

843 LEXINGTON AVENUE

BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC Voluntary Cleanup # 15CVCP088K

OER Project Number 15EHAN305K

Prepared For:

The Marcal Group

620 Foster Avenue

Suite 301

718-210-0036

acaller@themarcalgroup.com

Prepared By:

Equity Environmental Engineering LLC

227 Route 206, Suite 6

973-527-7451

Bob.Jackson@equityenvironmental.com

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REMEDIAL ACTION WORK PLAN

TABLE OF CONTENTS

FIGURES

Figure 1: Site Location Map

Figure 2: Site Boundary Map

Figure 3: Surrounding Land Usage

Figure 4: Site Excavation and Backfill Placement Diagram

Figure 5: Site-wide Cover System Plan

Figure 6: Vapor Barrier/Waterproofing Membrane and Sub-Slab Depressurization Design Diagram

Figure 7: Map of End-point Sample Locations

APPENDICES

Appendix 1: Proposed Development Plans

Appendix 2: Citizen Participation Plan

Appendix 3: Sustainability Statement

Appendix 4: Soil/Materials Management Plan

Appendix 5: Construction Health and Safety Plan

LIST OF ACRONYMS

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
CHASP	Construction Health and Safety Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
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
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, Peter Jaran 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 843 Lexington Avenue site, site number 15CVCP159088K. I certify to the following:

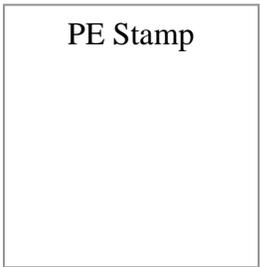
- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for 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.

Peter Jaran
Name

PE License Number

Signature

Date



I, Robert Jackson am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 843 Lexington Avenue site, site number 15CVCP159088K. 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.

Robert Jackson, P.E.
QEP Name

QEP Signature

Date

EXECUTIVE SUMMARY

The Marcal Group is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 10,000-square foot site located at 843 Lexington Avenue in Brooklyn, 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 in the Bedford Stuyvesant area of Brooklyn and is identified as Block 1623 and Lot 73 on the New York City Tax Map. The lot is 10,000 square feet and is bounded by residential and commercial facilities. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant and contains a partial two-story, vacant warehouse building of brick and wood construction. The small western portion of the building appears to have once been used as residential or commercial office space as there are two small rooms and a bathroom. The three larger sections on the eastern portion of the building were once used as manufacturing and storage areas. The water table is at approximately 42 feet below grade surface (bgs).

Summary of Redevelopment Plan

The development project consists of the construction of an approximately 37,570-square foot, seven (7)-story residential building with a partial cellar. The building will occupy approximately 60 percent of the lot at grade, with the remainder of the site consisting of an asphalt-paved parking lot. The approximately 2,500-square foot cellar level will require excavation to approximately 13.5 feet below grade surface (bgs) and will consist of mechanical, storage and laundry rooms. An elevator pit at the northeast corner of the building will require additional excavation to a depth of approximately 19.5 feet bgs. The remainder of the site outside the cellar footprint will require excavation to a depth of approximately 0-2 feet bgs. Floor 2 through 6 will consist of residential apartment units, with an exterior recreation space at the sixth floor. The seventh floor will house an exercise room and bathroom. The proposed development will have 37 affordable housing units. There will be no pervious surfaces onsite when the development is complete. The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Summary of Surrounding Property

The block that the property is located on is bounded by Greene Avenue to the north, Patchen Avenue to the west and Broadway to the east. The surrounding properties are generally residential except to the east where there is a vacant warehouse, church and public school. According to the OER Searchable Property Environmental E-Database (SPEED), there are no sensitive receptors (such as schools, hospitals and day-care facilities) within a 500-foot radius of the Sites.

Summary of Past Site Uses and Areas of Concern

The Site has been used for a variety of uses including a construction contracting office, wood furniture manufacturing facility, metal finishing warehouse, general manufacturing, a laundry, printing company, vehicle garage with service, and stables. The 2014 Equity Environmental Engineering LLC Phase I Environmental Site Assessment, indicated that there were three (30 Recognized Environmental Concerns (RECs) :

1. A 550 gallon and 3,000 gallon underground storage tanks are present onsite in unknown condition. The 550 gallon gasoline tank and 3,000 gallon heating oil tank are not in the NYC database. The initial sampling around the tanks showed no evidence of a leak.
2. Numerous areas within the building contained heavy fuel staining on the concrete floor and staining on the walls and ceiling from water damage.
3. There is a masonry pit located in the central portion of the building.

Summary of Work Performed under the Remedial Investigation

A Phase II Site Investigation was conducted in December 2014 to address the following areas of concern that were identified in the Phase I ESA: the presence of a 550-gallon gasoline UST and a 3,000-gallon heating oil UST. Additional borings and soil sampling were also performed in drain and pit area locations. The Phase II Site Investigation consisted of the following:

1. Performed ground-penetrating radar in order to assist in determining the UST and UST piping locations. The gas UST was determined 4 feet diameter by 6 feet in length and 40 inches below grade. The piping was located 18 inches below grade and extended approximately 15 feet to a remote fill location in the sidewalk adjacent to the street. The oil UST was determined to be 25 inches below grade. The oil UST was determined to be approximately 7 feet in diameter by 12 feet in length. The piping was located 8 inches below grade and extended approximately 15 feet to a remote fill located in the sidewalk adjacent to the street.
2. Installed seven (7) soil borings and collected one soil sample from each boring for chemical analysis. Two borings were installed at the end of each UST and samples were collected from below the invert of each tank and analyzed for VOCs and SVOCs. One boring was installed adjacent to each drain and one boring was installed adjacent to the pit and a sample was collected from a shallow interval at each boring

A subsequent Remedial Investigation (“preliminary Remedial Investigation”) was conducted in April 2015 and included:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.). This did not include a subsequent geophysical survey.

2. The installation five (5) soil borings and the collection of 10 soil samples for chemical analysis.
3. The installation of three (3) permanent monitoring wells and the collection of three (3) groundwater samples for chemical analysis. The wells were surveyed to determine groundwater flow direction.
4. The installation of three (3) soil-gas points for the collection of soil-gas samples for chemical analysis.

Summary of Findings of Remedial Investigation

1. Elevation of the property is approximately 53 feet above mean sea level.
2. Depth to groundwater is approximately 40.43 to 46.28 feet below ground surface at the Site.
3. Groundwater flow is generally from the southwest to the northeast.
4. Bedrock was not encountered during this investigation.
5. The stratigraphy of the Site, from surface down is approximately 6-inches of concrete, 12-inches of fill material, brown coarse sand, clay to a depth of approximately 14 feet, and hard pack silt/till to terminal depth of 70 feet.
6. Soil samples from the Phase II Site Investigation and preliminary Remedial Investigation were compared to NYSDEC Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives (SCOs) as presented in 6NYCRR Part 375-6.8 and CP51. The only volatile organic compounds (VOCs) that were detected were TCE (max of 0.058 µg/Kg) and PCE (max of 0.11 µg/Kg), both of which were detected in nearly all of the samples collected from both investigations but at concentrations below Unrestricted Use SCOs. Bis(2-ethylhexyl)phthalate (61 mg/Kg), benzo(b)fluoranthene (1.3 mg/Kg), indeno(1,2,3-cd)pyrene (1.1 mg/Kg) were detected above Restricted Residential Use SCOs in one shallow soil sample collected during the Phase II Site Investigation (S7 1-1.5'). The metals arsenic (30 mg/Kg), barium (370 mg/Kg), copper (max 1,000 mg/Kg), mercury (1.6 mg/Kg), and silver (max 47 mg/Kg) were also detected above Restricted Residential Use SCOs in this S7 1-1.5' sample and iron (max 74,000 mg/Kg) was detected above Restricted Residential Use SCOs in several samples collected during the Phase II Site Investigation. The concentration of copper in S7 1-1.5' represents a hotspot. No pesticides or PCBs were detected in any of the soil samples.
7. Groundwater sample results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Groundwater samples from the three monitoring wells contained relatively high concentrations of Tetrachloroethene (PCE), Trichloroethene (TCE), and total Chromium. Groundwater samples showed no pesticides, PCBs, or SVOCs at detectable concentrations. Elevated concentrations of several VOCs were detected above their GQSs, and of those, tetrachloroethene (PCE) was detected in all three groundwater samples at 6.8 µg/L, 150 µg/L and 210 µg/L. Trichloroethene (TCE) was detected in all three groundwater samples at 7.3 µg/L, 80 µg/L and 120 µg/L. cis-1,2-Dichloroethene was detected slightly above GQS in one sample at 6 µg/L. Several metals were identified in groundwater at concentrations exceeding their GQSs and included chromium (max. of 106.6 µg/L), iron (max. of 103,000 µg/L), lead (max. of 73.3 µg/L), magnesium (max. of 42,500 µg/L), manganese

(max. of 6,498 µg/L), nickel (max. of 213.7 µg/L), sodium (max. of 33,800 µg/L), and thalium (0.07 µg/L) in one or more unfiltered samples. The groundwater samples were not analyzed for dissolved metals.

8. Soil vapor samples collected during the RI were compared to the compounds listed by the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Numerous VOCs were detected including 1,3-Butadienen, Isopropanol, Tertiary butyl Alcohol (TBA), PCE, TCE, Toluene, and p/m-Xylene. Soil vapor samples showed high levels of petroleum-related VOCs and chlorinated VOCs. The maximum total concentration of petroleum-related VOCs (BTEX) was at 54 µg/m³. The chlorinated VOC, trichloroethylene (TCE) was detected in all three soil gas samples at elevated concentrations of 564 µg/m³, 1130 µg/m³ and 3760 µg/m³. Tetrachloroethylene (PCE) was also detected in all soil gas samples at elevated concentrations of 365 µg/m³, 685 µg/m³ and 2400 µg/m³. Concentrations of chlorinated PCE and TCE were above the mitigation level ranges established within the NYSDOH soil vapor guidance matrix.

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. Additional investigation onsite consisting of the installation of a fourth well, another round of groundwater sampling at the existing and newly-installed wells, additional soil sampling around S7 to delineate the copper hotspot, additional soil-gas sampling at multiple locations and depth intervals.
2. Perform additional site characterization sampling of soil for the design of the SVE system would include 2-4 soil borings along the north and west sides of the Site.
3. Preparation and submission of Remedial Investigation Report (RIR) to NYC OER documenting the results of the preliminary Remedial Investigation and additional soil, soil vapor and groundwater specified above. Updating of this Remedial Action Work Plan (RAWP), if required based upon the results of RIR.
4. 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).
5. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
6. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
7. Establishment of Site-specific (Track 4) Soil Cleanup Objectives (SCOs).

8. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs. Approximately 25% of the Site will be excavated to a depth of approximately 13.5 feet below grade for development purposes. A small portion of property will be excavated to the depths of 19.5 feet below grade for the elevator pit(s). The remainder of the property will be excavated minimally (0 to 2 feet) for at grade parking areas. Approximately, 3800 tons of soils will be excavated and removed from this Site and properly disposed at an appropriately licensed or permitted facility.
9. Delineation of copper hotspot (S7) area. Excavation and removal of soil/fill in copper hotspot (S7) area.
10. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
11. 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.
12. Removal of two UST's; one 550 gallon gasoline UST on the southwestern side of the Site and one 3,000 gallon heating oil UST on the southeastern side of the Site. Any additional USTs encountered during Site development will be properly removed.
13. Registration of tanks and reporting petroleum spills associated with USTs and appropriate closure of these petroleum spills, if any, will be in compliance with applicable local, State and Federal laws and regulations.
14. 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.
15. Collection and analysis of end-point samples per NYSDEC DER-10 to determine the performance of the remedy with respect to attainment of SCOs.
16. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
17. Construction of an engineered composite cover consisting of a 4 to 8-inch thick concrete building slab with an 6 to 8-inches of clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, 4-inch asphalt on 4 to 6-inch sub-base in the parking area.
18. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of at least a 20-mil vapor barrier below the slab throughout the full building area and outside all sub-grade foundation sidewalls. The remedial engineer will certify in the RAR that the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building. The manufacturer of the vapor barrier will be determined during the design process.
19. Installation of an active sub-slab depressurization system (SSDS) consisting of a network of horizontal pipes or venting mat set in the middle of a gas permeable layer immediately

beneath the building slab and vapor barrier system. The horizontal piping will consist of fabric wrapped, perforated schedule 40 4-inch PVC pipe or vent mat connected to a 4 to 6-inch cast iron or steel riser pipe that penetrates the slab and travels through or outside the building to the roof where the exhaust fan will be installed. The gas permeable layer will consist of a 6-inch thick layer of 1-2-inch trap rock stone. The active SSDS will be hardwired and will include an appropriate sized fan or blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the cellar. Design details of the SSDS will be provided to OER prior to installation for approval. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active 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.

