

975 MANHATTAN AVENUE

BROOKLYN, NEW YORK

Remedial Action Work Plan


NYC VCP Project Number: 19CVCP060K

OER Project Number: 18TMP1329K, 18EH-N439K

Prepared For:

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REMEDIAL ACTION WORK PLAN

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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

Acronym	Definition
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, Stephen M. Kline, 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 975 Manhattan Avenue site, site number 18TMP1329K, 18EH-N439K, 19CVCP060K. 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.

Stephen M. Kline, P.E.

Name

NYS 080431

PE License Number

Signature

Date



EXECUTIVE SUMMARY

Brilliant Real Estate Development LLC is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program (VCP) to investigate and remediate a property located at 975 Manhattan Avenue in the Greenpoint neighborhood of Brooklyn, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

Site Location and Background

The Site is located at 975 Manhattan Avenue in the Greenpoint neighborhood of Brooklyn, New York and is identified as Block 2532 and Lot 46 on the New York City (NYC) Tax Map. The Site is approximately 2,500 SF in area and is bounded by a construction site (proposed 8-story residential building) to the north, a 4-story mixed commercial and residential use building to the south, Manhattan Avenue followed by 4- and 5-story mixed-use commercial and residential buildings to the east, and a 3-story residential building to the west. Currently, the Site is unoccupied and contains a one- and two-story building with a cellar (depth of approximately seven feet below sidewalk grade) and a concrete-paved rear yard.

Summary of Redevelopment Plan

Demolition and removal are proposed for the existing building on Site. The proposed redevelopment plan for the Site will consist of constructing a new 7-story, mixed commercial and residential use building with one cellar level. The proposed depths to the top of the cellar slab (TOS) range between approximately 6 feet below ground surface (bgs) and 11 feet bgs. To account for a seismic gap and adjacent building encroachment, approximately 2,451 square feet (SF) of the 2,500-SF lot is buildable. The current zoning designation is “R7A” residential district with a “C2-4” commercial overlay. The proposed use is consistent with the existing zoning for the property. Based on the NYC Department of City Planning (DCP) Zoning and Land Use (ZoLa) records, the

property is located within the Greenpoint-Williamsburg Contextual Rezoning area with zoning map and text amendments/resolution, effective July 29, 2009. The Site is assigned an Environmental Designation (E-Designation) for Hazardous Materials and Noise (E-Designation Number E-232) by the NYC Office of Environmental Remediation (OER).

The redevelopment plans (square footage and depths) are shown on Drawing A-101.00, titled “Cellar & First Floor Plans”, Drawing A-301.00, titled “Section”, and Drawing A-302.00, titled “Section”, prepared by Yuen Design+Architecture PLLC (Architect) and dated October 9, 2018 (revision date) and additional information provided by Architect on October 30, 2018 and November 1, 2018. The cellar will occupy the entirety of the buildable portion of the lot (approximately 2,451 SF) with an approximately 1,862-SF area for commercial use and an approximately 589-SF area for residential or mechanical use. The first floor of the building will occupy an approximately 2,451 SF area of the lot (the entirety of the buildable portion of the lot) and include approximately 2,033 SF of commercial and approximately 418 SF of residential spaces. Each of the second through sixth floors of the proposed building will consist of approximately 1,625 SF for use as residential space. The penthouse level (7th floor) will consist of approximately 625 SF for use as residential space. The bulkhead floor (above the penthouse level) will consist of an approximately 518-SF area and include a boiler room (approximately 225 SF in area), machine room (approximately 193 SF in area), and a stairwell (approximately 100 SF in area). The proposed building will have a gross square footage of approximately 14,170. The proposed new building will include 10 residential units, each of which will be market rate residential units.

After demolition and removal of the one- and two-story building and existing cellar, the approximately 2,451 SF buildable portion of the Site will be excavated to approximately 3 feet below the proposed TOS and to final depths ranging between approximately 9 and 14 feet bgs for the construction of the building cellar and foundation and the installation of an active sub-slab depressurization system (SSDS). The electrical room and pump room area will be excavated to approximately 14 feet bgs, the elevator lift area will be excavated to approximately 10 feet bgs, the machine room and stairwell area will be excavated to approximately 12 feet bgs, and the remainder of the Site (southern and western portions of existing cellar and the western portion of the Site without a cellar) will be excavated to 9 feet bgs.

The anticipated volume of soil to be excavated from the Site is approximately 600 cubic yards (CY) which includes the excavation across 2,451 sf to depth ranging between 9 and 14 feet bgs, the over-excavation during development and remediation, and a margin of error. The anticipated depth to groundwater at the Site is approximately 15 feet bgs. Based on the proposed development plans, the depth to excavation is anticipated to be above the groundwater table.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Summary of Surrounding Property

The surrounding properties within a 1/4-mile of the Site consists primarily of multi-story buildings. The buildings along Manhattan Avenue include commercial properties on the ground floor and residences above. Residential apartment buildings are located along India and Huron Streets. The Site vicinity is primarily zoned for multi-story, medium density residential use (R7A) with a commercial overlay (C2-4). The New York City Metropolitan Transportation Authority (MTA) G subway line operates in a north-south direction under Manhattan Avenue, adjacent to the Site.

The property adjoining the Site to the north is an 8-story residential building under construction (977 Manhattan Avenue); to the south is a 4-story building with a commercial property on the ground floor and residences above (971 Manhattan Avenue); to the east and across Manhattan Avenue, are a 5-story building and a 4-story building with commercial properties on the ground floor and residential units above; and to the west is a 3-story residential building with a partial cellar (127 India Street).

No sensitive receptors were identified within 250 feet of the Site.

