

**TWO FULTON SQUARE**  
**QUEENS, NEW YORK**

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**Remedial Action Work Plan**

**NYC VCP Project Number 16CVCP042Q**  
**OER Project Number 15ENOS328Q**

**Prepared For:**

Two Fulton Square, LLC  
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**Prepared By:**

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**DECEMBER 2015**

# REMEDIAL ACTION WORK PLAN

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## LIST OF ACRONYMS

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

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

## CERTIFICATION

I, Charles McGuckin, 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 Two Fulton Square (133-31 39<sup>th</sup> Avenue, Flushing, New York site, site number 16CVCP042Q. 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.

Charles McGuckin  
Name

069509  
PE License Number

Charles McGuckin  
Signature

12/9/15  
Date



I, Sin Senh, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the Two Fulton Square (133-31 39<sup>th</sup> Avenue, Flushing, New York) site, site number 16CVCP042Q. I certify to the following:

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

Sin Senh  
QEP Name

Sin Senh  
QEP Signature

12/9/15  
Date

## **EXECUTIVE SUMMARY**

Two Fulton Square LLC is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 141,983-square foot site located at 133-31 39<sup>th</sup> Avenue in Queens, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

### **Site Location and Background**

The Site is located at 133-31 39<sup>th</sup> Avenue in the Flushing section in Queens, New York and is identified as Block 4972 and Lot 65 (previously Lots 8, 10, 16 and 65) on the New York City Tax Map. Figure 1 shows the Site location. The Site is 141,983-square feet and is bounded by 37<sup>th</sup> Avenue (and residential and retail commercial properties) to the north, 39<sup>th</sup> Avenue (and retail commercial properties) to the south, Prince Street (and office buildings, residential and retail commercial properties) to the east and College Point Boulevard (a lumber yard and commercial properties) to the west. A map of the site boundary is shown in Plate 1. Currently, all six buildings have been demolished and the Site is an active construction site.

### **Summary of Redevelopment Plan**

The proposed development project consists of the construction of four towers over a podium. The podium will contain three stories with retail. The building footprint will be approximately 142,000 square feet. The four new towers will consist of a 13-story commercial tower (Prince Street Tower), a 12-story mixed-use tower and two (one 17-story and one 16-story) residential towers consisting of approximately 307 residential units and community space. There will be three levels of underground parking below the podium. Excavation will occur down to 40 to 48 feet across the Site, with the exception of the Prince Street Tower which will require excavation to a depth of approximately 16 feet below grade for the foundation construction. An active sub-slab depressurization system (SSDS) will be installed beneath the Prince Street Tower building slab. This will result in a total excavated volume of approximately 300,000 cubic yards of soil. Excavation is anticipated to extend to approximately 4 to 12 feet

below the groundwater table, requiring dewatering and treatment of groundwater prior to discharge. Demolition of the previous buildings was completed concurrent with the RI. As part of development, Lots 8, 10, 16 and 65 have been merged into Lot 65.

Layout of the proposed Site development is presented in Figure 2. The current zoning designation for Lot 65 is C4 and designates a commercial mixed use.

Since the Prince Street Commercial tower will be excavated to depths of 16 feet below grade and requires an active SSDS, this area will constitute Site A. The remainder of the property, which will be excavated to more than 40 feet, will be designated as Site B.

### **Summary of Surrounding Property**

The Site is located in a mixed residential and commercial zoned area and is abutted by 37<sup>th</sup> Avenue (and retail commercial properties) to the north, 39<sup>th</sup> Avenue (and retail commercial properties) to the south, Prince Street (and retail commercial properties) to the east and College Point Boulevard (and commercial properties) to the west. No schools or hospitals are within a 500-foot radius of the Site boundary. However, there is a day care (Kon Wah Day School) listed at 135-27 38<sup>th</sup> Avenue, Flushing, New York that is approximately 225 feet from the closest Site boundary. The remediation of the Site will have no adverse effects on this location. Figure 3 shows the surrounding land usage.