20. Construction and operation of SVE system.
21. Groundwater remedy and monitoring if required by NYSDEC. A remedial design document will be prepared and submitted to OER and NYSDEC prior to performance of groundwater treatment actions and for groundwater monitoring program.
22. If required by NYSDEC, treatment of residual groundwater contamination via injections of a groundwater remediation product to promote chemical reduction or oxidation of chlorinated solvent-related groundwater contamination at the Site.
23. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
24. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
25. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
26. Submission of a Remedial Action Report (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.
27. Submission of an approved Site Management Plan (SMP) in the 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.
28. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP 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: 843 Lexington Avenue
- NYC Voluntary Cleanup Program Project Number: 15CVCP088K

Project Contacts:

- OER Project Manager: Shana Holberton, 212-788-8841
- Site Project Manager: Robert Jackson, 973-527-7451, ext. 103
- Site Safety Officer: Robert Jackson, 973-527-7451, ext. 103
- Online Document Repository:

<http://www.nyc.gov/html/oer/html/repository/RBrooklyn.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 Construction Health and Safety Plan (CHASP) 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 construction 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

The Marcal Group 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 843 Lexington Avenue in the Bedford-Stuyvesant section of Brooklyn, New York (the “Site”) Figure 1. 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 remedial alternatives analysis that included 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 in the Bedford Stuyvesant area of Brooklyn and is identified as Block 1623 and Lot 73 on the New York City Tax Map. The lot is 10,000 square feet and is bounded by residential and commercial facilities. A map of the site boundary is shown in Figure 2. Currently, the Site is vacant and contains a partial two-story, vacant warehouse building of brick and wood construction. The small western portion of the building appears to have once been used as residential or commercial office space as there are two small rooms and a bathroom. The three larger sections on the eastern portion of the building were once used as manufacturing and storage areas. The water table is at approximately 42 feet below grade surface (bgs).

1.2 Redevelopment Plan

The development project consists of the construction of an approximately 37,570-square foot, seven (7)-story residential building with a partial cellar. The building will occupy approximately 60 percent of the lot at grade, with the remainder of the site consisting of an asphalt-paved parking lot. The approximately 2,500-square foot cellar level will require excavation to approximately 13.5 feet below grade surface (bgs) and will consist of mechanical, storage and laundry rooms. An elevator pit at the northeast corner of the building will require additional excavation to a depth of approximately 19.5 feet bgs. The remainder of the site outside the cellar footprint will require excavation to a depth of approximately 0-2 feet bgs. Floor 2 through 6 will consist of residential apartment units, with an exterior recreation space at the sixth floor. The seventh floor will house an exercise room and bathroom. The proposed development will have 37 affordable housing units. There will be no pervious surfaces onsite when the development is complete. The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 Description of Surrounding Property

The block that the property is located on is bounded by Greene Avenue to the north, Patchen Avenue to the west and Broadway to the east. The surrounding properties are generally residential except to the east where there is a vacant warehouse and church. According to the

OER Searchable Property Environmental E-Database (SPEED), there are no sensitive receptors (such as schools, hospitals and day-care facilities) within a 500-foot radius of the Sites. Figure 3 shows the surrounding land usage.

1.4 Summary of Past Site Uses and Areas of Concern

Based on the review of the Phase I Environmental Site Assessment (ESA) Report prepared by Equity Environmental Engineering LLC, the subject property is a 10,000 square foot lot and was previously used as a construction contracting office, wood furniture facility, metal finishing facility, general manufacturing facility, laundry, printing shop, auto garage (with service), and stables.

The AOCs identified for the site included:

1. A 550 gallon and 3,000 gallon underground storage tanks are present onsite in unknown condition. The 550 gallon gasoline tank and 3,000 gallon heating oil tank are not in the NYC database. The initial sampling around the tanks showed no evidence of a leak.
2. Numerous areas within the building contained heavy fuel staining on the concrete floor and staining on the walls and ceiling from water damage.
3. There is a masonry pit located in the central portion of the building.

1.5 Summary of Work Performed under the Remedial Investigation

A Phase II Site Investigation was conducted in December 2014 to address the following areas of concern that were identified in the Phase I ESA: the presence of a 550-gallon gasoline UST and a 3,000-gallon heating oil UST. Additional borings and soil sampling were also performed in drain and pit area locations. The Phase II Site Investigation consisted of the following:

1. Performed ground-penetrating radar in order to assist in determining the UST and UST piping locations. The gas UST was determined 4 feet diameter by 6 feet in length and 40 inches below grade. The piping was located 18 inches below grade and extended approximately 15 feet to a remote fill location in the sidewalk adjacent to the street. The oil UST was determined to be 25 inches below grade. The oil UST was determined to be approximately 7 feet in diameter by 12 feet in length. The piping was located 8 inches below grade and extended approximately 15 feet to a remote fill located in the sidewalk adjacent to the street.
2. Installed seven (7) soil borings and collected one soil sample from each boring for chemical analysis. Two borings were installed at the end of each UST and samples were collected from below the invert of each tank and analyzed for VOCs and SVOCs. One boring was installed adjacent to each drain and one boring was installed adjacent to the pit and a sample was collected from a shallow interval at each boring

A subsequent Remedial Investigation (“preliminary Remedial Investigation”) was conducted in April 2015 and included:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.). This did not include a subsequent geophysical survey.

2. The installation five (5) soil borings and the collection of 10 soil samples for chemical analysis.
3. The installation of three (3) permanent monitoring wells and the collection of three (3) groundwater samples for chemical analysis. The wells were surveyed to determine groundwater flow direction.
4. The installation of three (3) soil-gas points for the collection of soil-gas samples for chemical analysis.

1.6 Summary of the Phase II Site Investigation and preliminary Remedial Investigation Findings

1. Elevation of the property is approximately 53 feet above mean sea level.
2. Depth to groundwater is approximately 40.43 to 46.28 feet below ground surface at the Site.
3. Groundwater flow is generally from the southwest to the northeast.
4. Bedrock was not encountered during this investigation.
5. The stratigraphy of the Site, from surface down is approximately 6-inches of concrete, 12 inches of fill material, brown coarse sand and clay to a depth of approximately 12 feet, and hard pack silt/till to terminal depth of 70 feet.
Soil samples from the Phase II Site Investigation and preliminary Remedial Investigation were compared to NYSDEC Unrestricted Use and Restricted Residential Use Soil Cleanup Objectives (SCOs) as presented in 6NYCRR Part 375-6.8 and CP51. The only volatile organic compounds (VOCs) that were detected were TCE (max of 0.058 µg/Kg) and PCE (max of 0.11 µg/Kg), both of which were detected in nearly all of the samples collected from both investigations but at concentrations below Unrestricted Use SCOs. Bis(2-ethylhexyl)phthalate (61 mg/Kg), benzo(b)fluoranthene (1.3 mg/Kg), indeno(1,2,3-cd)pyrene (1.1 mg/Kg) were detected above Restricted Residential Use SCOs in one shallow soil sample collected during the Phase II Site Investigation (S7 1-1.5'). The metals arsenic (30 mg/Kg), barium (370 mg/Kg), copper (max 1,000 mg/Kg), mercury (1.6 mg/Kg), and silver (max 47 mg/Kg) were also detected above Restricted Residential Use SCOs in this S7 1-1.5' sample and iron (max 74,000 mg/Kg) was detected above Restricted Residential Use SCOs in several samples collected during the Phase II Site Investigation. The concentration of copper in S7 1-1.5' represents a hotspot. No pesticides or PCBs were detected in any of the soil samples.
6. Groundwater sample results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Groundwater samples from the three monitoring wells contained relatively high concentrations of Tetrachloroethene (PCE), Trichloroethene (TCE), and total Chromium. Groundwater samples showed no pesticides, PCBs, or SVOCs at detectable concentrations. Elevated concentrations of several VOCs were detected above their GQSs, and of those, tetrachloroethene (PCE) was detected in all three groundwater samples at 6.8 µg/L, 150 µg/L and 210 µg/L. Trichloroethene (TCE) was detected in all three groundwater samples at 7.3 µg/L, 80 µg/L and 120 µg/L. cis-1,2-Dichloroethene was detected slightly above GQS in one sample at 6 µg/L. Several metals were identified in groundwater at concentrations exceeding their GQSs and included chromium (max. of 106.6 µg/L), iron (max. of 103,000 µg/L), lead (max. of 73.3 µg/L), magnesium (max. of 42,500 µg/L), manganese

(max. of 6,498 µg/L), nickel (max. of 213.7 µg/L), sodium (max. of 33,800 µg/L), and thalium (0.07 µg/L) in one or more unfiltered samples. The groundwater samples were not analyzed for dissolved metals

7. Soil vapor samples collected during the RI were compared to the compounds listed by the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Numerous VOCs were detected including 1,3-Butadienen, Isopropanol, Tertiary butyl Alcohol (TBA), PCE, TCE, Toluene, and p/m-Xylene. Soil vapor samples showed high levels of petroleum-related VOCs and chlorinated VOCs. The maximum total concentration of petroleum-related VOCs (BTEX) was at 54 µg/m³. The chlorinated VOC, trichloroethylene (TCE) was detected in all three soil gas samples at elevated concentrations of 564 µg/m³, 1130 µg/m³ and 3760 µg/m³. Tetrachloroethylene (PCE) was also detected in all soil gas samples at elevated concentrations of 365 µg/m³, 685 µg/m³ and 2400 µg/m³. Concentrations of chlorinated PCE and TCE were above the mitigation level ranges established within the NYSDOH soil vapor guidance matrix.

Supplemental Remedial Investigation activities will be performed during the initial phase of this RAWP implementation to provide additional soil, groundwater, and soil vapor data to further evaluate subsurface conditions prior to soil disturbance activities. The scope of work for the additional investigation activities are detailed in an OER-approved Work Plan which was submitted to NYC OER in May 2015. The results of the Supplemental Remedial Investigation will be documented in a companion document called “Remedial Investigation Report, 843 Lexington Avenue”, (RIR).

Based on an evaluation of the data and information from the Phase II Site Investigation and preliminary Remedial Investigation, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 Remedial Action Objectives

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

Soil

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.
- Prevent migration of contaminants that would result in groundwater contamination.

Groundwater

- Remove contaminant sources causing impact to groundwater.
- Monitor groundwater improvement (if required by NYSDEC) in response to contaminant source removal and/or treatment.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.
- Prevent off-Site migration of contaminated groundwater above applicable groundwater standards.

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 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 the excavation of Site soils to a depth of at least 13.5 feet. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation, 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 are required for a Track 1 cleanup, however, a vapor barrier would be installed beneath the new cellar slab and behind new foundation sidewalls as part of the development to prevent potential exposures from soil vapor in the future.
- Placement of a final cover over the entire Site as part of the construction.

Alternative 2:

- Establishment of Site specific (Track 4) SCOs;
- Removal of all soil/fill exceeding Track 4 SCOs and confirmation that Track 4 Site-specific SCOs have been achieved with post-excavation end point sampling. Excavation for new building cellar level (25% of property) will extend to approximately 14 feet below grade with additional excavation to approximately 20 feet below grade for elevator area. The remainder of property will be minimally excavated for new parking areas. A hotspot soil removal will be excavated around S7 area. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation, additional excavation would be performed to meet Track 4 Site-Specific SCOs.
- Placement of a composite cover system to prevent exposure to remaining soil. The engineered composite cover would consist of a 4 to 8-inch thick concrete building slab with an 6 to 8-inches of clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, 4-inch asphalt on 4 to 6-inch sub-base in parking areas.
- Installation of a vapor barrier (or) waterproofing/vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Installation of an active Sub Slab Depressurization System (SSDS);
- Installation and operation of a Soil Vapor Extraction (SVE) system to prevent migration of VOCs onto neighboring properties.
- Groundwater remedy and monitoring if required by NYSDEC.
- 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; and
- The property will continue to be registered with an E-Designation at the NYC Buildings Department.

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 soil/fill exceeding Track 1 Unrestricted Use SCO's and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contaminants leaching into groundwater.

Alternative 2 would achieve comparable protections of human health and the environment by excavation and removal of most of the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCO's, as well as by placement of Institutional and Engineering Controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil. Active SSDS and SVE system would prevent vapor intrusion in new building. Implementing Institutional Controls including a Site Management Plan and continuing the E-designation would ensure that the composite cover system remains intact and protective of public health. Establishment of Track 4 Site-Specific SCO's would minimize the risk of contamination leaching into groundwater.

For both Alternatives, potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a Construction Health and Safety Plan, an approved Soil/Materials Management Plan, and Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier, SSDS, and SVE systems below the building slab and outside foundations walls below grade.

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 SCO's and Protection of Groundwater SCO's. Compliance with SCGs for soil vapor would also be achieved by installing a vapor barrier below the new building's cellar slab and continuing the vapor barrier outside of subgrade foundation walls, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCO's. Compliance with SCG's for soil vapor would also be achieved by installing a vapor barrier and active SSDS below the new building's cellar slab and continuing the vapor barrier outside of subgrade foundation walls. In addition, a SVE system would be installed on at least the north and west sides of the Site to prevent vapor migration.

A Site Management Plan would ensure that these controls remained protective for the long term. Health and safety measures contained in the CHASP 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 construction and 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 excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Short-term impacts could potentially be higher for Alternative 1 since excavation of 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. Truck traffic 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 Construction 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. Construction workers operating under appropriate management procedures and a Construction 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 impacted soil/fill above Track 1 Unrestricted Use SCO's. Removal of on-Site contaminant sources will also prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs; installing a composite cover system across the Site; installing an active SSDS and SVE system; performing groundwater remedy and monitoring if required by NYSDEC; maintaining use restrictions; establishing an SMP to ensure long-term management of ICs and ECs; and maintaining registration as an E-designated property 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 all soil in excess of Track 1 Unrestricted Use SCO's.

Alternative 2 would remove most of the historic fill at the Site, and all remaining on-Site soil/fill beneath the new building will meet Track 4 Site-Specific SCO's.

Alternative 1 would remove a greater total mass of contaminants from the Site. The removal of soil to 13.5 feet for the new development in both scenarios would lessen the difference in contaminant mass removal between these two alternatives.

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.