Summary of Past Site Uses and Areas of Concern

As early as 1887, the historical documents show that the Site contained a two-story building fronting Manhattan Avenue, with a rear yard that included a shed. The Site has been used for commercial and/or residential use since 1887 until at least 2017. The ground floor of the building was initially used as a bakery, then a liquor store, followed by a Chinese restaurant, and then finally as a grocery store. The second floor of the building contained residential apartments. The building tenants vacated the property in late 2017. The property was unoccupied at the time of GZA's

Phase I Environmental Site Assessment (ESA) reconnaissance in January 2018. Based on the Phase I ESA, the following Area of Concern (AOC) was identified:

- The adjacent 977 Manhattan Avenue property was historically listed as a paint store from 1928 until 2014. Paint stores typically associated with storage and use of paints, solvents, lacquers, and other chemicals. The property has a documented 'E'-Designation and is under the OER's Voluntary Cleanup Program for documented soil target compound concentrations exceeding the New York State Department of Environmental Conservation (NYSDEC) Part 375 Unrestricted Use Soil Cleanup objectives (SCOs) and Restricted Residential Use SCOs and soil vapor concentrations exceeding New York State Department of Health (NYSDOH) Air Guidance values. Therefore, the property is considered a recognized environmental condition (REC) for the Site.

In addition, the Phase I ESA identified the following data gaps:

- The 980 Manhattan Avenue property was historically listed as a drycleaner from 1965 to 1985. Drycleaners are typically associated with the use chlorinated solvents and other chemicals. No other information on the property was available. This is considered a significant data gap and additional file review may be warranted.
- Pipes associated with former petroleum storage tank in the basement along with the vent and fill port (closed with concrete) near the Manhattan Avenue entrance to the building, were observed. No other information was available. GZA considers this a significant data gap.
- A grease trap and sump were observed in the cellar of the building. No other information was available to GZA regarding the construction of these Site features. The grease trap and sump may be a pathway to the subsurface and taken together with the evidence in the cellar, this is considered a significant data gap.

Summary of Work Performed under the Remedial Investigation

GZA performed the following remedial investigation (RI) scope of work on January 10, April 12 and 13, July 25, August 8 and 9, 2018:

1. GZA conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. GZA performed a surface geophysical survey of the Site to locate and identify underground utilities, storage tanks, and other substructures;
3. Installed five soil borings at the Site and collected 11 soil samples for chemical analysis to evaluate soil quality;
4. Installed two permanent and one temporary monitoring well at the Site to determine depth to groundwater and collected three groundwater samples for chemical analysis to evaluate groundwater quality; and
5. Installed four soil vapor probes at the Site and collected four soil vapor samples for chemical analysis.

Summary of Findings of Remedial Investigation

A remedial investigation was performed, and the results are documented in a companion document called “Remedial Investigation Report, 975 Manhattan”, dated January 2019 (RIR).

1. Elevation of the property is approximately 20 feet above mean sea level (msl).
2. Groundwater is estimated at a depth of 14.5 to 15.5 feet bgs.
3. Based on local topography, surface water flow patterns and measured depths to water at the RI monitoring wells, the inferred direction of groundwater flow is to the northwest.
4. Bedrock was not encountered during the RI.
5. The stratigraphy of the Site, from the surface down, consists of fill material to a depth of approximately 4 to 6 feet bgs, underlain by a sand stratum down to depths of approximately 8 to 14 feet bgs, and underlain by a silt stratum down to depths of about 28 to 43 feet bgs. At one test boring location (boring B-01), the silt stratum was noted to be underlain by a silty/clayey sand stratum down to a depth of approximately 52 feet bgs.
6. The geophysical investigation did not identify any anomalies consistent with an underground storage tank (UST).

7. Soil/fill samples collected during the RI were compared to the New York State Department of Environmental Conservation (NYSDEC) Part 375 “Unrestricted Use” (Track 1) and “Residential Use” (Track 2) soil cleanup objectives (SCOs). Soil/fill samples showed:

- No volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), or polychlorinated biphenyls (PCBs) exceeded their respective Track 1 SCOs.
- The pesticide 4,4'-DDE (0.00789 milligrams per kilogram [mg/kg]) exceeded Track 1 SCOs in one deep sample (SB-02). 4,4'-DDT (max 0.0154 mg/kg) exceeded Track 1 SCOs in two deep samples (SB-02 and SB-03).
- Metals including lead (193 mg/kg), mercury (0.698 mg/kg) and zinc (181 mg/kg) were detected exceeding Unrestricted Use SCOs in one shallow soil in the rear yard (SB-03). Of these metals, mercury (0.242 mg/kg) was also detected in one deep sample exceeding Unrestricted Use SCO (SB-04).

Overall the findings were consistent with observations for other historic fill sites in NYC.

8. Groundwater samples collected during the RI were compared to the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS).

- Several VOC exceeded their respective AWQS levels.
- In groundwater sample MW-01, tetrachloroethene (PCE) was detected at 32 micrograms per liter (ug/L) and trichloroethene (TCE) at 8.1 ug/L, exceeding AWQS levels.
- Toluene was detected in MW-02 (30 ug/L), exceeding AWQS level.