### **Summary of Past Site Uses and Areas of Concern**

According to the Sanborn Fire Insurance Maps of the late 1800's, the Site had been improved with dwellings. The former Tax Lot boundaries are shown on the Site Plan (Plate 1). According to the 1934 Sanborn Fire Insurance Map, a portion of Lot 16 was improved with a building labeled 'Laundry' and was last depicted on the 1951 Sanborn Fire Insurance Map (but may have been present until sometime prior to 1975). By 1951, Lot 10 is improved with three plumbing supplies warehouses and by 1966 the building layout for Lot 65 is constructed. According to the 1980 Sanborn Fire Insurance Map, Lot 65 was utilized by a machine shop (1954) and as a manufacturing facility (1956) until approximately 1988 (then utilized as the shopping plaza and parking). During this time frame the space previously utilized as a senior care facility was utilized by Rayex Corp., a sunglass manufacturer. In 1975, Lot 16 was improved with a one-story warehouse (no other details regarding products stored was given).

The AOCs identified for this site include:

1. An E-Designation (i.e., environmental requirement) was assigned to Lot 65 of the Site: E-74 for Window Wall Attenuation & Alternate Ventilation, effective as of September 17, 1998. These environmental requirements must be satisfied under the administration of the New York City Office of Environmental Remediation (OER).
2. Former Site Usage: From the mid-1950 until the late 1980's, portions of Lot 65 were utilized as a machine shop and for manufacturing (products manufactured not identified). In addition, a portion of Lot 16 was utilized by a laundry service from 1934 to at least 1951 (possibly until 1975). There is potential that the operations associated with these businesses affected the environmental quality of the subsurface soil and/or groundwater below the Site.
3. Adjacent Property Past Usage, 37-14 to 37-26 Prince Street, Lot C856 (43): a garage utilizing underground storage tanks (USTs) was depicted on historical records from 1934 until 2009. In addition, according to the EDR report Monahan Food Corp of 37-20 Prince Street (Lot C856 (43)), was identified as a large quantity generator of non-listed ignitable wastes in 1986 and 1996 and PCE in 1996 and 1997. There is potential that the operations associated with this business affected the environmental quality of the subsurface soil and/or groundwater below the Site.
4. Historic fill: Information suggests that the Site is most likely underlain to a depth of three to seven feet in some areas by historical urban fill material from an unknown origin.

### **Summary of Work Performed under the Remedial Investigation**

Roux Associates, Inc., on behalf of Two Fulton Square LLC, performed the following scope of work at the Site:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed twenty-three soil borings across the entire project Site, and collected fifty-seven (plus three duplicate samples) soil samples for chemical analysis from the soil borings to evaluate soil quality. Twelve of the soil borings were installed for the

- original RI with an additional eleven borings completed for delineation due to petroleum impacted material discovered onsite during the RI;
3. Collected four groundwater samples from four previously installed geotechnical monitoring wells in January 2015 for chemical analysis to evaluate groundwater quality;
  4. Installed four groundwater monitoring wells and utilized five existing groundwater monitoring wells throughout the Site to establish groundwater flow and collected nine groundwater samples in October 2015 for chemical analysis to evaluate groundwater quality; and
  5. Installed nine soil vapor probes around Site perimeter and collected nine and one duplicate soil vapor samples and one ambient air sample for chemical analysis.
  6. Fifty-six soil borings were installed across the entire project Site and 178 soil samples collected at a frequency of one per 800 cubic yards for the top 16 feet and one per 2,400 cubic yards below 16 feet below land surface for waste characterization analysis in preparation of soil disposal.

### **Summary of Findings of Remedial Investigation**

1. Elevation of the property ranges from 35 to 59 feet.
2. Depth to groundwater ranges from 26 to 44 feet at the Site.
3. Groundwater flow is generally from east to west beneath the Site.
4. Bedrock was not reached at the final depth of the soil borings, approximately 48 feet below land surface (ft bls). Approximate depth to bedrock is 100 ft bls; however, the elevation of the top of bedrock surface may be variable.
5. The stratigraphy of the Site, from the surface down, consists of three to seven feet of fill material consisting of brown fine to coarse sand with gravel and little brick and construction debris, underlain by a layer of brown to orange/brown, fine to coarse sand with little gravel. This layer extends to the water table and is interlaced by thin reddish

brown silt and clay lenses ranging in thickness from 6-inches to 5 feet at the water table (approximately 35 ft bls).