The techniques, materials and equipment to implement both Alternatives 1 and 2 are readily available and have been proven to be effective in remediating the contaminants present on the

Site. They use standard equipment and technologies that are well established in the industry. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

Cost effectiveness

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

Since contaminated soil at the Site was found to extend to a depth of up to 12 feet below grade during the RI, and the new building requires excavation of the building footprint (25% of property) to a depth of 14 feet, the costs associated with Alternative 1 would be significantly higher than Alternative 2. Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on active SSDS and SVE design and installation, performance of a groundwater remedy and monitoring if required by NYSDEC, and implementation of a Site Management Plan as part of Alternative 2.

The remedial plan would couple the remedial action with the redevelopment of the Site, lowering total costs. 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 2. 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. The proposed future use of the Site includes a seven story residential and commercial use building providing 37 affordable housing rate dwelling units and retail establishments at grade. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 4 Site-Specific SCOs, both of which are protective of public health and the environment for its planned residential use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns. The areas surrounding the site is urban and consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses. The development would remediate a vacant contaminated lot and provide a modern residential building. The proposed development would clean up the property and make it safer, create new employment opportunities, living space and associated societal benefits to the community, and other economic benefits from land revitalization.

Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities. Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs, both of which are protective of public health and the environmental for its planned use.

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.

Alternative 2 would result in higher total energy usage based on the need to continuously operate an active SSDS and SVE systems. This would offset any savings realized in potentially reduced offsite disposal of contaminated soil. Alternative 1 would have a greater opportunity to achieve

a sustainable remedial action. The remedial plan for either alternative would take into consideration the shortest trucking routes during off-Site disposal of historic fill and other soils, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. The New York City Clean Soil Bank program is available for reuse of any clean native soils under either alternative. A complete list of green remedial activities considered as part of the NYC VCP is included in a Sustainability Statement.

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. Additional investigation onsite consisting of the installation of a fourth well, another round of groundwater sampling at the existing and newly-installed wells, additional soil sampling around S7 to delineate the copper hotspot, additional soil-gas sampling at multiple locations and depth intervals.
2. Perform additional site characterization sampling of soil for the design of the SVE system would include 2-4 soil borings along the north and west sides of the Site.
3. Preparation and submission of Remedial Investigation Report (RIR) to NYC OER documenting the results of the preliminary Remedial Investigation and additional soil, soil vapor and groundwater specified above. Updating of this Remedial Action Work Plan (RAWP), if required based upon the results of RIR.
4. 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).
5. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
6. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
7. Establishment of Site-specific (Track 4) Soil Cleanup Objectives (SCOs).
8. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas. Excavation and removal of soil/fill exceeding Track 4 Site Specific SCOs. Approximately 25% of the Site will be excavated to a depth of approximately 13.5 feet below grade for development purposes. A small portion of property will be excavated to the depths of 19.5 feet below grade for the elevator pit(s). The remainder of the property will be excavated minimally (0 to 2 feet) for at grade parking areas. Approximately, 3800 tons of soils will be excavated and removed from this Site and properly disposed at an appropriately licensed or permitted facility.
9. Excavation and removal of soil/fill in copper hotspot (S7) area.
10. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.

11. 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.
12. Removal of two UST's; one 550 gallon gasoline UST on the southwestern side of the Site and one 3,000 gallon heating oil UST on the southeastern side of the Site. Any additional USTs encountered during Site development will be properly removed.
13. Registration of tanks and reporting petroleum spills associated with USTs and appropriate closure of these petroleum spills, if any, will be in compliance with applicable local, State and Federal laws and regulations.
14. 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.
15. Collection and analysis of end-point samples per NYSDEC DER-10 to determine the performance of the remedy with respect to attainment of SCOs.
16. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
17. Construction of an engineered composite cover consisting of a 4 to 8-inch thick concrete building slab with an 6 to 8-inches of clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, 4-inch asphalt on 4 to 6-inch sub-base in the parking area.
18. Installation of a vapor barrier system consisting of vapor barrier beneath the building slab and outside of sub-grade foundation sidewalls to mitigate soil vapor migration into the building. The vapor barrier system will consist of at least a 20-mil vapor barrier below the slab throughout the full building area and outside all sub-grade foundation sidewalls. The remedial engineer will certify in the RAR that the vapor barrier system was designed and properly installed to mitigate soil vapor migration into the building. The manufacturer of the vapor barrier will be determined during the design process.
19. Installation of an active sub-slab depressurization system (SSDS) consisting of a network of horizontal pipes or venting mat set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The horizontal piping will consist of fabric wrapped, perforated schedule 40 4-inch PVC pipe or vent mat connected to a 4 to 6-inch cast iron or steel riser pipe that penetrates the slab and travels through or outside the building to the roof where the exhaust fan will be installed. The gas permeable layer will consist of a 6-inch thick layer of 1-2-inch trap rock stone. The active SSDS will be hardwired and will include an appropriate sized fan or blower installed on the roof line and a pressure gauge and alarm located in an accessible area in the cellar. Design details of the SSDS will be provided to OER prior to installation for approval. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active 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.
20. Construction and operation of SVE system.

21. Groundwater remedy and monitoring if required by NYSDEC.
22. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
23. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
24. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
25. Submission of a Remedial Action Report (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.
26. Submission of an approved Site Management Plan (SMP) in the 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.
27. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP 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:

<u>Contaminant</u>	<u>Site-Specific SCO's</u>
PCE, TCE	Groundwater Protection Standards
Copper	Groundwater Protection Standards
Total SVOCs	250 ppm
Arsenic	25 ppm
Barium	500 ppm
Mercury	2.5 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

4. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Soil/Fill Excavation and Removal

The excavation will include the footprint of the proposed cellar to a depth of approximately 13.5 feet deep and 19.5 feet deep for the elevator pit. 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 3,845 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.

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; 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.

Confirmation End-point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Confirmation samples will be collected per NYSDEC DER-10. To evaluate attainment of Track 4 Site-specific SCOs, analytes will include those for which SCOs have been developed, including: VOCs and metals according to analytical methods described above.

Hotspot End-point Sampling

End-point samples will be collected from the sidewalls and base of excavation at the hotspot location identified in the Remedial Investigation, according to the procedure listed below. Hotspots include S7 for copper. End-point samples will be analyzed for copper.

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:

1. 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.

2. 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.
3. 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.
4. 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. Samples will be collected in appropriate sample containers that are pre-preserved as required. Samples will be collected and shipped via courier to the ELAP lab so as to not miss analytical method required holding times. Typical EPA SW846 analytical methods will be used and the standards used for comparison clearly stated.

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 or groundwater 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-paks” to maintain a temperature of 4°C.

The lab will report the results of lab blanks taken during the analytical program.

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 withalconox® 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.

Import of Soils

Import of soils onto the property will be performed in conformance with the Soil/Materials Management Plan in Appendix 4. Imported soil will meet the lower of:

- Track 2 Restricted Residential 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 will be determined. A map of soil backfill placement locations is shown in Figure 4.

Reuse of Onsite Soils

Soil reuse is not planned on this project, but if that changes reuse of onsite soils already onsite will be performed in conformance with the Soil/Materials Management Plan in Appendix 4.

4.3 Engineering Controls

The excavation required for the proposed Site development will achieve Track 4 Site-Specific SCOs. Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site has 4 primary Engineering Control Systems. These are:

- (1) Composite Cover System
- (2) Soil Vapor Barrier System
- (3) Active Sub-Slab Depressurization System
- (4) SVE system

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system will be comprised of:

- Approximately 4-inches of asphalt and 4 to 6-inches of sub-base on roads will be designed according to the required loading for the driveway and parking lot;
- Approximately 4 to 6-inches of concrete and 6 to 8-inches of sub-base on building slabs will be designed in accordance with NYC building codes.

Figure 5 shows the typical design for each remedial cover type used on this Site. Figure 5 shows the location of each cover type built at the Site.

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.

Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of at least a 20-mil geo-synthetic liner installed in accordance with the selected manufacturer's specification. The barrier shall be properly booted around all pipe or other penetrations and anchored around the perimeter of the proposed building foundation. It will be properly sealed/welded along all seams with at least a 3-inch overlap. Only product approved installation contractors shall install the vapor barrier.

The vapor barrier will extend throughout the area occupied by the footprint of the new building and up the foundation sidewalls and will be installed in accordance with manufacturer specifications.

A plan view showing the location of the proposed vapor barrier system is provided in Figure 5. Typical design sections for the vapor barrier and SSDS are provided in Figure 6. The Remedial Action Report will include as-built drawings and diagrams; manufacturer documentation; and photographs.

The Remedial Action Report will include a PE-certified letter (on company letterhead) from the primary contractor responsible for installation oversight and field inspections and a copy of the manufacturer's certificate of warranty.

The Vapor Barrier System is a permanent engineering control and 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 vapor barrier system is disturbed after the remedial action is complete. Maintenance of these systems will be described in the Site Management Plan in the Remedial Action Report.

Sub-Slab Depressurization System

Migration of soil vapor into the building will be mitigated with the construction of an active Sub-Slab Depressurization System (SSDS). The SSDS will consist of a 6-8 inch permeable layer of 1-2 inch crushed stone, a series of horizontal, perforated PVC pipes or venting mat to collect vapors sub-slab, 4-inch cast iron or steel vertical piping above the slab that travels up through or outside the building to the roof where in-line exhaust fans will be installed. The appropriate vacuum gauges and alarms will be installed on each individual unit and hard wired into the building by a NY certified electrician. One unit will be installed per approximately every 2,000 square feet of the building footprint. The specific design details, including brand of the various components will be provided to OER and DEC for approval prior to construction.

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 location and layout of the SSDS will be determined. A typical detail sheet of the system is shown in Figure 6.

Soil Vapor Extraction System

Migration of soil vapor offsite will be controlled with a Soil Vapor Extraction (SVE) system to be installed along the north and west side of the proposed building. The SVE system will consist of a skid mounted or package plant with blower, knockout pot for moisture, granular activated carbon (GAC) unit, pipe manifold, horizontal PVC header and extraction points that consist of perforated PVC vertical pipe to collect the vapors. The size, brand, etc., of the package plant will be determined upon further soil investigation.

4.4 Institutional Controls

A series of Institutional Controls (IC's) 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:

- Continued registration of the E-Designation for the property. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the SMP which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- 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 determined by OER in the SMP and will comply with RCNY §43-1407(1)(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 house both residential and commercial use and will not be used for a higher level of use without prior approval by OER.

4.5 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 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.

4.6 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

The onsite soil consists of 6-inches of concrete, 12 inches of fill, sand and clay from about 2-feet below grade to approximately 12 feet and hard pack silt/till to 70 feet. There is sandstone below that interval.

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

Soil: SVOCs including Bis(2-ethylhexyl)phthalate (61 mg/Kg), benzo(b)fluoranthene (1.3 mg/Kg), and indeno(1,2,3-cd)pyrene (1.1 mg/Kg) above Restricted Residential Use SCOs in one shallow sample. Metals including arsenic (30 mg/Kg), barium (370 mg/Kg), copper (max 1,000 mg/Kg), mercury (1.6 mg/Kg), and silver (max 47 mg/Kg) in one shallow sample and iron (max 74,000 mg/Kg) in several samples above Restricted Residential Use SCOs.

Groundwater: The primary contaminants of concern (COCs) in groundwater are PCE and TCE which were both detected above the NY Ambient Water Quality Standards (AWQS) in all of the groundwater samples. PERC was detected at 6.8 ug/L, 150 ug/L, and 210 ug/L; and TCE at 7.3 ug/L, 80 ug/L, and 120 ug/L. Several metals including total chromium, iron, lead, magnesium, manganese, nickel, and sodium were also detected above the AWQS. The samples were not analyzed for dissolved metal concentrations.

Soil Vapor: The primary contaminants of concern (COCs) in soil vapor are PCE and TCE. PCE was detected at 365 ug/m³, 685 ug/m³, and 2,400 ug/m³, and TCE was detected at 564 ug/m³, 1,130 ug/m³, and 3,760 ug/m³, both well above the mitigation level ranges established within the NYSDOH soil vapor guidance matrix.

Nature, Extent, Fate and Transport of Contaminants

Soil: Metals listed above, including copper, were detected in the surficial sample at concentrations above the applicable criteria. There is no readily available transport mechanism for these metals to migrate offsite or into groundwater which approximately 40 feet deep.

Groundwater: The primary COCs in groundwater are PCE and TCE which were detected above the AWQS. The groundwater appears to be flowing from west to east across the site. Further groundwater investigation will be performed to identify if the contaminants are migrating to or from the site.

Soil Vapor: VOCs PCE and TCE were detected in high concentrations in the soil-vapor samples. The compounds are most likely volatilizing from the contaminated groundwater and have the potential to migrate into sub-surface soils on adjacent properties.

Receptor Populations

On-Site Receptors: The site is currently a predominantly a 1-story industrial building with a small portion that is 2-stories, that is vacant. Access to the building on Site is restricted by locked doors. Onsite receptors are limited to trespassers, site representatives and visitors granted access to the property. During construction, potential on-site receptors include construction workers, site representatives, and visitors. Under proposed future conditions, potential on-site receptors include the owner/operators of any retail stores on the first floor and resident on the remaining floors and cellar. That would include adult and child building residents, workers and visitors.

Off-Site Receptors: Potential off-site receptors within a 500 foot radius of the Site include adult and child residents; commercial and construction workers; pedestrians; and trespassers based on the following land uses within 500 feet of the Site:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/ Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – future

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 site is currently capped with a building and asphalt except for a small lawn in the rear of the Site; there are no potential exposure pathways from ingestion, inhalation, or dermal absorption of soil/ fill. When the site is uncapped for construction purposes, there is the potential for ingestion, inhalation and dermal absorption from soil/fill. Upon completion of the proposed development the Site will be covered with impervious surfaces and there will be no exposure routes with respect to soil.

