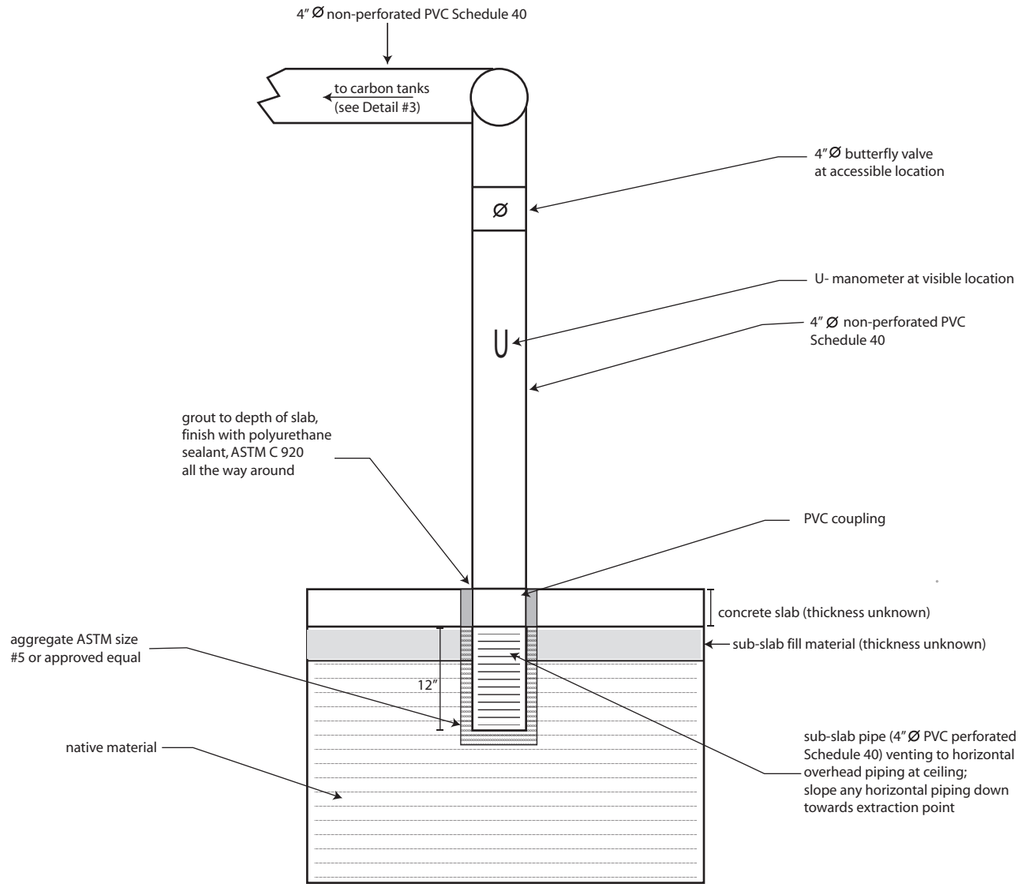


Figure 1A: Enhanced Subslab Depressurization System Details #1 and #2

87-47 123rd Street Borough of Queens, New York	ESI File: SQ16016.50
	Not to Scale
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Ecosystems Strategies, Inc.