6. Soil/fill samples results were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives and Restricted Residential Soil Cleanup Objectives (SCOs) as presented in 6NYCRR Part 375-6.8 and CP51. 24 soil/fill samples collected during the RI showed no PCBs in any sample. Several volatile organic compounds (VOCs) were detected with 1,2,4-trimethylbenzene (4,800 µg/kg) exceeding Unrestricted Use SCOs in one sample and ethylbenzene (max 3,300 µg/kg), naphthalene (max 94,000 µg/kg), xylenes (max 6,500 µg/kg) exceeding Unrestricted Use SCOs in soil boring SB-12. Tetrachloroethene (max 24 µg/kg) and trichloroethene (1.1 µg/kg) were also detected below their Unrestricted Use SCOs. Several semi-volatile organic compounds (SVOCs) consisting of Polycyclic Aromatic Hydrocarbons (PAH) compounds were detected but only naphthalene (max 13,000 µg/kg) exceeded Unrestricted Use SCOs in SB-12. Two pesticides, 4,4'-DDE (7.1 µg/kg) and 4,4'-DDT (8.06 µg/kg) were detected above Unrestricted Use SCOs in one sample. Several metals including arsenic (max 19 mg/kg), chromium (max 45 mg/kg), copper (max 180 mg/kg), lead (max. 79 mg/kg), and nickel (max. 66 mg/kg) were detected exceeding Unrestricted Use SCOs. Of these metals, arsenic and chromium also exceeded Restricted Residential SCOs.
7. Due to gross contamination observed in the northwestern corner of the Site, NYSDEC Spill #1506310 was called in and 11 additional soil borings installed around SB-12 to delineate the extent of the petroleum contamination. The 33 additional soil/fill samples collected showed elevated concentrations of VOCs including acetone (max 1,500 µg/kg), benzene (390 µg/kg), ethylbenzene (max 4,000 µg/kg), naphthalene (max 33,000 µg/kg), xylenes (max 5,100 µg/kg), 2-butanone (max 320 µg/kg), 1,2,4-trimethylbenzene (max 3,800 µg/kg), and 1,2-dichlorobenzene (max 2,100 µg/kg) detected above Unrestricted Use SCOs. Tetrachloroethene was also detected at a maximum of 48 µg/kg. SVOCs including naphthalene (max 37,000 µg/kg) was detected above Unrestricted Use SCOs with benz(a)anthracene (max 37,000 µg/kg), benzo(a)pyrene (max 32,000 µg/kg), benzo(b)fluoranthene (max 44,000 µg/kg) benzo(k)fluoranthene (max 13,000 µg/kg), chrysene (max 39,000 µg/kg), dibenzo(a,h)anthracene (max 6,200 µg/kg), and

indeno(1,2,3-cd)pyrene (max 23,000 µg/kg) detected above Restricted Residential SCOs in one shallow sample at SB-23. Total PCBs was detected at a maximum of 58.1 µg/kg in these samples. Two pesticides, 4,4'-DDE (max 16 µg/kg) and 4,4'-DDT (max 55.8 µg/kg) were detected above Unrestricted Use SCOs. Several metals were also detected but only chromium (max 37 mg/kg) and nickel (max 38 mg/kg) were detected above Unrestricted Use SCOs.

8. Groundwater samples collected during the RI were compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQSs). A total of thirteen groundwater samples were collected from across the Site in January 2015 and October 2015. Groundwater samples results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Groundwater samples collected during the investigations showed no PCBs in any sample. Five (5) VOCs were detected above GQS, including 1,2-Dichloroethene (max 59 µg/L), chloroform (max 10 µg/L), cis-1,2-Dichloroethene (max 59 µg/L), tetrachloroethene (max 70 µg/L) and trichloroethene (max 130 µg/L). Several SVOCs were detected with benz(a)anthracene (0.11 µg/L), benzo(a)pyrene (0.25 µg/L), benzo(b)fluoranthene (0.46 µg/L), benzo(k)fluoranthene (0.13 µg/L), chrysene (0.29 µg/L), and indeno(1,2,3-cd)pyrene (0.23 µg/L) exceeding GQS in BW-3 and bis(2-ethylhexyl)phthalate (max 11 µg/L) exceeding its GQS in BW-6D. One pesticide, gamma-Chlordane (0.011 µg/L) was detected in RMW-01 at a concentration above GQS. Several dissolved metals were identified in groundwater but only magnesium (max. 74,300 µg/L), manganese (max. 3,874 µg/L), and sodium (max. 681,000 µg/L) exceeded their respective GQS.
9. Soil vapor results during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the New York State Department of Health (NYSDOH) in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Soil vapor samples collected during the RI showed elevated levels of petroleum-related VOCs. Total concentrations of petroleum-related VOCs (BTEX) ranged from 4.4 to 6884 µg/m<sup>3</sup>. Toluene was the highest detected compound with a maximum concentration of 6820 µg/m<sup>3</sup> in SV-06. Elevated levels of chlorinated VOCs were also detected with tetrachloroethylene (PCE) detected between 21.6 µg/m<sup>3</sup> and 13,300 µg/m<sup>3</sup>.