Groundwater is not and will not be exposed at the site under any known scenario. The site is served by the public water supply and groundwater, which is approximately 40 feet deep, is not used at the site for potable supply and there is no potential for exposure.

Currently there is the potential for vapor intrusion into the existing building and adjacent properties to the north and west. The relatively shallow soil-gas points contained high concentrations of PCE and TCE. During construction the Site will be monitored for volatile emissions until such time as the vapor barrier is installed. Post-construction, there will a vapor barrier and operating SSDS and SVE systems to prevent the migration and exposure of soil vapor to residents, visitors, commercial customers, etc.

Construction/ Remediation Conditions: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of on-Site construction and excavation activities. On-Site construction 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 construction, 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 and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, all soils in excess of Track 4 SCOs will be removed. The site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls (vapor barrier/SSDS/SVE) 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 is a potential for complete exposure pathways for the current site condition for soil vapor. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There are no complete exposure pathways under future conditions after the site is developed. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure, site-wide surface cover, and a subsurface vapor barrier, SSDS and SVE systems for the building. Under current conditions, on-Site exposure pathways exist for those with access to the Site and trespassers. During remedial construction, 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 Soil/Materials Management Plan, and a Construction Health and Safety Plan. Potential post-construction 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.

Environmental Media & Exposure Route	Human Exposure Assessment for Proposed Remedial Action
Direct contact with surface and subsurface soils	<ul style="list-style-type: none"> • (Track 4) There is no direct contact with soil because the site will be completely covered with an engineered composite cover. Future contact with soil will be prevented by the implementation of a Site Management Plan and Soil and Materials Management Plan for any future ground intrusive work
Ingestion of groundwater	<ul style="list-style-type: none"> • The area is served by an upstate water

	<p>supply and groundwater is not being used for potable water supply. Groundwater use for potable supply onsite is prohibited by municipal law.</p>
Direct contact with groundwater	<ul style="list-style-type: none"> • (Track 4) There is no direct contact with groundwater because it is 40 feet deep and the site will be completely covered with an engineered composite cover. Future contact with groundwater will be prevented by the implementation of a Site Management Plan and Soil and Materials Management Plan for any future ground intrusive work •
Direct contact with soil vapor	<ul style="list-style-type: none"> • Contact with impacted soil vapor will be prevented by a soil vapor barrier • Contact with soil vapor will be prevented with a soil vapor barrier and an active sub-slab depressurization and soil vapor extraction systems.

5.0 Remedial Action Management

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Aharon Steinberg/Project Manager. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Peter Jaran and Robert Jackson respectively.

For the vapor barrier, SSDS, and SVE system installations, Peter Jaran, PE will provide oversight. For the remaining components of the RAWP, Robert Jackson, PE will provide the oversight.

5.2 Site Security

Site access will be controlled by a NYC DOB approved construction fence and site management.

5.3 Work Hours

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. The hours of operation will be conveyed to OER during the pre-construction meeting.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix 5. The Site Safety Coordinator will be determined prior to construction. 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 construction 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. Exceedences 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 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 remedial construction have been or will be obtained prior to the start of remedial construction. 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-Construction Meeting

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

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 and construction materials and 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 construction 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 will be reported to OER once determined.

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 (if Track 1 remedial action is not achieved)
- 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 (if Track 1 remedial action is not achieved);
- 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;
- Continue registration of the property with an E-Designation by the NYC Department of Buildings (if Track 1 remedial action is not achieved);
- The RAWP and Remedial Investigation Report will be included as appendices to the RAR;
- Reports and supporting material will be submitted in digital form and final PDF's will include bookmarks for each appendix.

Remedial Action Report Certification

I, Peter Jaran, 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 843 Lexington Avenue site, site number [VCP site number]. 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, Robert Jackson, am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the 843 Lexington Avenue site, site number [VCP site number]. 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, an approximately 4 month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization	2	1
Remedial Excavation	2	3
Installation of vapor barrier, SSDS, and SVE	6	3
Demobilization	18	2
Submit Remedial Action Report	22	4



Site Location

FIGURE 1 SITE LOCATION MAP

843 Lexington Avenue
(Block 1623 / Lot 73)
Brooklyn, New York



equity environmental engineering

227 Route 206, Suite 6, Flanders, NJ 07836, (973) 527-7451

DRAWN BY/ DATE

CHK/DATE

DRAWING NUMBER

NG / 05.28.15

2014076 - 2

Notes: Aerial basemap provided by Esri, HERE, DeLorme, TomTom, MapmyIndia, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo; Copyright: © OpenStreetMap contributors, and the GIS user community



0 20 40 80 120 160 Feet
 1 inch = 104 feet

FIGURE 2 SITE BOUNDARY MAP

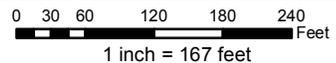
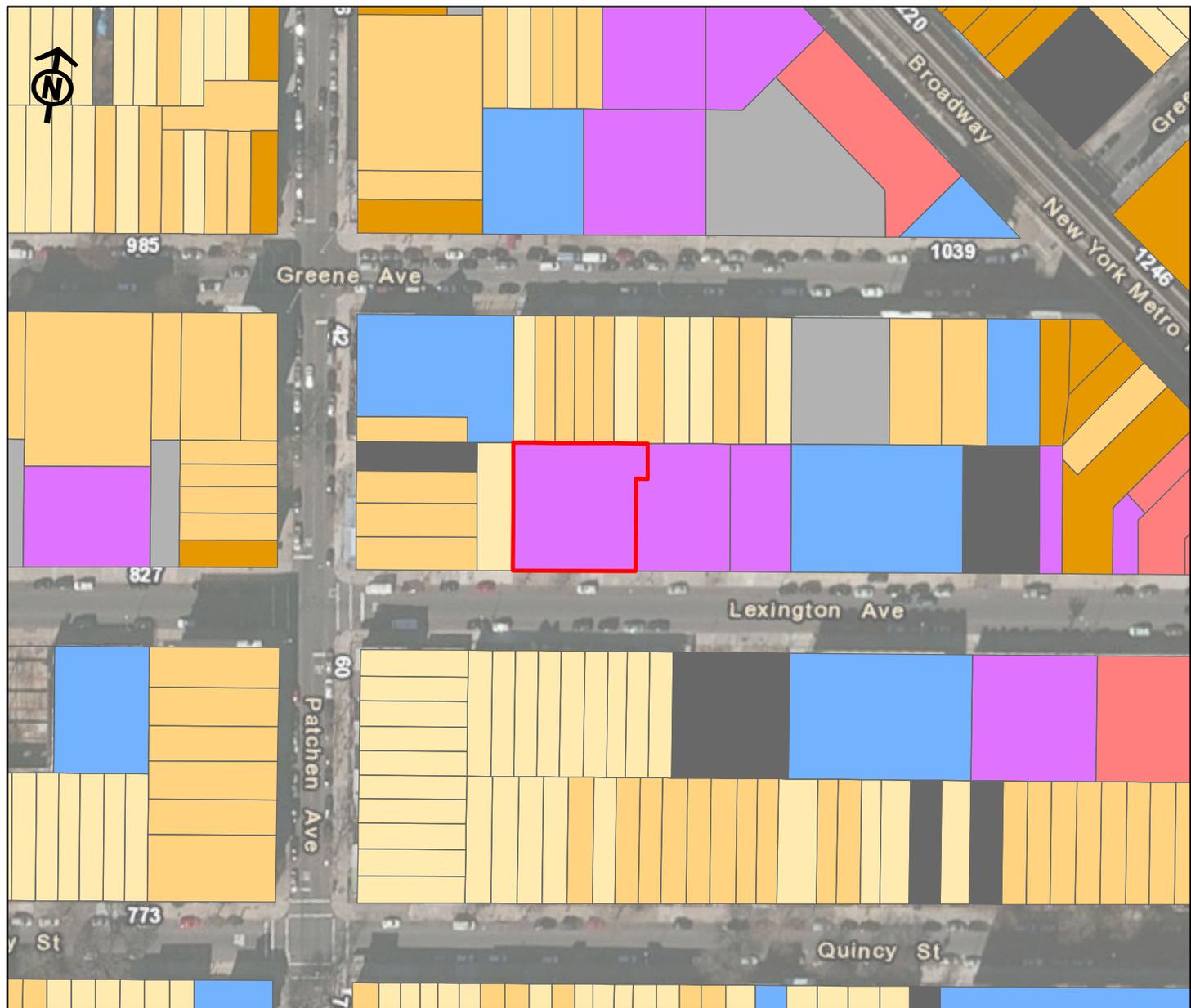
843 Lexington Avenue
 (Block 1623 / Lot 73)
 Brooklyn, New York



equity environmental engineering
 227 Rt. 206, Bldg. 1, Flanders, NJ 07836, (973) 527-7451

DRAWN BY / DATE	CHK / DATE	DRAWING NUMBER
NG / 05.28.15		2014076 - 2

Notes:
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Legend	
	Subject Property
	Vacant Land
	Parking
	Public Facility / Institution
	Industrial / Manufacturing
	Commercial / Office
	Mixed Residential & Commercial
	Multi-Family Residential
	One & Two Family Residential

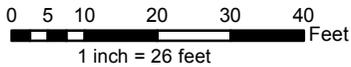
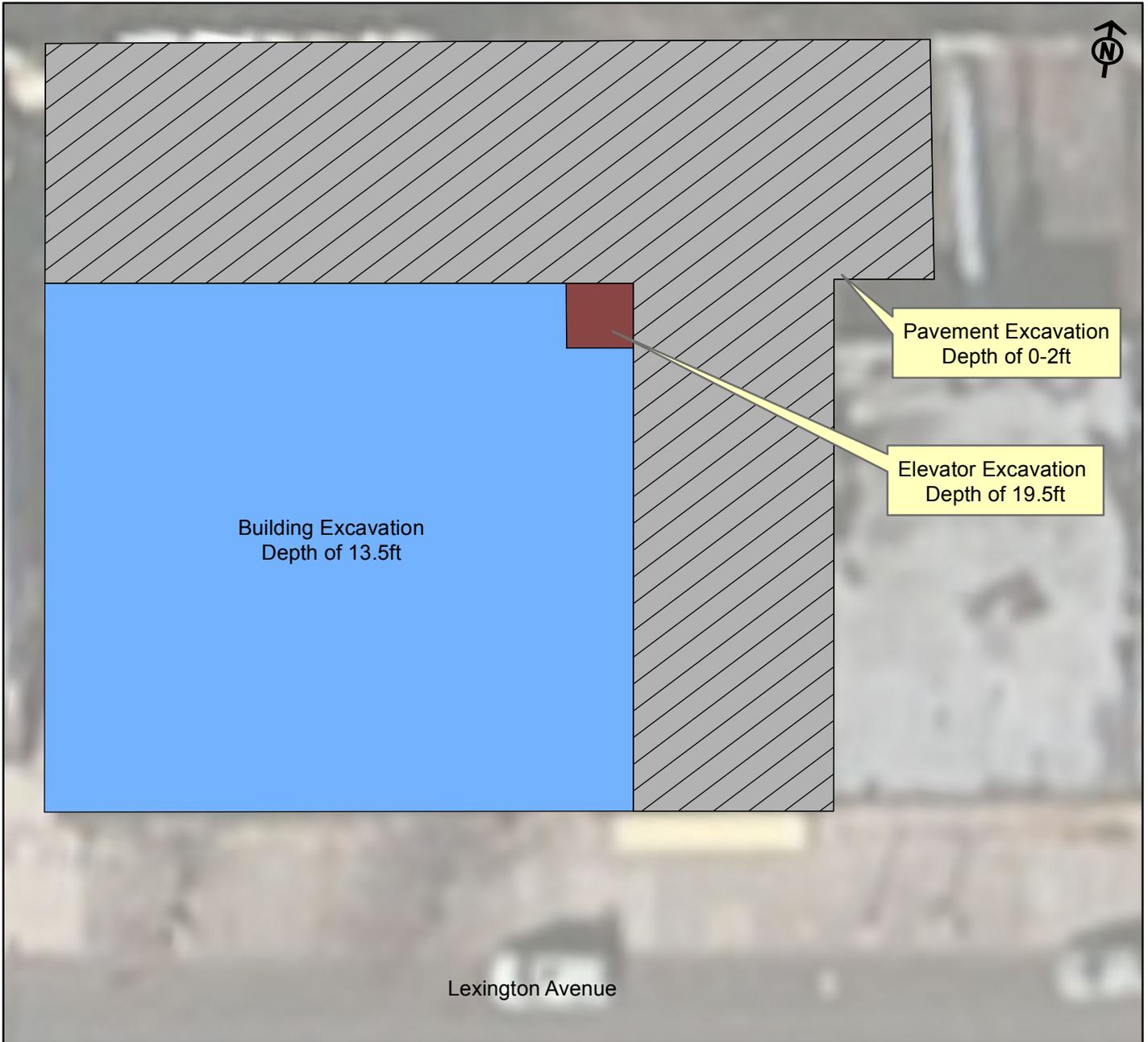
FIGURE 3 LAND USE MAP

843 Lexington Avenue
 (Block 1623 / Lot 73)
 Brooklyn, New York



equity environmental engineering
 227 Rt. 206, Bldg. 1, Flanders, NJ 07836, (973) 527-7451

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Legend

-  Backfill Placement Location
-  Paved Area (Asphalt)
-  Elevator Pit Location
-  Building Location