9. Soil vapor samples collected during the RI were compared to the monitoring and the mitigation levels in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion’s decision matrices. Several VOCs were detected in all four soil vapor samples (SV-01, SV-02, SV-03, and SV-04) including some crude oil constituents and several elevated levels of chlorinated solvents. Benzene, toluene,

ethylbenzene, and xylene (BTEX) were detected in soil vapor at a maximum concentration in SV-01 of 55.99 micrograms per cubic meter (ug/m^3). The chlorinated solvents 1,4-dichlorobenzene (max $2.81 \text{ ug}/\text{m}^3$), chloroform (max $8.25 \text{ ug}/\text{m}^3$), cis-1,2-dichloroethene ($1.39 \text{ ug}/\text{m}^3$), dichlorodifluoromethane (max $4.18 \text{ ug}/\text{m}^3$), PCE (max $175 \text{ ug}/\text{m}^3$), TCE (max $44.9 \text{ ug}/\text{m}^3$) and trichlorofluoromethane (max $3.31 \text{ ug}/\text{m}^3$) were detected in soil vapor. Of the detected chlorinated solvents, PCE and TCE exceeded their respective NYSDOH Air Guideline Values (AGVs).

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. Performance of a Community Air Monitoring Program (CAMP) for particulates and volatile organic carbon compounds.
2. Selection of Unrestricted Use (Track 1) SCOs.
3. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
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. Excavation and removal of soil/fill exceeding Unrestricted Use (Track 1) SCOs. The entirety of the buildable portion (2,451 SF) of the Site will be excavated to 9- to 14 -foot bgs for the construction of the building cellar and foundation and installation of a passive SSDS. The electrical room and pump room area will be excavated to approximately 14 feet bgs, the elevator lift area will be excavated to approximately 10 feet bgs, the machine room and stairwell area will be excavated to approximately 12 feet bgs, and the remainder of the Site (southern and western portions of existing cellar and the western portion of the Site

without a cellar) will be excavated to 9 feet bgs. Approximately 600 CY (800 tons) of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.

6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a photo-ionization detector (PID). Appropriate segregation of excavated media on-Site.
7. 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.
8. Removal of all UST's that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
9. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
10. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
11. 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.
12. Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will either be containerized for off-site licensed or permitted disposal or will be treated under a permit from New York City Department of Environmental Protection (NYCDEP) to meet pretreatment requirements prior to discharge to the sewer system.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following construction elements implemented as part of new development will constitute Engineering and Institutional Controls (EC/ICs):

15. As part of development, construction of an engineered composite cover consisting of 6-inch thick concrete building slab underlain by 8-inch thick clean granular sub-base material underneath the entire building footprint.
16. As part of development, installation of a waterproofing/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 a 46-mil Grace Preprufe 300R below the slab throughout the full building area and a 31-mil Grace Preprufe 160R outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.
17. As part of development, installation of a SSDS consisting of a network of horizontal pipe 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, slotted schedule 40 4-inch PVC pipe connected to a 6-inch galvanized steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consist of a 12-inch thick layer of 2-inch trap rock stone. The pipe will be finished at the roof line. After the cellar slab has been installed and the building constructed, a Soil Vapor Intrusion (SVI) study will be conducted at the Site. If results indicate a passive system is acceptable, the remedial engineer will certify in the RAR that the SSDS was designed and properly installed as part of development. If results of the SVI study indicate an active system is warranted, the SSDS pipe will finish at the roof with a Fantech Rn3 6-inch Radon Fan. The active SSDS will constitute 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.
18. If SVI study determines that an active SSDS is required, a deed restriction will be placed on the property to document the installation of, and continued operation, of the active SSD systems.

19. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
20. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
21. 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: 975 Manhattan Avenue
- OER Project Numbers: 18TMP1329K, 18EH-N439K, 19CVCP060K

Project Contacts:

- OER Project Manager: Tara Ostock, 212-788-8841
- Site Project Manager: Smita Day, 646-929-8928
- Site Safety Officer: To be determined, Phone Number
- Online Document Repository: <https://a002-epic.nyc.gov/app/workspace/5907/docrepository>

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 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 includes 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 OER 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 is 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

Brilliant Real Estate Development LLC is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program (VCP) to investigate and remediate a property located at 975 Manhattan Avenue in the Greenpoint neighborhood of Brooklyn, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 975 Manhattan Avenue in the Greenpoint section of Brooklyn, New York and is identified as Block 2532 and Lot 46 on the New York City (NYC) Tax Map. **Figure 1** shows the Site location. The Site is approximately 2,500 SF in area and is bounded by a construction site (proposed 8-story residential building) to the north, a 4-story mixed commercial and residential use building to the south, Manhattan Avenue followed by 4- and 5-story mixed-use commercial and residential buildings to the east, and a 3-story residential building to the west. A map of the Site boundary is shown in **Figure 2**. Photographs of the Site are included in **Appendix A**. Currently, the Site is unoccupied and contains a one- and two-story building with a cellar (depth of approximately seven feet below sidewalk grade) and a concrete-paved rear yard.

1.2 Redevelopment Plan

Demolition and removal are proposed for the existing building on Site. The proposed redevelopment plan for the Site will consist of constructing a new 7-story, mixed commercial and residential use building with one cellar level. The proposed depths to the top of the cellar slab (TOS) range between approximately 6 feet bgs and 11 feet bgs. To account for a seismic gap and adjacent building encroachment, approximately 2,451 SF of the 2,500-SF lot is buildable. Layouts

of the proposed Site development are presented in **Appendix B**. The current zoning designation is “R7A” residential district with a “C2-4” commercial overlay. The proposed use is consistent with the existing zoning for the property. Based on the NYC Department of City Planning (DCP) Zoning and Land Use (ZoLa) records, the property is located within the Greenpoint-Williamsburg Contextual Rezoning area with zoning map and text amendments/resolution, effective July 29, 2009. The Site is assigned an Environmental Designation (E-Designation) for Hazardous Materials and Noise (E-Designation Number E-232) by the NYC Department of City Planning.