Trichloroethene (TCE) was also detected between 9.62  $\mu\text{g}/\text{m}^3$  and 117  $\mu\text{g}/\text{m}^3$ . Concentrations for both PCE and TCE were detected well above the monitoring level ranges established within the State DOH soil vapor guidance matrix. 1,1,1-trichloroethane (TCA) was detected in one sample at 2.9  $\mu\text{g}/\text{m}^3$ , below the monitoring level ranges.

## **Summary of the Remedial Action**

The preferred remedy for the Site is Alternative 1, Track 1 Unrestricted Use SCOs. The Track 1 remedy will remove all soil/fill exceeding Unrestricted Use SCOs throughout the Site, which will be confirmed with post-excavation sampling. No Engineering Controls are required for a Track 1 cleanup. A concrete slab covering the entire site and waterproofing membrane would be installed as part of standard building development and are not considered part of the remedy.

Due to elevated soil vapor levels, additional soil vapor management would be required under only the Prince Street Tower (Site A). Thus, Site A will achieve a Track 2 Restricted Residential Use SCOs remedy. Use of the active SSDS as a long-term engineering control for vapor mitigation is permitted under Track 2.

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs) for Site B and Restricted Residential Use (Track 2) SCOs for Site A.

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 for Site B and excavation and removal of soil/fill exceeding Restricted Residential Use (Track 2) SCOs for Site A. The entire footprint of the building area (about 95% of the entire property) will be excavated to a depth of approximately 40 to 48 feet below grade for development purposes. A small portion of property, Site A (under the Prince Street Commercial Tower), will be excavated to the depth of 16 feet below for development purposes. Approximately 300,000 cubic yards of soil/fill will be removed from the property and properly disposed at an appropriately registered 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 any 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. Spill closure and any associated groundwater remediation will be managed under NYSDEC authority for Spill# 1506310.
11. 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.

12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of Track 1 and Track 2 SCOs for Site B and Site A respectively.
13. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
14. 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.
15. 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.
16. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
17. 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 for Site B, the following construction elements implemented as part of new development will constitute Engineering and Institutional Controls. The following elements constitute Engineering and Institutional Controls for Site A, the Track 2 cleanup:

18. As part of development, construction of an engineered composite cover consisting of a six-inch thick concrete building slab with an 8-inch clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, and two feet of clean soil in all open space and landscaped areas.
19. As part of development, installation of a vapor barrier system consisting of waterproofing 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 20-mil vapor barrier below the slab throughout the full building area and a Grace Bituthene (or equivalent) vapor barrier system outside all sub-grade foundation sidewalls. All welds,

seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.

20. Installation and operation of an active sub-slab depressurization system under the Prince Street tower (Site A). The active SSDS will consist of a gravel trench beneath the concrete slab and above the foundation grade beams in a single lateral in the middle interior space of the new building footprint utilizing 10-ounce geotextile fabric wrapped  $\frac{3}{4}$ -inch gravel with 4-inch diameter schedule 40 perforated PVC pipes aligned horizontally and attached to an Ametek Rotron™ 2-Hp regenerative blower Model No. EN505AX72ML capable of 90 cfm and 45 in. of w.c. located in the maintenance room. The discharge of the blower will be connected to a 6-inch diameter vertical riser pipe, with vapors conveyed via a chase to be vented above the roof of the building (as shown in Plate 2). The regenerative blower will have a knockout tank and be installed in a sound attenuating enclosure with an in-line air filter on the inlet. A warning light will be provided and will be located in the maintenance office (or other location) to notify the building superintendent if the blower is not operating. Two soil vapor monitoring points are proposed to be installed within the Prince Tower building footprint as shown on Plate 2. During start-up of the blower, the soil vapor monitoring points will be used to confirm the presence of sub-slab vacuum. The vapor barrier and passive SSDS are considered protective systems to be installed as part of development. 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.
21. As part of new development, construction and operation of three levels of a sub-cellar parking garage with high volume air exchange in conformance with NYC Building Code (in all new construction, with the exception of Site A, the Prince Street Commercial Tower).
22. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.