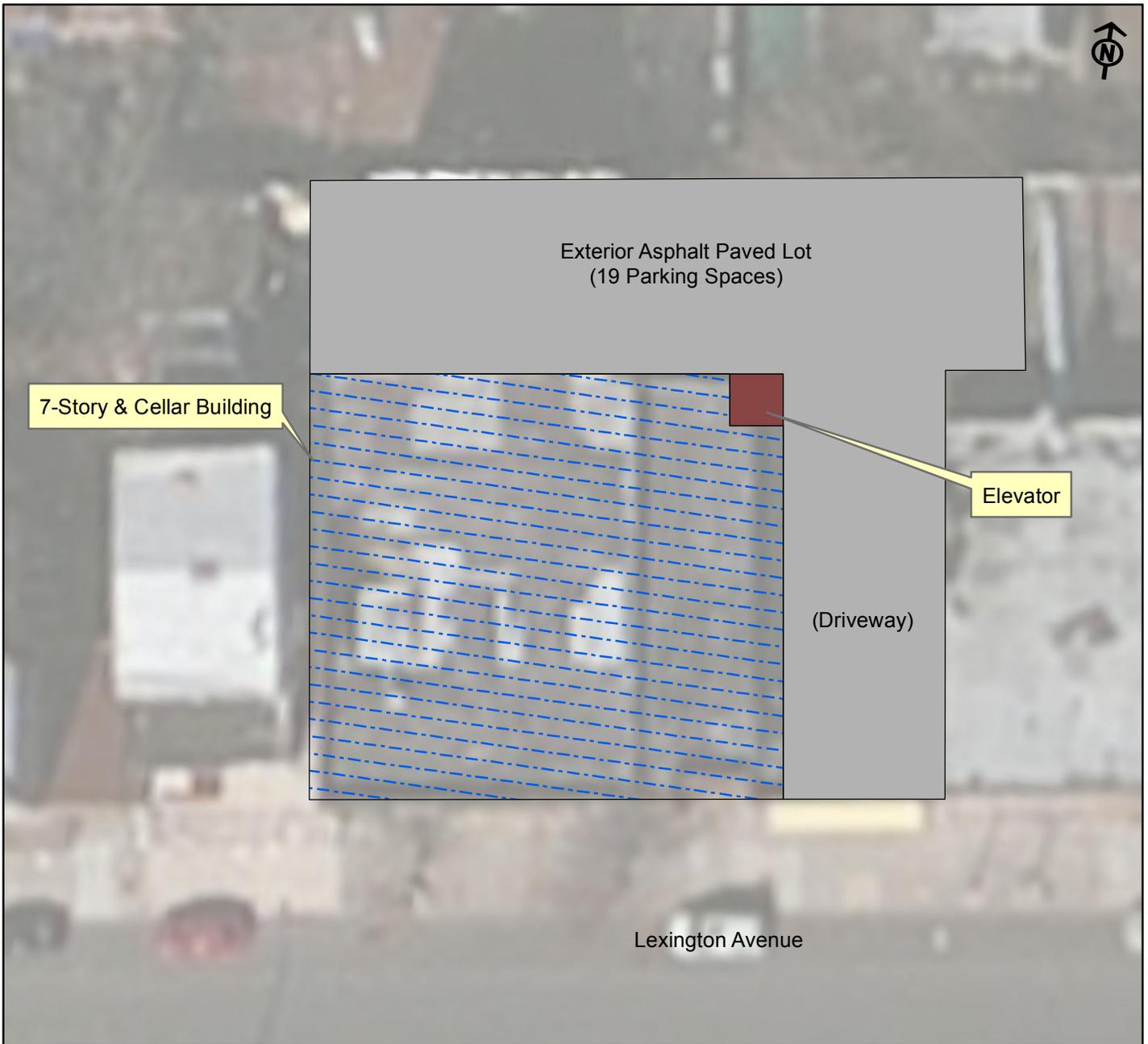
FIGURE 4 EXCAVATION & BACKFILL PLAN

843 Lexington Avenue
(Block 1623 / Lot 73)
Brooklyn, New York



equity environmental engineering
227 Rt. 206, Bldg. 1, Flanders, NJ 07836, (973) 527-7451

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0 5 10 20 30 40 Feet
1 inch = 32 feet

Legend

-  Vapor Barrier Below Building
-  Paved Area (Asphalt)
-  Elevator Pit Location

FIGURE 5 SITE-WIDE COVER SYSTEM PLAN

843 Lexington Avenue
(Block 1623 / Lot 73)
Brooklyn, New York



equity environmental engineering
227 Rt. 206, Bldg. 1, Flanders, NJ 07836, (973) 527-7451

DRAWN BY / DATE	CHK / DATE	DRAWING NUMBER
NG / 05.29.15		2014076 - 5

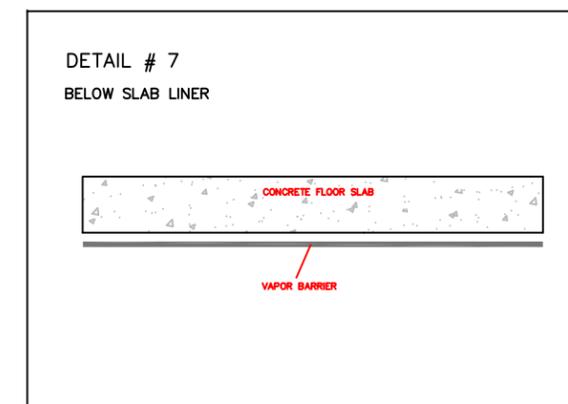
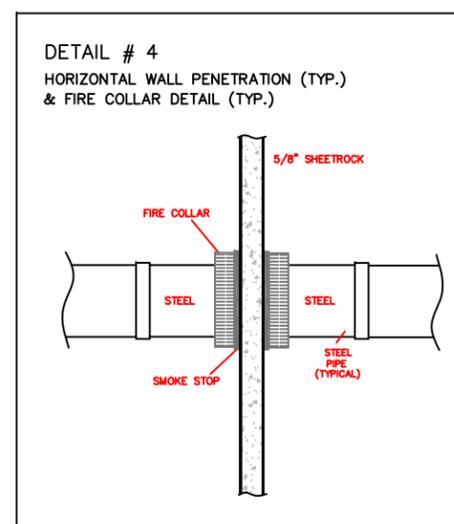
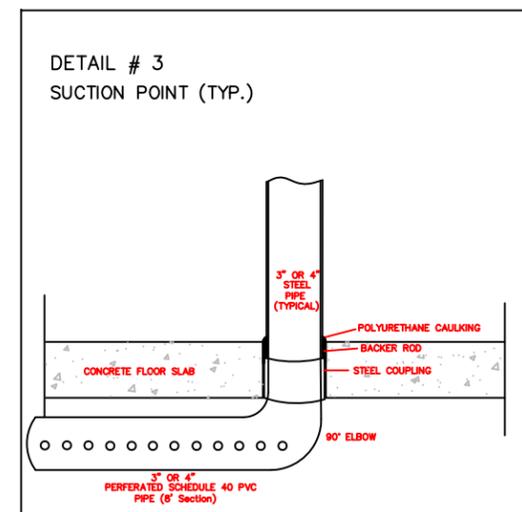
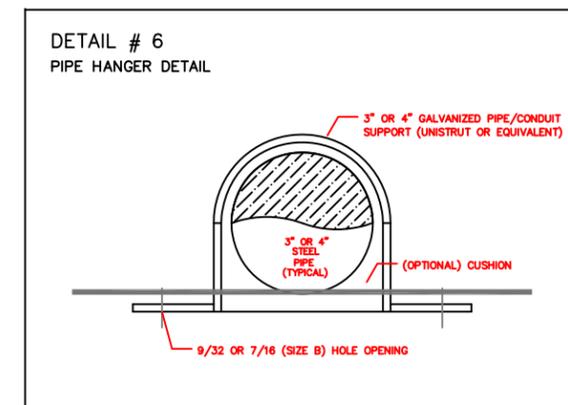
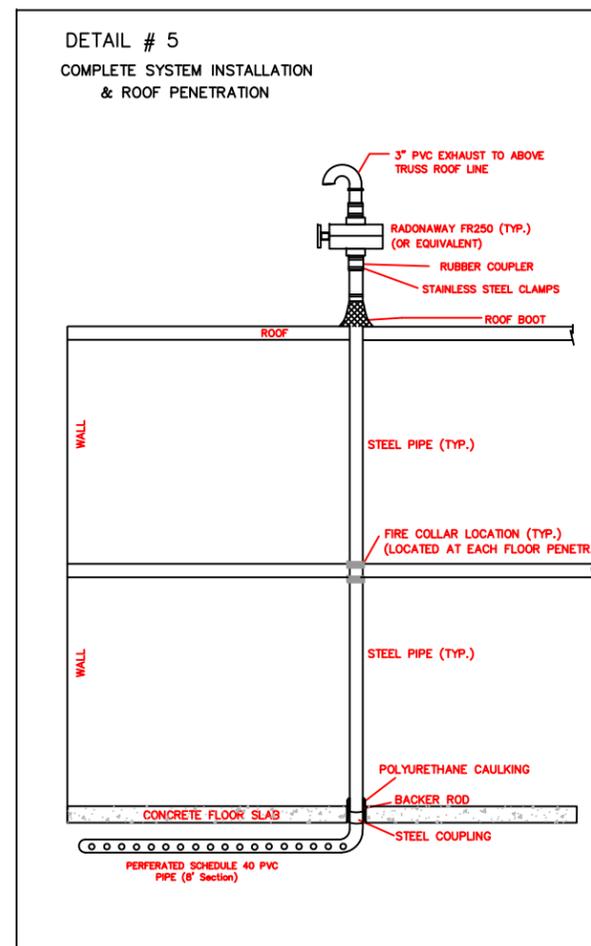
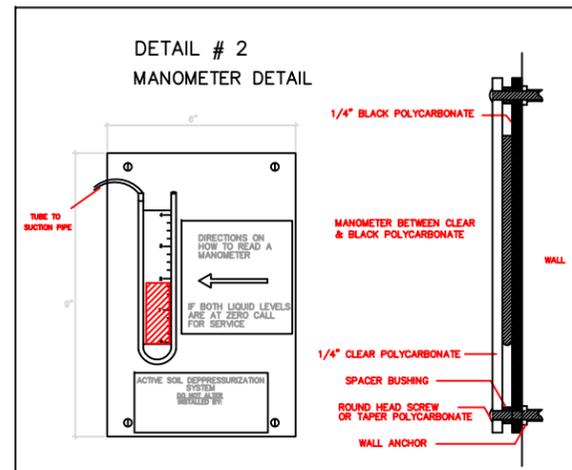
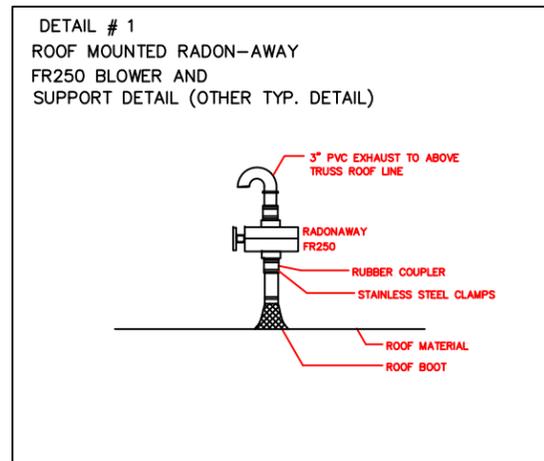


FIGURE 6

VAPOR BARRIER/WATERPROOFING MEMBRANE
 AND SUB-SLAB DEPRESSURIZATION DESIGN DIAGRAMS
 843 LEXINGTON AVE
 BROOKLYN, NEW YORK


Equity Environmental Engineering LLC
 227 Route 206, Bldg 1
 Flanders, NJ 07836
 Phone: (973) 527-7451

DATE	DWG BY	REV	DWG NUMBER
05-29-15	NG		2014076-6

APPENDIX 1

PROPOSED DEVELOPMENT PLANS

APPENDIX 2

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and The Marcal Group 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, The Marcal Group 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, Shana Holberton, 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:

Brooklyn Public Library – Dekalb Branch
790 Bushwick Avenue, Brooklyn, NY 11221
718-455-3898

10:00AM to 6:00 PM Monday, Tuesday, Thursday, and Friday; 1:00PM to 6:00 PM on Wednesday and 10:00 AM to 5:00 PM on Saturday. The library is closed on Sunday.

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: No issues of concern are anticipated for this project.

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 3

SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

Reuse of Clean, Recyclable Materials and Reduced Consumption of Non-Renewable Resources:

Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction. An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

Reduced Energy Consumption and Promotion of Greater Energy Efficiency:

Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Conversion to Clean Fuels: Use of clean fuel improves NYC's air quality by reducing harmful emissions. An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

Recontamination Control: Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site. An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

Stormwater Retention: Stormwater retention improves water quality by lowering the rate of combined stormwater and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters. An estimate of the enhanced stormwater retention capability of the redevelopment project will be included in the RAR.

Linkage with Green Building: Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use. The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total

square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

Paperless Voluntary Cleanup Program: The Marcal Group is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

Low-Energy Project Management Program: The Marcal Group is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

Trees and Plantings: Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance. An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

APPENDIX 4

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., hot spots, 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 of 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

On-Site soils are not planned to be reused for the development of the Site. 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.