The redevelopment plans (square footage and depths) are shown on Drawing A-101.00, titled “Cellar & First Floor Plans”, Drawing A-301.00, titled “Section”, and Drawing A-302.00, titled “Section”, prepared by Yuen Design+Architecture PLLC (Architect) and dated October 9, 2018 (revision date) and additional information provided by Architect on October 30, 2018 and November 1, 2018. The cellar will occupy the entirety of the buildable portion of the lot (approximately 2,451 SF) with an approximately 1,862-SF area for commercial use and an approximately 589-SF area for residential or mechanical use. The first floor of the building will occupy an approximately 2,451 SF area of the lot (the entirety of the buildable portion of the lot) and include approximately 2,033 SF of commercial and approximately 418 SF of residential spaces. Each of the second through sixth floors of the proposed building will consist of approximately 1,625 SF for use as residential space. The penthouse level (7th floor) will consist of approximately 625 SF for use as residential space. The bulkhead floor (above the penthouse level) will consist of an approximately 518-SF area and include a boiler room (approximately 225 SF in area), machine room (approximately 193 SF in area), and a stairwell (approximately 100 SF in area). The proposed building will have a gross square footage of approximately 14,170. The proposed new building will include 10 residential units, each of which will be market rate residential units.

After demolition and removal of the one- and two-story building and existing cellar, the approximately 2,451 SF buildable portion of the Site will be excavated to approximately 3 feet below the proposed TOS and to final depths ranging between approximately 9 and 14 feet bgs for the construction of the building cellar and foundation and installation of a passive sub-slab depressurization system (SSDS). The electrical room and pump room area will be excavated to approximately 14 feet bgs, the elevator lift area will be excavated to approximately 10 feet bgs,

the machine room and stairwell area will be excavated to approximately 12 feet bgs, and the remainder of the Site (southern and western portions of existing cellar and the western portion of the Site without a cellar) will be excavated to 9 feet bgs.

The anticipated volume of soil to be excavated from the Site is approximately 600 CY which includes the excavation across 2,451 sf to depth ranging between 9 and 14, the over-excavation during development and remediation, and a margin of error. The anticipated depth to groundwater at the Site is approximately 15 feet bgs. Based on the proposed development plans, the depth to excavation is anticipated to be above the groundwater table.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 Description of Surrounding Property

The surrounding properties within a 1/4-mile of the Site consists primarily of multi-story buildings. The buildings along Manhattan Avenue include commercial properties on the ground floor and residences above. Residential apartment buildings are located along India and Huron Streets. The Site vicinity is primarily zoned for multi-story, medium density residential use (R7A) with a commercial overlay (C2-4). The New York City Metropolitan Transportation Authority (MTA) G subway line operates in a north-south direction under Manhattan Avenue, adjacent to the Site.

The property adjoining the Site to the north is an 8-story residential building under construction (977 Manhattan Avenue); to the south is a 4-story building with a commercial property on the ground floor and residences above (971 Manhattan Avenue); to the east and across Manhattan Avenue, are a 5-story building and a 4-story building with commercial properties on the ground floor and residential units above; and to the west is a 3-story residential building with a partial cellar (127 India Street).

No sensitive receptors were identified within 250 feet of the Site. **Figure 3** shows the surrounding land usage.

1.4 Summary of Past Site Uses and Areas of Concern

As early as 1887, the historical documents show that the Site contained a two-story building fronting Manhattan Avenue, with a rear yard that included a shed. The Site has been used for commercial and/or residential use since 1887 until at least 2017. The ground floor of the building was initially used as a bakery, then a liquor store, followed by a Chinese restaurant, and then finally as a grocery store. The second floor of the building contained residential apartments. The building tenants vacated the property in late 2017. The property was unoccupied at the time of GZA's Phase I Environmental Site Assessment (ESA) reconnaissance in January 2018. Based on the Phase I ESA, the following Area of Concern (AOC) was identified:

- The adjacent 977 Manhattan Avenue property was historically listed as a paint store from 1928 until 2014. Paint stores typically associated with storage and use of paints, solvents, lacquers, and other chemicals. The property has a documented 'E'-Designation and is under the OER's VCP for documented soil target compound concentrations exceeding the NYSDEC Part 375 Unrestricted Use SCOs and Restricted Residential Use SCOs and soil vapor concentrations exceeding NYSDOH Air Guidance values. Therefore, the property is considered a REC for the Site.

In addition, the Phase I ESA identified data gaps:

- The 980 Manhattan Avenue property was historically listed as a drycleaner from 1965 to 1985. Drycleaners are typically associated with the use chlorinated solvents and other chemicals. No other information on the property was available. This is considered a significant data gap and additional file review may be warranted.
- Pipes associated with former petroleum storage tank in the basement along with the vent and fill port (closed with concrete) near the Manhattan Avenue entrance to the building, were observed. No other information was available. GZA considers this a significant data gap.
- A grease trap and sump were observed in the cellar of the building. No other information was available to GZA regarding the construction of these Site features. The grease trap and sump may be a pathway to the subsurface and taken together with the evidence in the cellar, this is considered a significant data gap.

1.5 Summary of Work Performed under the Remedial Investigation

GZA performed the following remedial investigation (RI) scope of work on January 10, April 12 and 13, July 25, and August 8 and 9, 2018:

1. GZA conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. GZA performed a surface geophysical survey of the Site to locate and identify underground utilities, storage tanks, and other substructures;
3. Installed five soil borings at the Site and collected 11 soil samples for chemical analysis to evaluate soil quality;
4. Installed two permanent monitoring wells and one temporary monitoring well at the Site to determine depth to groundwater and collected three groundwater samples for chemical analysis to evaluate groundwater quality; and
5. Installed four soil vapor probes at the Site and collected four soil vapor samples for chemical analysis.