23. If Track 1 SCOs are not achieved for Site B, recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and Institutional Controls and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

## COMMUNITY PROTECTION STATEMENT

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

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

### **Project Information:**

- Site Name: Two Fulton Square
- Site Address: 133-31 39<sup>th</sup> Avenue, Flushing, New York
- NYC Voluntary Cleanup Program Project Number: 16CVCP042Q

### **Project Contacts:**

- OER Project Manager: Sarah Pong, 212-788-8841
- Site Project Manager: Jessica Collins, 631-232-2600
- Site Safety Officer: MaryBeth Lyons, 516-776-4599
- Online Document Repository:  
<http://www.nyc.gov/html/oer/html/repository/RQueens.shtml>

**Remedial Investigation and Cleanup Plan:** Under the oversight of the NYC OER, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify

contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

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

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

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

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

**Worker Training:** Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take

annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

**Community Air Monitoring Plan:** Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a ‘Contingency Plan’).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Truck Routing:** Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the

property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

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

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

# **REMEDIAL ACTION WORK PLAN**

## **1.0 Project Background**

Two Fulton Square, LLC is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a property located at 133-31 39<sup>th</sup> Avenue in the Flushing section of Queens, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

## **1.1 Site Location and Background**

The Site is located at 133-31 39<sup>th</sup> Avenue in the Flushing section in Queens, New York and is identified as Block 4972 and Lot 65 (previously Lots 8, 10, 16 and 65) on the New York City Tax Map. Figure 1 shows the Site location. The Site is 141,983-square feet and is bounded by 37<sup>th</sup> Avenue (and residential and retail commercial properties) to the north, 39<sup>th</sup> Avenue (and retail commercial properties) to the south, Prince Street (and office buildings, residential and retail commercial properties) to the east and College Point Boulevard (and commercial properties) to the west. A map of the site boundary is shown in Plate 1. Currently, all six buildings have been demolished and the Site is an active construction site.

## **1.2 Redevelopment Plan**

The proposed development project consists of the construction of four towers over a podium. The podium will contain three stories with retail. The building footprint will be approximately 142,000 square feet. The four new towers will consist of a 13-story commercial tower (Prince Street Tower), a 12-story mixed-use tower and two (one 17-story and one 16-

story) residential towers consisting of approximately 307 residential units and community space. There will be three levels of underground parking below the podium. Excavation will occur down to 40 to 48 feet across the Site, with the exception of the Prince Street Tower which will require excavation to a depth of approximately 16 feet below grade for the foundation construction. An active sub-slab depressurization system (SSDS) will be installed beneath the Prince Street Tower building slab. This will result in a total excavated volume of approximately 300,000 cubic yards of soil. Excavation is anticipated to extend to approximately 4 to 12 feet below the groundwater table, requiring dewatering and treatment of groundwater prior to discharge. Demolition of the previous buildings was completed concurrent with the RI. As part of development, Lots 8, 10, 16 and 65 have been merged into Lot 65.

Layout of the proposed Site development is presented in Figure 2 and Appendix A. The current zoning designation for Lot 65 is C4 and designates a commercial mixed use. The proposed use is consistent with existing zoning for the property.

Since the Prince Street tower will be excavated to depths of 16 feet below grade and requires an active SSDS, this area will constitute Site A. The remainder of property, which will be excavated to more than 40 feet, will be called Site B.

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

### 1.3 Description of Surrounding Property

The Site is located in a mixed residential and commercial zoned area and is abutted by 37<sup>th</sup> Avenue (and retail commercial properties) to the north, 39<sup>th</sup> Avenue (and retail commercial properties) to the south, Prince Street (and retail commercial properties) to the east and College Point Boulevard (and commercial properties) to the west. The table below provides additional details concerning the adjacent property usage surrounding the Site:

North	Retail stores and 37 <sup>th</sup> Avenue; office, retail, parking, residential further North.
West	College Point Boulevard; Lumber yard, truck parking further West.