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 5

CONSTRUCTION HEALTH AND SAFETY PLAN

Project Name: 847 Lexington
Project Number: 15EHAN305K

Equity Environmental Services Inc.
227 Route 206
Flanders, New Jersey 07836

SITE-SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN

**Address: 847 Lexington Avenue
Brooklyn, New York 11221**

Plan Revisions

Number	Date	Initials
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____

Neha Gautam _____ 5-29-2015 _____
Plan Preparer Date
Site Supervisor

Pete Lakatos _____ 5-29-2015 _____
Site Supervisor (SS) Date

Robert Jackson _____ 5-29-2015 _____
Project Manager (PM) Date
Health & Safety Officer (HSO)

May 29 2015

Table of Contents

	<u>Page</u>
Introduction.....	2
Site Information	3
Emergency Contacts	6
Emergency Contact List Cell Phone Numbers	6
Key Project Personnel.....	8
Medical Surveillance and Training Dates for Authorized Personnel	9
Task Identification	10
Chemical Hazards	11
Physical and Biological Hazards	12
Risk Analysis	13
General Safety Rules.....	14
Heat Stress	15
Cold Stress	16
Employee Training Program.....	17
Personal Protective Equipment (PPE) Requirements	19
Suggested Levels of Protection.....	20
Medical Surveillance	21
Monitoring Requirements	22
Air Monitoring and Contaminant Action Levels.....	23
Procedures for Handling Anticipated Wastes	24
Spill Prevention and Response.....	25
Emergency Procedure	27
Subcontractor Safety.....	31

FORMS

- Job Safety & Health Protection
- CHASP Sign-off
- Equipment Calibration Log
- Sampling Log
- Heat Stress Monitoring Log
- Daily Sign In/Sign Out
- Daily Safety Meeting Log
- Accident Injury Report
- Vehicle Accident Report
- Material Safety Data Sheets

Introduction

This Site-Specific Construction Health and Safety Plan (CCHASP) has been prepared by Equity summarize the work related health and safety hazards at the subject site (843 Lexington Ave., Brooklyn, New York) and the requirements and procedures to protect its employees from them. This plan meets or exceeds the requirements of Occupational Safety and Health Administration (OSHA), 29 CFR 1910.120, for a site-specific health and safety plan.

This plan was designed to reduce the potential for occupational illness or injury resulting from working at this site. The purpose of the CHASP is to inform EQUITY's employees of the health and safety risks present at this site, and the proper methods of protecting themselves from those risks. Each worker must be fully aware of the risks associated with the work to be accomplished, and be dedicated to completing that work safely.

Existing and potential hazards at this site have been identified. As new information becomes available, this CHASP will be revised. Standard practices and procedures of industrial hygiene, occupational health, safety, and environmental protection are prescribed in this plan, which was prepared and reviewed by experienced professionals.

EQUITY employees who work on this site must read the CHASP and sign the form included in this plan, to indicate that they understand the plan's contents, and agree to comply with its provisions. Anyone who cannot, or will not comply with this CHASP will be excluded from on-site activities. Violations of this CHASP or any applicable federal, state, or local health and safety regulations should be reported immediately to the Site Supervisor (SS), or to EQUITY's Health & Safety Officer (HSO).

This CHASP will be readily available so workers can reference it when necessary.

Site Information

Location: 843 Lexington Ave. Brooklyn, New York 11221

Current Site Information:

At the present time, no occupancy exists at the subject property and contains a partial two-story, vacant warehouse building of brick and wood construction. The subject property soil and groundwater are contaminated with PCE, TCE and copper respectively. There was also unregistered underground storage tanks and other staining/corrosion identified during the Phase I located on the subject property.

Location/Class: Industrial Commercial Urban/Residential
 Suburban Rural

Site Regulatory Status: CERCLA/SARA US EPA NYCDEP
 NPL RCRA NJ ISRA
 Other (NYSDEC) OER

Operations or Tasks to be Performed, and Approximate Duration of Each:

- 1- Soil Boring Installation Observation and Soil Sampling**
- 2- Well Installation Observation and Groundwater Sampling**
- 3- Soil Gas Point Installation Observation and Soil Gas Sampling**
- 4- Excavation of contaminated soil**
- 5- Installation of a vapor barrier, SSDS, and SVE systems subsurface**

Surrounding Population/Structures:

The area surrounding the subject property primarily has residential, commercial, and industrial uses.

Site and Surrounding Topography:

The subject property topography is primarily flat with no slopes, depressions, or hills observed in the vicinity.

Known or Suspected Pathways of Contaminant Dispersion:

Soil Vapor Intrusion; soil and/or groundwater ingestion or dermal contact

Emergency Shower, Eyewash and First Aid Equipment Located at:

Eyewash and emergency shower will not be available.

First aid kits located in field vehicle and first aid also provided by emergency services (911).

Personnel On-Site trained in First Aid:

- | | |
|----------|----------|
| 1. _____ | 5. _____ |
| 2. _____ | 6. _____ |
| 3. _____ | 7. _____ |

Emergency Medical Care

Hospital

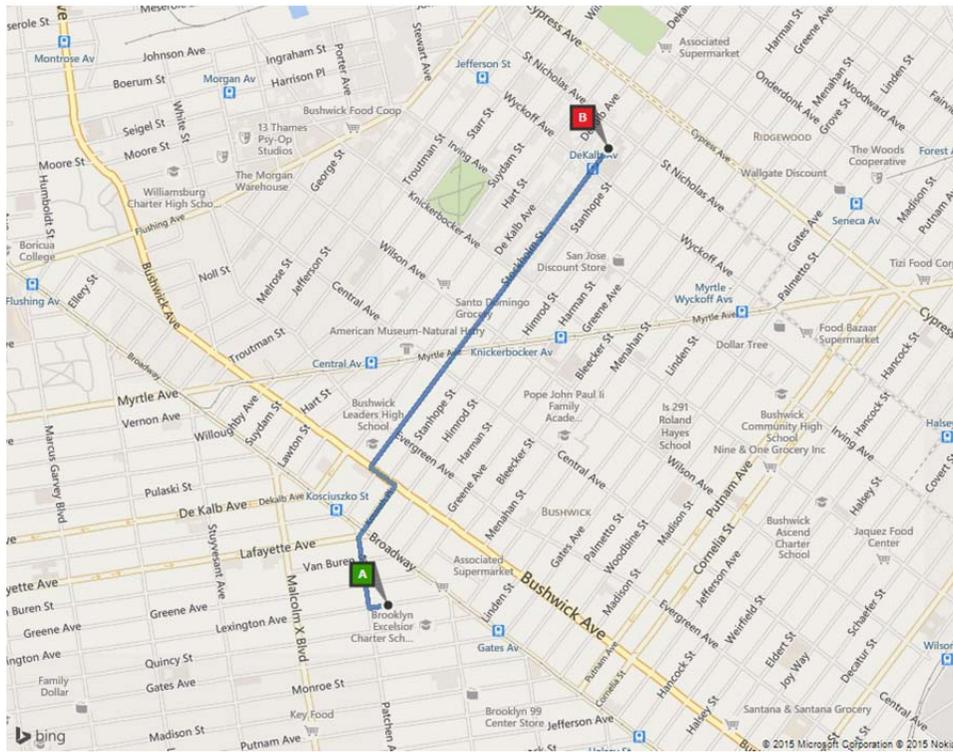
Hospital Name: Wyckoff Heights Medical Center Telephone #718-963-7272

Address: 374 Stockholm St., Brooklyn, NY

Contact: _____ Operator _____ Telephone # _____

- Type of Service
- (X) Physical Trauma Only
 - () Physical Trauma and Chemical Exposure
 - (X) Available 24 Hours

Hospital Route:



1. Depart Lexington Ave toward Patchen Ave. 210 ft
2. Turn right onto Patchen Ave 0.2 m
3. Bear right onto Kosciuszko Pl 0.1 mi
4. Turn left onto Bushwick Ave 354 ft
5. Turn right onto Stockholm St 0.8 mi

Arrive at 374 Stockholm St, Brooklyn, NY - The last intersection is Wyckoff Ave. If you reach St Nicholas Ave, you've gone too far.

Hospital route information has been provided to satisfy OSHA requirements (29 CFR 1910.120). **However, where 911-emergency service and/or transport is available, EQUITY personnel are strictly prohibited from transporting accident victims in either company or personal vehicles.

Transporting the injured in non-emergency vehicles increases the potential for motor vehicle accidents during transit to the hospital and further injury to the victim. Also, the victims' condition can worsen during transit. As a result, transportation in non-emergency vehicles can delay or even prevent treatment by trained emergency personnel during a critical time. Employees must remain at the site of the accident, administer appropriate first aid, and await the arrival of **trained emergency and/or rescue personnel.**

Emergency Contacts

	Town	Phone
Fire Department	NYC	911
Police Department	NYC – Brooklyn 81 st Precinct	911 / (718) 574-0411
Site Contact	EQUITY Personnel	Faron - (201) 341-1323 Neha – (201) 916-3416 Bob- (973) 641-0825
Site Telephone	EQUITY Personnel	Faron - (201) 341-1323 Neha – (201) 916-3416 Bob- (973) 641-0825
Nearest Telephone	EQUITY Personnel	TBD
First Aid/EMS	NYC	911
Federal Agency Representative	NA	NA
State Agency Representative	NA	NA
Local Agency Representative	NA	NA
Pesticide Poisoning	NA	(800) 845-7633
NY Poison Control Center	State-wide	(212) 764-7667
CHEM TREC	Washington, DC	(800) 424-9300
Utility	Company Name	Phone
Water Supply	NYC DEP	*
Sewer	NYC DEP	*
Power	Con Edison	*
Telephone	*	*
Gas	National Grid	*
NY One Call	NY	811

* NY One Call will supply this information

Equity Environmental Engineering LLC
Emergency Contact List
Cell Phone Numbers

Robert Jackson	973-641-0825
Neha Gautam	201-916-3416
Peter Jaran	973-479-2381

Key Project Personnel

The following describes the project position assignments, associated responsibilities, and reporting relationships.

Position	Job Description	Interactions
Project Manager (PM)	Responsible for technical and administrative performance of the project. Supports Site Supervisor and is available to him at all times. Will visit the site periodically, or as necessary. Reports progress of project on a regular basis. Assigns key personnel, and identifies, requests, secures, and monitors use of resources for project. Approves program expenditures and invoices.	Reports directly to Managing Director. Works closely with Site Supervisor.
Site Supervisor (SS)	Acts as point of contact for client and client's representative(s). Supervises all on-site personnel and subcontractors. Coordinates daily site-specific work efforts, and ensures all activities are in strict compliance with site-specific health and safety plan. Has authority to suspend all work that possesses any health and safety risk. Briefs subordinate technical personnel on task requirements. Identifies and resolves technical problems. Provides periodic review of project progress.	Reports directly to Project Manager.
Health & Safety Officer (HSO)	Develops, implements, and enforces the on-site safety program. Oversees all health and safety aspects of project, conducts periodic audits to ensure compliance. Available at all times to discuss project progress and health and safety related issues.	Reports directly to Managing Director. Works closely with Project Manager, and Site Supervisor.
Onsite Health Physicist	Implementing the radiation safety at the Site with authorization to stop work due to unsafe acts, unsafe conditions, non-compliance and/or non-implementation of the Safety Plan and/or applicable safety and health requirements; performs the proper operation of radiation monitoring equipment; conducts radiation surveys; and notifies anomalies to the site supervisor.	Reports directly to Site Supervisor.

EQUITY is the entity responsible for managing health and safety for its employees at this site. Key project personnel are as follows:

Project Manager:	Robert Jackson	973-527-7451/973-641-0285
HSO	Name	Telephone / Cellular Number
Site Supervisor:	Neha Gautam	973-527-7451/201-916--3416
	Name	Telephone / Cellular Number

Task Identification

Tasks covered under this plan:

Task #	Description
1	Soil boring installation observation and the collection of soil samples.
2	Permanent well installation observation and the collection of groundwater samples.
3	Soil Gas Point installation observation and Soil Gas sampling
4	Excavation of contaminated soil
5	Installation of a vapor barrier, SSDS, and SVE systems

Off-site tasks planned? Offsite disposal

Describe: _____

Chemical Hazards

Task No.(s)	Chemical Name (or class)	PEL	TLV	Other Pertinent Limits (specify)	Primary Hazard			SDS Attached Y/N
					Ingestion	Dermal	Inhalation	
1,2,3,4	Isobutylene (PID Calibration Gas)						x	Y
1,2,3,4	No. 2 Heating Oil			ACGIH TWA = 100 mg/m3	x	x	x	Y
1,2,3,4	Copper				x	x	x	Y
1,2,3,4	Tetrachloroethene				x	x	x	Y
1,2,3,4	Trichloroethene				x	x	x	Y

- PEL – OSHA Permissible Exposure Limit: the maximum allowable 8-hour time weighted average (TWA) exposure concentration.
 TLV – ACGIH Threshold Limit Value: the recommended 8-hour TWA exposure concentration.
 STEL – ACGIH or OSHA Short-term Exposure Limit: the maximum allowable 15-minute TWA exposure concentration.
 Ceiling – OSHA and Cal-OSHA Ceiling Limit: the maximum exposure concentration above, which an employee shall not be exposed during any period without respiratory protection.
 IDLH – Immediately Dangerous to Life and Health: the concentration at which one could be exposed for 30 minutes without experiencing escape-impairing or irreversible health effects.