1.6 Summary of Findings of Remedial Investigation

A RI was performed, and the results are documented in a companion document called “Remedial Investigation Report, 975 Manhattan”, dated January 2019 (RIR).

1. Elevation of the property is approximately 20 feet above mean seal level (msl).
2. Groundwater is estimated to be found at a depth of 14.5 to 15.5 feet bgs.
3. Based on local topography, surface water flow patterns and measured depths to water at the RI monitoring wells, the inferred direction of groundwater flow is to the northwest.
4. Bedrock was not encountered during the RI.
5. The stratigraphy of the Site, from the surface down, consists of fill material to a depth of approximately 4 to 6 feet bgs, underlain by a sand stratum down to depths of approximately 8 to 14 feet bgs, and underlain by a silt stratum down to depths of about 28 to 43 feet bgs.

At one test boring location (boring B-01), the silt stratum was noted to be underlain by a silty/clayey sand stratum down to a depth of approximately 52 feet bgs.

6. The geophysical investigation did not identify any anomalies consist with USTs.
7. Soil/fill samples collected during the RI were compared to the NYSDEC Part 375 “Unrestricted Use” (Track 1) and “Residential Use” (Track 2) SCOs. Soil/fill samples showed:
 - No VOCs, SVOCs, or PCB exceeded their respective Track 1 SCOs.
 - The pesticide 4,4'-DDE (0.00789 mg/kg) exceeded Track 1 SCOs in one deep sample (SB-02). 4,4'-DDT (max 0.0154 mg/kg) exceeded Track 1 SCOs in two deep samples (SB-02 and SB-03).
 - Metals including lead (193 mg/kg), mercury (0.698 mg/kg) and zinc (181 mg/kg) were detected exceeding Unrestricted Use SCOs in one shallow soil in the rear yard (SB-03). Of these metals, mercury (0.242 mg/kg) was also detected in one deep sample exceeding Unrestricted Use SCO (SB-04).

Overall the findings were consistent with observations for other historic fill sites in NYC.

8. Groundwater samples collected during the RI were compared to the NYSDEC TOGS 1.1.1 AWQS.
 - Several VOC exceeded their respective AWQS levels.
 - In groundwater sample MW-01, PCE was detected at 32 ug/L and TCE at 8.1 ug/L, exceeding AWQS levels.
 - Toluene was detected in MW-02 (30 ug/L), exceeding AWQS level.
9. Soil vapor samples collected during the RI were compared to the monitoring and the mitigation levels in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion’s decision matrices. Several VOCs were detected in all four soil vapor samples (SV-01, SV-02, SV-03, and SV-04) including some crude oil constituents and several elevated levels of chlorinated solvents. BTEX was detected in soil

vapor at a maximum concentration in SV-01 of 55.99 ug/m³. The chlorinated solvents 1,4-dichlorobenzene (max 2.81 ug/m³), chloroform (max 8.25 ug/m³), cis-1,2-dichloroethene (1.39 ug/m³), dichlorodifluoromethane (max 4.18 ug/m³), PCE (max 175 ug/m³), TCE (max 44.9 ug/m³) and trichlorofluoromethane (max 3.31 ug/m³) were detected in soil vapor. Of the detected chlorinated solvents, PCE and TCE exceeded their respective NYSDOH AGVs.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not suspected at this site.

2.0 Remedial Action Objectives

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

Soil

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

Groundwater

- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

Soil Vapor

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

3.0 Remedial Alternatives Analysis

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

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

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

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would be achieved by excavating for construction of the new building's

cellar level, building foundation and SSDS to depths ranging between 9 and 14 feet bgs across entirety of the buildable portion of the lot (approximately 2,451 SF) to remove all historic fill so as to achieve Unrestricted Use SCOs. The electrical room and pump room area will be excavated to approximately 14 feet bgs, the elevator lift area will be excavated to approximately 10 feet bgs, the machine room and stairwell area will be excavated to approximately 12 feet bgs, and the remainder of the Site (southern and western portions of existing cellar and the western portion of the Site without a cellar) will be excavated to 9 feet bgs. The anticipated volume of soil to be excavated from the Site is approximately 600 CY which includes the excavation across 2,451 sf to depths ranging between 9 and 14 feet bgs, the over-excavation during development and remediation, and a margin of error.

- If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building's cellar level is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 1 Unrestricted Use SCOs.
- No Engineering or Institutional Controls are required for a Track 1 cleanup. "As part of development, a vapor barrier, passive SSDS, and a composite cover system would be installed to prevent potential exposures from soil vapor in the future."

Alternative 2:

- Establishment of Site-specific (Track 4) SCOs (See Section 4.2);
- Removal of all soil/fill exceeding Track 4 Site-specific SCOs and confirmation that Track 4 Site-specific SCOs have been achieved with post-excavation end point sampling. Based on the results of the Remedial Investigation, it is expected that SCOs would be achieved by excavating for construction of the new building's cellar level, building foundation and SSDS to depths ranging between 9 and 14 feet bgs across entirety of the buildable portion of the lot (approximately 2,451 SF). The electrical room and pump room area will be excavated to approximately 14 feet bgs, the elevator lift area will be excavated to approximately 10 feet bgs, the machine room and stairwell area will be excavated to approximately 12 feet bgs, and the remainder of the Site (southern and western portions of existing cellar and the western portion of the Site without a cellar) will be excavated to 9 feet bgs. The anticipated volume of soil excavation is approximately 600 CY which

includes the excavation across 2,451 sf to depths ranging between 9 and 14 feet bgs, the over-excavation during development and remediation, and a margin of error. 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 over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Installation of an active SSDS;
- 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.
- Placement of a deed notice to record the ECs/ICs on the deed to ensure that future owners of the Site continue to comply with the SMP, as required.