DETAIL #3 - SUCTION PIT - CROSS SECTION

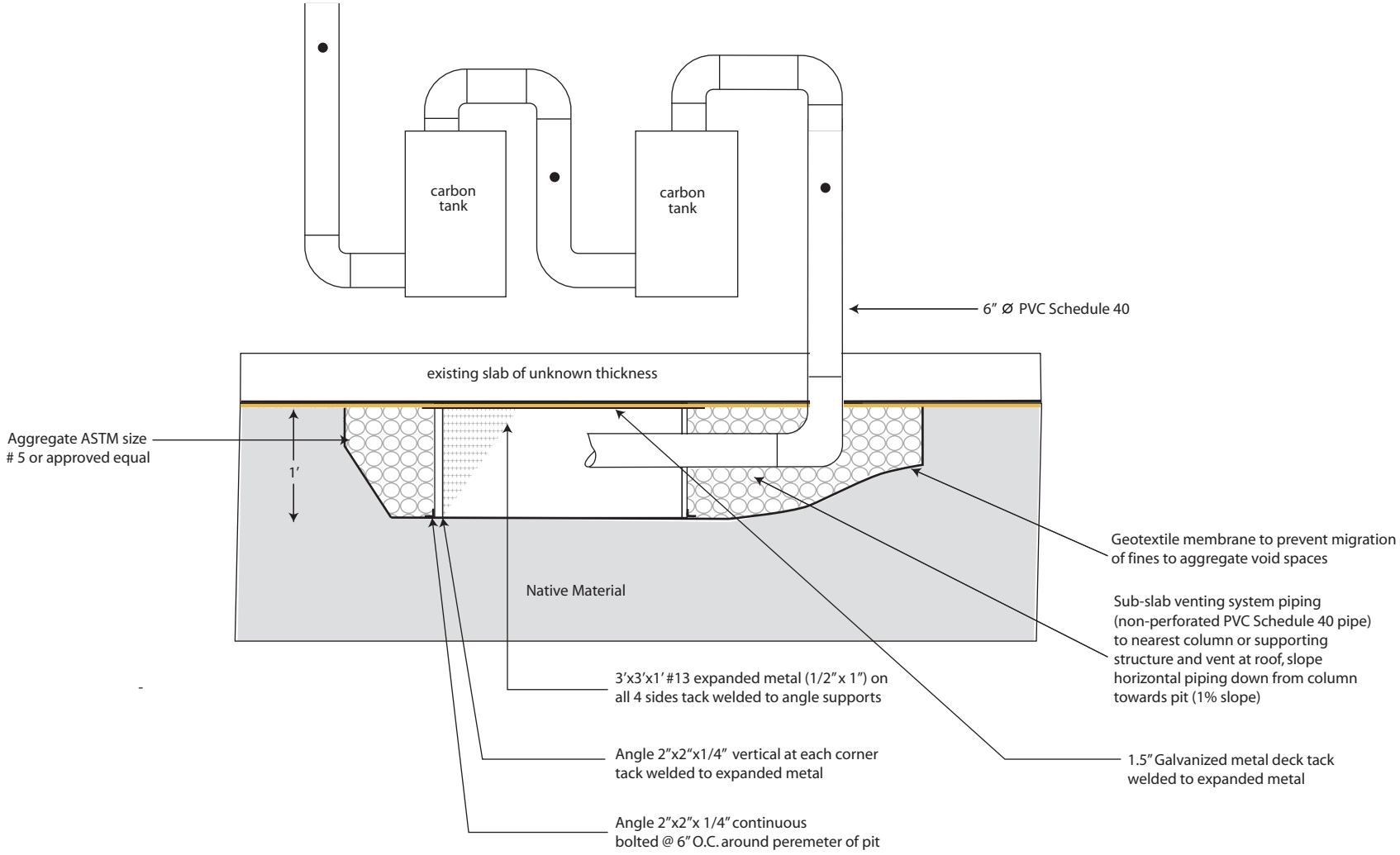

Figure 1B: Enhanced Subslab Depressurization System - Detail #3

87-47 123rd Street
Borough of Queens, New York

Legend:

- sampling point

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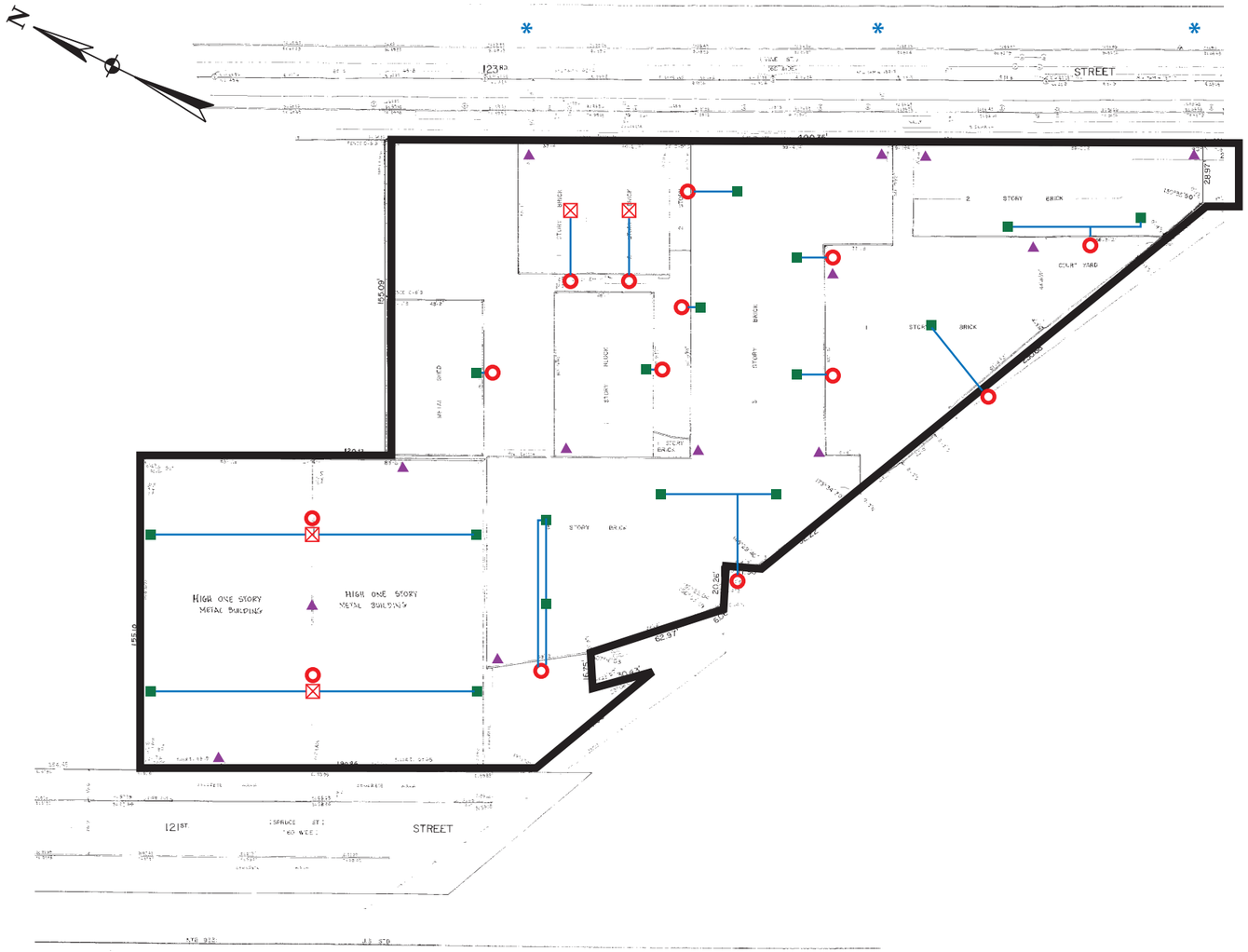