Physical and Biological Hazards

Hazard	Yes	No	Task No.(s)	Hazard	Yes	No	Task No.(s)
Electrical (overhead lines)		X		Uneven Terrain	X		1,2,3,4 ,5
Electrical (underground lines)	X		1,2,3,4 ,5	Unstable Surfaces	X		1,2,3,4 ,5
Gas Lines	X		1,2,3,4 ,5	Elevated Surfaces	X		1,2,3,4 ,5
Water Lines	X		1,2,3,4 ,5	Lightning	X		1,2,3,4 ,5
Drilling Equipment	X		1,2,3,4 ,5	Rain	X		1,2,3,4 ,5
Excavation Equipment	X		1,2,3,4 ,5	Snow	X		1,2,3,4 ,5
Power Tools	X		1,2,3,4 ,5	Liquefied/Pressurized Gases		X	
Heat Exposure	X		1,2,3,4 ,5	Lifting Equipment		X	
Cold Exposure	X		1,2,3,4 ,5	Vermin	X		1,2,3,4 ,5
Oxygen Deficiency		X		Insects	X		1,2,3,4 ,5
Confined Spaces		X		Disease-causing organisms	X		1,2,3,4 ,5
Noise	X		1,2,3,4,5	Others, e.g., marine sampling (specify)		X	
Ionizing Radiation		X					
Non-Ionizing Radiation		X					
Fire	X		1,2,3,4 ,5				
Explosive Atmospheres		X					
Shoring		X					
Scaffolding		X					
Holes/Ditches	X		1,2,3,4 ,5				
Steep Grades		X					
Slippery Surfaces	X		1,2,3,4 ,5				

General Safety Rules

1. If an employee must work alone, he/she must call his/her supervisor twice a day. If the supervisor is unavailable, that supervisor's supervisor must be contacted.
2. Workers must wear all personal protective equipment required for the tasks to be performed.
3. Horseplay or practical jokes are forbidden on the job.
4. Compressed air must not be used to blow dirt from clothing, or played with or blown at another person.
5. Drinking of alcoholic beverages or the use of drugs on the job is prohibited. Their use will cause immediate dismissal from the site.
6. All areas must be continually cleaned to maintain good housekeeping. Trash is to be piled neatly and removed promptly. All tools and work areas are to be kept in clean and safe condition.
7. Competent workers must do welding and cutting.
8. Ladders are to be of proper design and tied off while in use. Do not go up or down a ladder without the free use of both hands. Use a rope to lift or lower materials or tools. Always face a ladder when climbing or descending.
9. Every work site must have a complete first aid kit.
10. **ALL** accidents must be investigated and reported. Use the Accident Investigation Form in the back section of this plan.
11. Injuries sustained while on duty must be reported to supervisor immediately, or as soon as possible after injury is sustained.
12. Explosives must be handled and transported by licensed people only.
13. All tools and electrical equipment must be in proper working order.
14. Clothing appropriate to the duties performed shall be worn by all workers. Large pockets, loose jewelry, cuffed trousers and loose or torn clothing are dangerous and should not be worn around machinery, or when climbing ladders, or working on structures.

Heat Stress

Site employees will be trained to recognize signs of heat stress. The Site Supervisor will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as worker monitoring results. Appropriate rest periods will be provided to help site workers accommodate to temperature extremes.

Signs and Symptoms of Heat Stress

- **Heat rash** may result from continuous exposure to heat or humid air.
- **Heat cramps** are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:
 - muscle spasms
 - pain in the hands, feet and abdomen
- **Heat exhaustion** occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms are:
 - pale, cool, moist skin
 - heavy sweating
 - dizziness
 - nausea
 - fainting
- **Heat stroke** is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Signs and symptoms are:
 - red, hot, usually dry skin
 - lack of reduced perspiration
 - nausea
 - dizziness and confusion
 - strong, rapid pulse
 - coma

Measures to Avoid Heat Stress

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternate job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. **DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK.** For an 8-hour workday, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak hours, such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.

Site personnel should monitor their pulse rate as an indicator of heat strain by the following method:

At the beginning of the rest period, count the radial pulse during a 30-second period. If the rate exceeds 110 beats per minute, lengthen the rest period by one-third. If the heart rate still exceeds 110 beats per minute at the end of the rest period, shorten the next work cycle by one-third.

Cold Stress

EQUITY will provide appropriate rest periods to help site workers accommodate to temperature extremes. Site employees will be trained to recognize signs of cold stress.

Measures to Avoid Cold Stress

- Wear multi-layer clothing (the outer most layer should be of wind-resistant fabric)
- Drink warm fluids
- Work in pairs
- Avoid heavy sweating

Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)												
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Equivalent Chill Temperature (°F)												
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-195
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect).	LITTLE DANGER In <hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA

The Site Supervisor will maintain a log of all site employees exposed to temperature extremes, showing the work and rest times as well as environmental monitoring results.

Employee Training Program

All personnel performing work in areas on this site covered by this CHASP must have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual must have completed an 8-hour refresher-training course and/or initial 40-hour training course within the last two years prior to performing any intrusive work on this site covered by this CHASP. Records that demonstrate that all persons subject to the training requirements have actually met them will be maintained either on site or in the project file. The Project Manager and/or Supervisor are responsible for verifying compliance of the project team with these rules.

Prior to commencement of on-site activities, a site safety meeting will be held to review the specific information and requirements of this CHASP. CHASP sign-off sheets will be collected at the end of this meeting.

Site Specific Training (when applicable) will include:

- Explanation of the overall site CHASP.
- Health and safety personnel and organization.
- Brief site history.
- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use and limitations of available safety.
- Personal hygiene and decontamination.
- Respirator face-piece fit testing.
- PPE use and maintenance.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication.
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Contingency plan.

Prior to work, each EQUITY employee will attend the contractor's health and safety orientation, if applicable. In addition, EQUITY's employees will review health and safety items specific to the tasks to be performed that were not covered in the contractor's orientation.

Site Health and Safety Meetings

In addition, the Site Supervisor will meet daily with all EQUITY employees prior to beginning work on site. The agenda of the meeting will include a review of important elements of this plan, any special safety items, and a discussion of the emergency response procedures. Also, everyone will agree on a schedule for periodic meetings, (for example, before beginning work each day), to review the effectiveness of this plan and make changes as necessary. If significant changes at the site occur, special meetings will be scheduled.

Training Records

The Site Supervisor will complete a report of the daily safety meetings, using the form in the back section of this plan, and all attending the meeting will sign the Daily Safety Meeting Log.

The training status of contractor and subcontractor employees will be verified that their training criteria meets the requirements specified in 29 CFR 1910.120(e). A copy of all training certificates will be kept for EQUITY personnel working at the site.

Personal Protective Equipment (PPE) Requirements

Task No.(s)	Level of Protection (A – D)*	Level of Upgrade	PPE Suit	PPE Gloves	PPE Feet	PPE Head	PPE Eye	PPE Ear	PPE Respirator	Additional PPE for Upgrade
1,2,3,4,5	D	NA	Std	N	Steel	HH	Glasses	Plugs	NA	
<u>SUIT</u> Std = Standard Work Clothes Tyvek = Uncoated Tyvek Disposal Coverall PE Tyvek = Polyethylene-coated Tyvek Saranex = Saranex-laminated Tyvek PVC Suite = PVC Raingear <u>GLOVES</u> Work = Work Gloves (canvas, leather) Neo = Neoprene Gloves PVC = PVC Gloves N = Nitrile Gloves V = Vinyl Gloves L = Latex Gloves				<u>FEET</u> Steel = Steel/composite-toed shoes or boots Steel+ = Steel-toe shoes or boots & PVC boots Booties = PVC booties <u>HEAD</u> HH = Hardhat <u>EYE</u> Glasses = Safety glasses Goggles = Goggles Shield = Face shield <u>EAR</u> Plugs = Earplugs Muff = Ear muffs			<u>RESPIRATOR</u> APR = Air purifying respirator Full APR = Full face APR Half APR = Half face APR SAR = Airline supplied air respirator SCBA = Self contained breathing apparatus Escape = Escape SCBA OV = Organic Vapor Cartridge AG = Acid Gas Cartridge OV/AG = Organic Vapor/Acid Gas Cartridge AM = Ammonia Cartridge Dust/Mist = Dust/Mist pre-filter and cover for cartridge HEPA = High efficiency particulate air filter cartridge			

* For unspecified volatile organics (based on 1-minute breathing zone measurement using PID or OVA):

Up to 1 ppm above background	Level D
1 – 5 ppm above background	Level C
5 – 500 ppm above background	Level B
500 ppm above background	Level A

** Earplugs will be available on-site, but are not required

Suggested Levels of Protection

Level “D” Protection

1. Coveralls (optional)
2. Gloves
3. Boots/shoes – steel toe
4. Boots (outer) chemical resistant (disposable- if required)
5. Safety glasses or chemical splash goggles
6. Hard hat (safety shield if required)

Level “C” Protection

1. Full-face, air-purifying, canister-equipped respirator (NIOSH/MSHA approved)
2. Chemical resistant clothing (coveralls; hooded, two-piece, chemical splash suit; chemical resistant hood & apron; disposable, chemical-resistant coveralls)
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots (outer) chemical-resistant
7. Boots (inner) steel toe
8. Hard hat (face shield)
9. Escape mask
10. Two-way radio

Level “B” Protection

1. Pressure/Demand SCBA (MSHA-NIOSH approved)
2. Chemical resistant clothing (overalls and long-sleeved jacket; coveralls; hooded, one- or two-piece chemical splash suite; disposable, chemical-resistant coveralls)
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots (outer) chemical-resistant
7. Boots (inner) steel toe
8. Hard hat (face shield)
9. Two-way radio

Level “A” Protection (EQUITY does not perform work in Level A PPE)

1. Pressure/Demand SCBA (MSHA-NIOSH approved)
2. Fully encapsulating, chemical-resistant suit
3. Coveralls
4. Gloves (outer) chemical-resistant
5. Gloves (inner) chemical-resistant
6. Boots, chemical-resistant, steel toe (depending on suit construction, work over or under suit boot)
7. Hard hat (under suit)
8. Two-way radio

Medical Surveillance

Requirements

All EQUITY employees covered by this CHASP, who engage in site activities governed by 29 CFR 1910.120 for 30 or more days per year, must meet the medical surveillance requirements specified in 1910.120(f). Therefore, such personnel must have completed occupational medical baseline or surveillance examination, performed by a licensed physician, within the last 24 months. The medical examination includes the following components:

- Personal Medical Questionnaire
- Occupational Exposure History
- Physical Examination
- Vision Testing
- Spirometry
- Audiometry
- Blood Chemistry Panel (e.g., SMAC-20)
- Complete Blood Count with Differential
- Urinalysis
- Chest X-Ray (every two years at a minimum)
- Electrocardiogram (at physician's discretion)

Examinations are required upon hiring, termination, and exposure to substances at or above the PEL.

Results of the examinations are communicated directly from the physician to the employee. Medical records for EQUITY's employees are kept by the Company and the employee

Monitoring Requirements

Monitoring is to be conducted by the Site Supervisor, or his/her designee. Copies of monitoring results and calibration logs will be filed with the CHASP.

Monitoring is designed to assess exposure to employees during site activities, and to determine if PPE is required and adequate to assure protection. Because investigation and remediation activities at hazardous waste sites are of an inconsistent nature, it is not possible to assign a monitoring protocol that excludes, or is not directly dependent upon, professional judgment in determining when monitoring is required to assess exposure. Thus, the following generic protocol must be followed at a minimum, and should be modified to be more conservative (e.g., require more monitoring) if deemed necessary by the Site Supervisor or HSO. Under no conditions will the required frequency be decreased.

At a minimum, air monitoring will be conducted before and during each task or activities for which air monitoring has been designated. If airborne concentrations of contaminants reach action levels based on observations with the direct reading instruments, then the appropriate PPE upgrade or work stoppage order will be enforced by the Site Supervisor. In case a work stoppage order is given, the area must be cleared of all personnel immediately.

The use of action levels and the basis for the selection of monitoring equipment is explained as follows:

Action levels determine:

- (1) the PPE to be used by site workers
- (2) their ability to remain and work in the exclusion zone

The selection of the specified monitoring equipment is based on

- (1) the nature of the contaminants
- (2) the likely concentrations of the contaminants
- (3) the probable duration of exposure
- (4) the relative sensitivity of the monitoring equipment to the specific contaminants

The following summarizes the calibration requirements for the air monitoring instruments used at the site:

<u>Instrument</u>	<u>Calibration Frequency</u>
PID: Mini RAE-3000 (or equivalent)	Beginning of each work shift

Air Monitoring and Contaminant Action Levels

Task No.(s)	Location	Contaminant	Monitoring Equipment	Monitoring Frequency	Action Level Concentration	
					Mandatory Respirator Use	Mandatory Work Stoppage
1,2,3	Work Areas	Volatile Organic	PID: Mini-Rae	Periodically during all tasks/activities.	NA	10 ppm above background sustained in breathing zone

PID = Photoionization Detector (e.g., Multi-Rae, Mini-Rae, HNU, TIP, OVM)

FID = Flame Ionization Detector (e.g., OVA)

LEL-O₂ = Explosivity and Oxygen Meter

Name(s) of individual(s) responsible for performing the monitoring, and certifying the results:

All EQUITY personnel

Type, make and model of instruments used: Mini-Rae 3000 (or equivalent) PID Gas Monitor

Method and frequency of calibration:

- 100 ppm isobutylene-calibration gas. Calibrated prior to each day's use according to manufacturer's instruction.
- The calibration of all radiation survey instrumentation will be conducted using calibration standards traceable to the National Bureau of Standards, All instruments used for surveys will be calibrated every six months and after instrument repair when required. All instrument calibrations will be performed by the original manufacturer or a qualified vendor. Instruments will be response checked to a known source of radiation prior to and after field use.

Procedures for Handling Anticipated Wastes

Waste Generation

Anticipated: Yes No

Types: Liquid Solid Sludge Gas

Quantity: Expected volume of each type:

This project will will not generate hazardous wastes. These wastes will be:
 stored treated
 transported manifested in the following manner:

Contaminated soil will be excavated and disposed offsite for the construction of the proposed building. The soil is not anticipated to be hazardous but, if it is, it will be properly manifested and transported by a properly licensed transporter to a licensed disposal facility.