3.1 Threshold Criteria Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of ECs/ICs. 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 Engineering Controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing Institutional Controls including a Site Management Plan and continuing the E-designation instituting a deed notice on the property 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 (CHASP), an approved Soil/Materials Management Plan (SMMP), 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 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 waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier outside of subgrade foundation walls, installing a passive SSDS and constructing a composite cover system, 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 waterproofing/vapor barrier system below the new building's basement slab and continuing the vapor barrier outside of subgrade foundation walls, installing an active SSDS and constructing a composite cover system. A Site Management Plan would ensure that these controls remained protective for the long term.

Health and safety measures contained in the CHASP and 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 are 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 CHASP, a CAMP, and a 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 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 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; installing soil vapor barrier; and implementing a passive SSDS; 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 soil vapor barrier; implementing an active SSDS; 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 9- to -14 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.

Historic fill at the Site was found to extend to a depth of up to 4 to 6 feet across the Site during the RI, and the new building requires excavation of 9 to 14 feet bgs across the entire Site. For the construction of the building cellar and foundation and installation of a SSDS, the electrical room and pump room area will be excavated to approximately 14 feet bgs, the elevator lift area will be excavated to approximately 10 feet bgs, the machine room and stairwell area will be excavated to approximately 12 feet bgs, and the remainder of the Site (southern and western portions of existing

cellar and the western portion of the Site without a cellar) will be excavated to 9 feet bgs. Costs associated with **Alternative 1** could be comparable to **Alternative 2** since soil with analytes above Track 1 Unrestricted Use SCOs is not encountered below the excavation depth required for development. The estimated soil excavation for both **Alternative 1 and Alternative 2** is 600 CY. However, long-term costs for **Alternative 2** are likely higher than **Alternative 1** based on the maintenance of the active SSDS and the 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 C**. 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, mixed-use building with residential units and commercial space. The proposed new building will include 10 residential units, each of which will be market rate residential units. 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 consists primarily of multi-story buildings. The buildings along Manhattan Avenue include commercial properties on the ground floor and residences above. Residential apartment buildings are located along India and Huron Streets. The Site vicinity is primarily zoned for multi-story, medium density residential use (R7A) with a commercial overlay (C2-4). The development would remediate an unoccupied contaminated lot and provide a modern mixed-use residential building with commercial space. The proposed development would clean up the property and make it safer, create new employment opportunities 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. The proposed building design will incorporate sustainable practices including low flow fixtures and toilets, efficient lighting, low/no VOC paints, primers, adhesive and sealants, mold prevention in wet area, and healthy flooring materials. The project's Sustainability Statement is provided in **Appendix D**.

While **Alternative 2** would potentially result in lower energy usage based on reducing the volume of material transported off-Site, both remedial alternatives are comparable with respect to the opportunity to achieve 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 1**, the **Track 1** remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. Excavation and removal of soil/fill exceeding Unrestricted Use (Track 1) SCOs. The entirety of the buildable portion (2,451 SF) of the Site will be excavated to depths of 9 to 14 feet bgs for the construction of the building cellar and foundation and installation of a passive SSDS. The electrical room and pump room area will be excavated to approximately 14 feet bgs, the elevator lift area will be excavated to approximately 10 feet bgs, the machine room and stairwell area will be excavated to approximately 12 feet bgs, and the remainder of the Site (southern and western portions of existing cellar and the western portion of the Site without a cellar) will be excavated to 9 feet bgs. Approximately 600

CY (800 tons) of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.

7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
8. 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.
9. Removal of all UST's that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
10. 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.
11. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
12. 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.
13. Dewatering in compliance with city, state, and federal laws and regulations. Extracted groundwater will either be containerized for off-site licensed or permitted disposal or will be treated under a permit from New York City Department of Environmental Protection (NYCDEP) to meet pretreatment requirements prior to discharge to the sewer system.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
15. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following construction elements implemented as part of new development will constitute Engineering and Institutional Controls:

16. As part of development, construction of an engineered composite cover consisting of 6-inch thick concrete building slab underlain by 8-inch thick clean granular sub-base material underneath the entire building footprint.
17. As part of development, installation of a waterproofing/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 a 46-mil Grace Preprufe 300R below the slab throughout the full building area and a 31-mil Grace Preprufe 160R outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.
18. As part of development, installation of a SSDS consisting of a network of horizontal pipe 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, slotted schedule 40 4-inch PVC pipe connected to a 6-inch galvanized steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consist of a 12-inch thick layer of 2-inch trap rock stone. The pipe will be finished at the roof line. After the cellar slab has been installed and the building constructed, a Soil Vapor Intrusion (SVI) study will be conducted at the Site. If results indicate a passive system is acceptable, the remedial engineer will certify in the RAR that the SSDS was designed and properly installed as part of development. If results of the SVI study indicate an active system is warranted, the SSDS pipe will finish at the roof with a Fantech Rn3 6-inch Radon Fan. The active SSDS will constitute 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.
19. If SVI study determines that an active SSDS is required, a deed restriction will be placed on the property to document the installation of, and continued operation, of the active SSD systems.

20. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site.
21. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (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.
22. 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

Track 1 SCO's are proposed for this project and SCO's are defined in 6 NYCRR Part 375, Table 6.8(a) Track 1 Unrestricted Use. If Track 1 SCO's are not achieved, Track 4 Site-specific SCO's will apply, which will be the Track 2 SCO as modified by the following:

<u>Contaminant</u>	<u>Site-Specific SCO's</u>
Lead	800 ppm
Mercury	1.5 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 E**. 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 approximately 2,451 SF buildable portion of the Site will be excavated to a depth of approximately 9 to 14 feet bgs for development purpose. The location of planned excavations is shown in **Figure 4**. Given the proposed approximately 7 feet excavation in electrical room and pump room area, the approximately 3 feet excavation in elevator lift area, the approximately 5 feet excavation in machine room and stairwell area and the approximately 9 feet excavation in the remainder of the Site (southern and western portions of existing cellar and the western portion of the Site without a cellar), the total quantity of soil/fill expected to be excavated and disposed off-Site is approximately 600 CY (800 tons). For each disposal facility to be used in the remedial action, a letter from the developer/ qualified environmental professional (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.

The proposed disposal locations for Site-derived impacted materials are listed below. Additional disposal locations established at a later date will be reported promptly to the OER Project Manager.

Disposal Facility	Waste Type	Estimated Quantity
Soil Safe-Metro12 300 Salt Meadow Road, Carteret, NJ	Non-Hazardous Soil	500 tons
P PARK, 100 Planten Ave., Prospect Park, NJ	Urban Fill, Non-hazardous soil	300 tons

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 Environmental Laboratory Approval Program (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. Two (2) confirmation samples will be collected from the base of the excavation at locations to be determined by OER. To evaluate attainment of Track 1 SCOs, samples will be analyzed for VOCs, SVOCs, pesticides, PCBs and metals according to analytical methods described above. Proposed end-point sample locations are shown on **Figure 5**.

Hotspot End-point Sampling

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 light non-aqueous phase liquid (LNAPL) and/or dense non-aqueous phase liquid (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 Quality Assurance Project Plan (QAPP) generally describes a Quality Assurance / Quality Control (QA/QC) program of the Site consistent with contract documents and the nature of the work to be performed, including applicable codes, standards and regulations. Elements considered in preparing a QAPP are:

- the quality-related activities to be performed according to the contract scope of work
- the need for special controls over QA/QC activities
- Sample collection apparatus
- Sampling methods
- Decontamination methods
- Sample containers
- Holding time
- Preservatives including temperature
- Lab blanks

- Detection levels
- Standards for comparative analysis

QA/QC procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for this investigation. Field QA/QC procedures will be used: (1) to document that samples are representative of actual conditions at the Site; and (2) identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results were biased either by interfering compounds in the sample matrix, or by laboratory techniques that could have introduced systematic or random errors to the analytical process. Trip blanks will be collected and analyzed for VOCs at an ELAP-certified laboratory. The QAPP is included as **Appendix F**.

Import of Soils

Importing of soils is not planned on this project.

Reuse of Onsite Soils

Reuse of onsite soil is not planned on this project.

4.3 Engineering Controls

The remedial action will achieve Track 1 Unrestricted Use SCOs and no Engineering Controls are required. However, the following design elements will be incorporated into the project as part of the development:

- (1) Composite Cover System
- (2) Soil Vapor Barrier System
- (3) Sub-Slab Depressurization System

If Track 1 is not achieved, these elements will constitute Engineering Controls that will be employed in the remedial action to address residual contamination remaining at the Site.

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 6-inch thick concrete building slab underlain Grace Preprufe 300R waterproofing/vapor barrier membrane underlain by, a minimum 12-inch thick layer of 2-inch trap rock stone surrounding the fabric wrapped horizontal slotted schedule 40 4-inch PVC SSDS piping underlain by, remaining on-Site material underneath the entire building footprint. **Figure 6** shows the location and the typical design 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 extend throughout the area occupied by the footprint of the new building (the entire lot), beneath the building slab, and outside of sub-grade foundation sidewalls and will be installed in accordance with manufacturer specifications. The vapor barrier system will consist of a 46-mil Grace Preprufe 300R below the slab throughout the full building area and a 31-mil Grace Preprufe 160R outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration. A certified contractor will install the vapor barrier.

A plan view showing the location of the proposed vapor barrier system is provided in **Figure 7-1**. Typical design sections for the vapor barrier on slab and sidewalls are provided in **Figure 7-2**.

Product specification sheets are provided in **Appendix G**. 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 a SSDS. An SSDS will be installed beneath the entire cellar slab to address residual soil vapors. The SSDS will consist of a network of horizontal pipe 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, slotted schedule 40 4-inch PVC pipe connected to a 6-inch steel riser pipe that penetrates the slab and travels through the building to the roof. The gas permeable layer will consist of a 12-inch thick layer of 2-inch trap rock stone. The pipe will be finished at the roof line. After the cellar slab has been installed and the building constructed, a Soil Vapor Intrusion (SVI) study will be conducted at the Site. If results indicate a passive system is acceptable, the remedial engineer will certify in the RAR that the SSDS was designed and properly installed as part of development. If results of the SVI study indicate an active system is warranted, the SSDS pipe will finish at the roof with a Fantech Rn3 6-inch Radon Fan. The SSDS piping will be outfitted with a collection point and two risers. The risers will be placed at a minimum distance of 15 ft from all air intakes and will consist of 6-inch galvanized steel.

If an active system is required, the SSDS will constitute 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 is shown in **Figure 7-1**. A typical section of the system is shown in **Figure 7-2**.

4.4 Institutional Controls

A Track 1 remedial action is proposed and Institutional Controls are not required. If a Track 1 remedial action is not achieved, Institutional Controls (IC's) will be incorporated in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. 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 determine by OER in the SMP and will comply with RCNY §43-1407(l)(3).
- If the soil vapor intrusion study indicates an active SSDS is needed, recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county

clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the SMP, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;

- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for a mix of 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

A Track 1 remedial action is proposed and Site Management is not required. If a Track 1 remedial action is not achieved, Site Management will be required and will be the last phase of remediation. Site Management will begin 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 remedial action 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 E** 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 Area of Concerns (AOCs) identified for this site include presence of historic fill material, the property adjacent to the north (977 Manhattan Avenue) potentially associated with storage and use of paints, solvents, lacquers, and other chemicals, the adjacent property across Manhattan Avenue (980 Manhattan Avenue) potentially associated with the use chlorinated solvents and other chemicals, and the grease trap and sump in the cellar of the existing building, which may be a pathway to the subsurface.