Notes:

1. Seven (7) suction pits (3'x3'x1') and one (1) suction point shall be constructed at the indicated locations, following the specifications in Figure 1B and 1C: Sub-slab Depressurization System Details #3 and #4.
2. Piping materials above and below ground shall comply with materials specified in NYC DOB Sanitary Drainage Code, Tables 702.1 (aboveground) and Table 702.2 (belowground). Cast iron, 6" inside diameter (ID), with corresponding cast iron no-hub couplers at all pipe unions, is recommended for inter-slab and above-slab piping. If approval is secured from NYC DOB, the following materials are acceptable: perforated, 6" ID Schedule 40 PVC pipe for sub-slab piping; and non-perforated, 6" ID Schedule 40 PVC pipe for piping at and above the concrete slab.
3. Unless approval is secured from NYC DOB, sub-slab suction pit and suction point piping shall consist of 6" ID non-perforated cast iron. Sub-slab suction pit piping shall be covered with 3" min. of aggregate ASTM size #5 (or equivalent).
4. Sub-slab and overhead piping shall be pitched down from the riser pipe towards suction pits or points at 1/8" per foot (1% slope) to facilitate condensation drainage.
5. Pre-treatment riser piping (prior to carbon drums) shall be 6" ID non-perforated cast iron transitioning to 4" ID post-treatment (after carbon drums) riser piping.
6. Appropriate fire stop details shall be installed at any location in which the riser pipe penetrates a fire rated wall and all joints shall be sealed with plumber's cement (or similar product) to be applied according to the manufacturer's specifications.
7. Overhead piping and riser pipe inside the building shall be mounted to the nearest building column, beam or supporting structure. Riser pipes outside the building shall be mounted to the nearest external building component with stabilizing straps and supports at the roof level.
8. Location of sub-slab and overhead piping and riser pipes subject to change based upon final site design and integration with building renovation design.
9. Riser pipe termination shall extend at least 6" above the parapet, and at least 10' from other buildings, HVAC intakes, windows or doors.
10. A powered fan shall be installed at each riser pipe termination following specifications in Figure 1A: Sub-slab Depressurization System Detail #1. Fan size to be determined by vacuum testing.
11. Sub-slab monitoring points shall be installed after installation of all Sub-slab Depressurization System components, with exception of the fan, for field testing and monitoring purposes. Locations are shown generally here; exact locations will be determined in the field and in consultation with the environmental consultant. Sub-slab negative pressure will be considered adequate if measurements using valid pressure gauges are equal to or greater than -0.004 inches of water.
12. U-manometers or equivalent pressure gauges shall be installed at each riser pipe inside the building at visible locations as visual indicators of negative pressure.
13. A 6-inch butterfly valve (or approved equal) shall be installed at an accessible location in each vertical pipe connecting the sub-slab piping to the horizontal overhead piping.
14. All U-manometers, visible SSDS piping in the exterior and interior portions of the building, and powered fans shall be clearly labeled as "Sub-Slab Venting System" by means of tag, stencil or other approved marking.
15. General Contractor shall provide shop and coordination drawings for approval.

Legend:

- subject property border
- suction point
- suction pit
- manifolding pipes
- riser
- post-installation monitoring points
- post-installation soil vapor sampling locations

Note: expected radius of influence (70' for suction pit, 30' for suction point)

Figure 2: Schematic of Enhanced Subslab Depressurization System

87-47 123rd Street Borough of Queens, New York	ESI File: SQ16016.50
	Scale as shown
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