Packaging requirements for waste material:

Spill Prevention and Response

Potentially hazardous spill situations can be mitigated by using containment devices and materials in work areas. If site conditions are suitable, earthen berms will be constructed around specific areas. If site conditions are not suitable for this, or the potential spill is smaller, barriers will be constructed with sorbent materials such as “speedi-dry”, sorbent booms and/or straw bales. Dikes and berms will also be used to divert stormwater run-on and run-off away from critical zones.

Because a spill cleanup must be conducted under crisis conditions, it is important that the methods used for dealing with a spill be thought out beforehand. However, the steps followed cannot be inflexible, because no two spills are identical. Factors that will be assessed in the event of any and all spills include:

1. The volume of the hazardous substance released and the rate of release.
2. The nature of the spill material.
3. What danger exists to personnel in the immediate area.
4. Nature of damage and possibilities of repair.
5. If the transfer of material to an alternate containment is advisable.
6. Feasibility of the construction of a containment dike.
7. Nature of spill area.
8. Whether the spilled substance has reached a watercourse or sewer.
9. Danger of explosion or fire.
10. Equipment and supplies necessary to confine the material and carry out the cleanup.

In most cases, the success of a cleanup operation is dependent upon the time it takes to contain the spill. Therefore, EQUITY’s first attempt at spill containment will be at the point of discharge. This can often be accomplished by closing valves, reinforcing or repairing damaged containers, moving or changing the position of fallen or ruptured containers, or emptying the container by pumping to a temporary storage or holding vessel. Pumps, suction hoses and containers will be available to recover spilled materials when directed to do so by the Site Supervisor.

Handling and transport of drummed waste always must be conducted in a controlled and safe manner, which will minimize damage to structurally sound drums, repacks and overpacks. If leakage or spillage of waste occurs, the drum must immediately be placed within an overpack unit. Overpack units must be provided at each staging area, at areas of existing drums, and along all site roadways.

Task/Work Area	Potential Spill or Discharge	Equipment, Materials, and Procedures for Spill Cleanup
Soil Boring Locations	Hydraulic fluid from drill rig	Pads/Speedy Dry with proper disposal of waste
MW Installation Locations	Hydraulic fluid from drill rig	Pads/Speedy Dry with proper disposal of waste
Excavation of soils	Hydraulic fluid from drill rig	Pads/Speedy Dry with proper disposal of waste

Emergency Procedures

Potential emergencies that may arise are most likely to be associated with physical hazards from heavy equipment operation and/or lifting and loading of debris. Emergency response will, in most cases, be performed in Level D protection.

Modifications to these emergency procedures may be necessary after the actual site set-up, based on prevailing conditions. Periodic reviews of these procedures will be performed by the Site Supervisor to ensure that they are appropriate for all anticipated emergencies.

Responsibilities

The Site Supervisor has the authority and responsibility to commit company resources to appropriately respond to an emergency, and to exclude all personnel not directly responding to the emergency.

Prior to beginning work at the site, EQUITY will designate an employee, usually the Site Supervisor, to be responsible for initiating any emergency response actions. In the event an injury or illness requires more than first aid treatment, the Site Supervisor (or alternate) will accompany the injured person to the hospital, and will remain with the person until release, admittance is decided, or another EQUITY staff relieves them of this responsibility.

Evacuation Plan

The basic elements of an emergency evacuation plan include employee training, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures and methods to account for all employees after evacuation.

When appropriate, wind direction will be discussed during the daily safety briefing to all on-site personnel by the Site Supervisor to indicate possible routes of upwind escape. Work-area entrance and exit routes will be planned, and emergency escape routes will be delineated by the Site Supervisor. The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, will result in the evacuation of the team and a re-evaluation of the hazard and the level of protection required. This re-evaluation will be conducted by appropriate on-site health and safety personnel in coordination with the HSO

In the highly unlikely event that barrels, canisters, or chemical gases or vapors are uncovered during site work, the following procedures shall be followed:

- 1) In the event that barrels, canisters, or any other vessels are encountered during excavation, all work shall immediately cease and all workers to be removed from the area. The Site Supervisor shall be immediately notified, and he/she shall identify vessel contents, handling procedures and storage and disposal techniques prior to starting work.
- 2) In the event that high concentrations of gases or vapors are detected, the following actions will be taken:
 - Remove all workers from the area
 - Monitor gas or vapor concentrations to determine the type of respiratory protection that will be required before workers reenter the area.
- 3) In the highly unlikely event of a major leak of toxic gas, such as might occur if a compressed gas cylinder were ruptured during excavation or drilling, all on-site personnel will be evacuated to a safe distance. The HSO and Emergency services will be contacted immediately and the risk will be assessed prior to restarting work.

Training

Employees will be instructed in the specific aspects of emergency evaluation applicable to the site as part of the site safety meeting prior to the commencement of all on-site activities. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed. During the site safety meeting, all employees will be trained in, and reminded of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes used during an emergency.

On a continuous basis, individual employees should be constantly alert for indicators of potentially hazardous situations, and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. In the event of any emergency that necessitates an evaluation of the site, on-site personnel will be notified by the use of car horns sounded in regularly spaced, repeated blasts, as detailed in the next section of this procedure. The Site Supervisor will control the site until the appropriate local or state agency representatives arrive, if required. He will also contact the HSO.

Alarm Systems Emergency Signals

The simplest and most effective emergency communication system, in any situation, is direct voice communications. Voice communications will be supplemented anytime voices cannot be clearly perceived above ambient noise levels (e.g., noise from heavy equipment, drilling rigs or backhoes), and anytime a clear line-of-sight cannot be easily maintained among all site personnel because of distance, terrain, or other obstructions. When voice communications must be supplemented, the following emergency signals, using car horns, will be used.

- **One Horn Blast: General Warning**

One blast is used to signal relatively minor, but important events on site. An example would be a minor chemical spill where there is no immediate damage to life or health, yet personnel working on site should be aware of the situation so unnecessary problems are avoided. If one horn blast is sounded, personnel must stop all activity and equipment on site and await further instruction from the Site Supervisor.

- **Two Horn Blasts: Medical Emergency**

Two blasts are used to signal a medical emergency where immediate first aid or emergency medical care is required. If two horn blasts are sounded, all first aid and CPR trained personnel should respond, as appropriate. All other activity and equipment should stop, and personnel should await further instructions from the Site Supervisor.

- **Three Horn Blasts Followed by One Continuous Blast: Immediate Danger to Life or Health**

Three blasts followed by another extended or continuous horn blast signals a situation that could present an immediate danger to the life or health (IDLH) to all employees on site. Examples of possible IDLH situations could include fires, explosions, hazardous chemical spills or releases, hurricanes, tornadoes, blizzards or floods. If three horn blasts followed by a continuous blast are sounded, all activity and equipment must stop, and all personnel must evacuate the site to an appropriately designated site located outside the site gate, or further off site if necessary. (Note: unless otherwise specified, all decontamination procedures must be implemented.) All personnel must be accounted for by the Site Supervisor, and other response actions determined by the Site Supervisor must be followed.

Employees on site will use the “buddy” system (pairs). Buddies should pre-arrange hand signals or other means of emergency communication in case radios cannot be used, or if the radios no longer operate. The following hand signals are suggested:

1. Hand gripping throat: out of air, can't breathe.
2. Grip partner's wrist or place both hands around waste: leave area immediately, no debate.
3. Hand on top of head: need assistance.
4. Thumbs up: OK, I'm alright, I understand.
5. Thumbs down: No, negative.

Visual contact will be maintained between employee pairs. Team members will remain in close proximity to each other in order to provide assistance in case of emergencies, and will inform each other of any of the following effects of exposure to site contamination:

- headaches
- dizziness
- blurred vision
- cramps
- irritation of eyes, skin or respiratory tract

If any member of the work crew experiences any adverse symptoms while on site, the entire work crew will immediately stop work and follow the instructions provided by the Site Supervisor.

Medical Treatment/First Aid

Community emergency services (EMS, fire, and police) will be notified immediately if their resources are needed on site. If necessary, the injured or sick party shall be taken to the nearest hospital.

Emergency Reporting

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage will be reported to EQUITY. An incident investigation will be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided.

The investigations will begin while details are fresh in the mind of all involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in Equity of efficiency, quality of work, as well as safety and health concerns.

On-Site Evacuation Plan –A series of repeated blasts is the signal for all EQUITY personnel and subcontractors to evacuate the site and assemble at:

To be determined at the beginning of each field event

The criteria for activating the alarm will be the first sign of any serious problem that requires assistance or evacuation. Should either a fire or explosion occur, all personnel will proceed immediately to the evacuation assembly point and await further instructions. At that time a personnel check will be conducted to determine if anyone is missing, and the local fire and police departments will be called for assistance. Once on site, the acting officer of the fire department and the Site Supervisor will determine if further evacuations are necessary. No EQUITY personnel will re-enter the site without clearance from the fire/police department and Site Supervisor. Subcontractor Safety It has been and shall continue to be the policy of EQUITY that employees of all

subcontractors are required to adhere to all applicable company, local, state, and federal safety rules and regulations.

When an infraction of a local, state, federal, or company safety regulation is observed, the Site Supervisor will request verbally that the subcontractor's supervisory personnel correct the infraction immediately. If correction is not made, then the project manager will request in writing that proper corrective action be taken. Subcontractors who continue to ignore proper safety procedures will have payments withheld until compliance is achieved or be terminated.

Subcontractors are required to hold safety meetings for their employees when they are working on EQUITY projects, and submit documentation of such meetings to the Project Manager. At a minimum they shall have specific safety procedures for proper use of all heavy equipment such as excavators, drilling rigs, etc., on site during the project. Subcontractor employees are required to attend EQUITY's safety meetings.

Forms

Job Safety & Health Protection

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

Employers

All employers must furnish to employees' employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

Employees

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct job site inspections to help ensure compliance with the Act.

Inspection

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Complaint

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection. If they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with their nearest OSHA office within 30 days of the alleged discriminatory action.

Citation

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period with which the alleged violation must be corrected.

The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

Proposed Penalty

The Act provides for mandatory penalties against employers of up to \$1,000 for each serious violation and for optional penalties of up to \$1,000 for each non-serious violation. Penalties of up to \$1,000 per day may be proposed for failure to correct violations within the proposed time period. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$10,000 for each such violation.

There are also provisions for criminal penalties. Any willful violation resulting in death of an employee, upon conviction, is punishable by a fine of up to \$250,000 (or \$500,000 if the employer is a corporation), or by imprisonment for up to six months or both. A second conviction of an employer doubles the possible term of imprisonment.

Voluntary Activity

While providing penalties for violation, the Act also encourages efforts by labor and management before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

Consultation

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State of Labor or Health Department or a State University.

Under provisions of Title 29, Code of Federal Regulations, part 1903.2(s)(1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

Heat Stress Monitoring Log

Employee Name							
Start Time							
<u>Measurement 1</u> Pulse Work Minutes Rest Minutes							
<u>Measurement 2</u> Pulse Work Minutes Rest Minutes							
<u>Measurement 3</u> Pulse Work Minutes Rest Minutes							
<u>Measurement 4</u> Pulse Work Minutes Rest Minutes							
<u>Measurement 5</u> Pulse Work Minutes Rest Minutes							
<u>Measurement 6</u> Pulse Work Minutes Rest Minutes							
<u>Measurement 7</u> Pulse Work Minutes Rest Minutes							
<u>Measurement 8</u> Pulse Work Minutes Rest Minutes							

Signature of Site Supervisor (or designee)

Date

Daily Safety Meeting Log
(to be completed on site)

Site Name 847 Lexington

Location 847 Lexington Ave., Brooklyn, New York

Weather _____

Topics _____

Employee Names:	Signatures
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Signature of Site Supervisor (or designee)

Date

- dusts, fumes, vapors
- Repetitive motion
- Illumination/noise hazard
- Other

- Taking unsafe or awkward position
- Servicing moving equipment
- Other

Other

ACCIDENT DESCRIPTION (continued):

What steps have already been taken to prevent similar incidents? _____

What else can be done (engineering controls, training, enforcement, process changes) to eliminate the hazard? _____

Site Supervisor Signature Date

Health and Safety Review: Is proposed action appropriate? Yes No Comments _____

HSO Signature Date

VEHICLE ACCIDENT REPORT

EMPLOYEE NAME: _____ DRV LIC NO.: _____
COMPANY ADDRESS: _____ INSURANCE COMPANY _____
POLICY NO.: _____

DESCRIPTION OF ACCIDENT

DATE: _____ TIME: _____ SPEED LIMIT _____ :
LOCATION: _____
DIRECTION OF TRAVEL: _____
HOW DID IT HAPPEN? _____

USE SPACE BELOW TO INDICATE VEHICLE PATHS - INDICATE NORTH BY ARROW

POLICE REPORT

NAME OF OFFICER: _____ BADGE #: _____
DEPARTMENT: _____ LOCATION: _____
SUMMONS ISSUED? Y [] N [] TO WHOM? _____

YOUR VEHICLE

YEAR/MAKE: _____ REGIST #: _____
DRIVEN BY: _____ AGE: _____ TEL #: _____
ADDRESS: _____ CITY: _____ STATE: _____
NATURE OF DAMAGE: _____

OTHER DRIVER

(continue below for additional drivers and witnesses)

NAME: _____

DRV LIC NO.: _____

ADDRESS: _____

VEHICLE REGISTRATION: _____

INSURANCE COMPANY _____

POLICY NO.: _____

Safety Data Sheets