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

Soil: No compounds were identified above their respective Track 2 Restricted Residential SCOs.

Groundwater: In groundwater sample MW-01, tetrachloroethene (PCE) was detected at 32 µg/L and trichloroethene (TCE) at 8.1 µg/L, exceeding AWQS levels. Toluene was detected in MW-02 (30 µg/L), exceeding Ambient Water Quality Standards (AWQS) level.

Soil Vapor: Tetrachloroethene (PCE) were detected in all four soil vapor samples. PCE was detected at 175 µg/m³ in SV-01, 57.7 µg/m³ in SV-02, 12.9 µg/m³ in SV-03, and 13.4 µg/m³ in SV-04. The PCE concentrations in SV-01 and SV-02 exceeded New York State Department of Health (NYSDOH) Air Guideline Value (AGV). Trichloroethene (TCE) was detected in SV-01 (44.9 µg/m³) and SV-02 (2.76 µg/m³), exceeding its NYSDOH AGV.

Nature, Extent, Fate and Transport of Contaminants

Soil: Low levels of BTEX found in soil only present in SB-01, adjacent to Manhattan Avenue, in both shallow and deep soil samples. Several SVOCs were detected at low concentrations in the backyard area, including B-02 (deep), SB-03 (shallow) and SB-04 (shallow). Metals found in the soil are present throughout the Site and are associated with the historic fill. In SB-03 shallow soil sample collected from the backyard, elevated levels of lead, mercury and zinc exceeding Track 1 SCOs were found. In SB-04, shallow sample indicated elevated level of Mercury exceeding Track 1 SCOs. Pesticides exceeding Track 1 SCOs were detected in the shallow samples from backyard and existing building footprint. Since groundwater is encountered at depths ranging from 14.5 to 15.75 ft bgs, it is anticipated that transport of contaminants is through historical fill.

Groundwater and Soil Vapor: In groundwater sample MW-01, PCE and TCE exceeded their respective AWQS levels. Toluene was detected in MW-02 exceeded AWQS level. PCE is widely used in the dry-cleaning of fabrics, including clothes. The source of the PCE could potentially be the upgradient historical dry-cleaning facility located across Manhattan Avenue (980 Manhattan Avenue). The TCE identified may be attributed to the historical paint store north of the property. Soil vapor samples SV-01 and SV-02 also reflect elevated levels of TCE and PCE. It is anticipated

that transport of contaminants is through migration into groundwater and volatilization into soil vapor.

Receptor Populations

On-Site Receptors: The site is currently unoccupied and contains a one- and two-story building with a cellar and a partially paved rear yard with soil exposure. The Site building is locked, and the backyard is enclosed by adjacent buildings and perimeter fence. 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, the entire Site will be capped with a combination of composite cover system, vapor barrier and passive SSDS. There will be no potential on-site receptors.

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 – existing and 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 unoccupied and potential exposure pathways are through ingestion, inhalation, or dermal absorption of soil/ fill. In portions of the backyard, soil is exposed, which can create exposure pathways for trespassers, site representatives, and visitors granted access to the property. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. The one- to -two story building with basement has the potential for soil vapor to accumulate on site, which may result in vapor intrusion and create exposure pathways for trespassers, site representatives, and visitors granted access to the property.

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, the entire site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls consisting composite cover systems, vapor barrier and passive SSDS will prevent any potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water supply, and groundwater is not used at the site. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

Overall Human Health Exposure Assessment

There are potential complete exposure pathways for the current site condition. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There

are no complete exposure pathways under future conditions after 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 system 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.

5.0 Remedial Action Management

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Stephen M. Kline (supervising principal and professional engineer) and Smita P. Day (project manager, professional engineer, and qualified environmental professional).

5.2 Site Security

Site access will be controlled by gated entrances to the fenced property.

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 H**. The Site Safety Coordinator will be designated by Brilliant Real Estate Development LLC. 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. Exceedances of action levels observed during performance of the 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

Based on the proposed depth of the basement slab and the associated foundation elements, dewatering of the foundation excavation will not likely be required during 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 shown on **Figure 8**.

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, [name], certify the following:

- I 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 [site name (address)] site, site number [VCP site number].
- 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.

If a Track 1 or a Track 2 Restricted Residential Remedial Action was achieved (without an active SSDS), substitute the following passage for above:

The [list protective elements like vapor barrier, passive SSDS, composite cover system implemented as part of construction] constructed 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.

If a Track 1 or a Track 2 Restricted Residential Remedial Action was achieved (without an active SSDS), substitute the following passage for above:

The [list protective elements like vapor barrier, passive SSDS, composite cover system implemented as part of construction] constructed during this remedial action were professionally observed by me or by a person under my direct supervision 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, liquid or other material from the property was 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, [name], certify the following:

- I am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the [site name (address)] site, site number [VCP site number].
- 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, liquid or other material from the property was taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

QEP Name

QEP Signature

Date



7.0 Schedule

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

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	[-8]	4
Mobilization	[-4]	4
Remedial Excavation	1	12
Install SSDS	12	4
Test and Complete Engineering Controls Second Floor Roof	16	4
Demobilization	20	1
Submit Remedial Action Report	21	3