East	Office buildings, retail businesses and Prince Street; residential and retail businesses further East.
South	Residential tower, hotel, retail businesses and 39 <sup>th</sup> Avenue; hotel, residential and retail buildings further South.

No schools or hospitals are within a 500-foot radius of the Site boundary. However, there is a day care (Kon Wah Day School) listed at 135-27 38<sup>th</sup> Avenue, Flushing, New York that is approximately 225 feet from the closest Site boundary, the remediation of the Site will have no adverse effects on this location.

Figure 3 shows the surrounding land usage.

#### **1.4 Summary of Past Site Uses and Areas of Concern**

According to the Sanborn Fire Insurance Maps of the late 1800's, the Site had been improved with dwellings. According to the 1934 Sanborn Fire Insurance Map, a portion of Lot 16 was improved with a building labeled 'Laundry' and was last depicted on the 1951 Sanborn Fire Insurance Map (but may have been present until sometime prior to 1975). By 1951, Lot 10 was improved with three plumbing supplies warehouses and by 1966 the building layout for Lot 65 was constructed. According to the 1980 Sanborn Fire Insurance Map, Lot 65 was utilized by a machine shop (1954) and as a manufacturing facility (1956) until approximately 1988 (then utilized as the shopping plaza and parking). During this time frame the space previously utilized as a senior care facility was utilized by Rayex Corp., a sunglass manufacturer. In 1975, Lot 16 was improved with a one-story warehouse (no other details regarding products stored was given).

Based on the available sources, the following chronology of the Site was developed.

Source / Year	Status
Sanborn Fire Map (1886)	Site details are not depicted. Development of the immediate surrounding area of the Site includes dwellings, carpenter shop, church, saloons, barns and a grocery store.
Sanborn Fire Map (1892, 1897) Topographic Map (1897)	A 3-story dwelling is depicted in the northern portion of Lot 65; 1- and 2-story dwellings are noted along 39 <sup>th</sup> Avenue (Locust Avenue) and 37 <sup>th</sup> Avenue (Washington Avenue).
Sanborn Fire Map (1903, 1917) Aerial Photo (1924)	There are no significant changes to the Site. Increasing development of immediately surrounding neighborhood with dwellings, furniture storage (north) and greenhouses (west).
Sanborn Fire Map (1934) Aerial Photo (1946) Topographic Map (1947)	The southern portion of the Site is improved as previous maps and photos. A dwelling is depicted in the portion of the Site previously occupied by the senior care facility. Lot 8 was improved with a 3-story dwelling and garage. Lot 10 is vacant. Lot 16 is improved with a 2-story dwelling and garage; a building labeled ‘Laundry’ encompassing a portion of the lot. The current residential tower on the corner of 39 <sup>th</sup> Avenue and College Point Boulevard is depicted. A Garage with gasoline tanks and a repair shop are depicted in the property currently occupying the residential/office space building (37-14 to 37-26 Prince Street). A second garage with gasoline tanks is depicted at the property located northeast of the Site, across 37 <sup>th</sup> Avenue.
Sanborn Fire Map (1951) Aerial Photo (1954) Topographic Map (1955)	Lot 10 is improved with three plumbing supplies warehouses; and Lot 8 is fully developed; it appears ‘Laundry’ is still present. A petroleum corporation (complete name not visible) is depicted across College Point Boulevard, utilizing seven buried gasoline and fuel oil tanks. An auto sales/service company is located north of the Site, across 37 <sup>th</sup> Avenue.
Aerial Photo (1966, 1975) Topographic Map (1966, 1979)	The most recent building construction is depicted for Lot 65 (1966). There does not appear to be any significant changes to the surrounding neighborhood.
Sanborn Fire Map (1980, 1982, 1985) Aerial Photo (1984)	Lot 16 is depicted as a one-story warehouse, built 1975 (no other details). A one-story machine shop is located in a portion of Lot 65, built in 1954 and added to in 1958. A larger portion of the Lot 65 building was constructed in 1956 as a manufacturing facility (details not visible). The portion of Lot 65, previously occupied by the senior care facility is depicted as Rayex Corp (sunglass manufacturer). Auto repair, medical instrument manufacturing and film processing (1980 only) are noted south of the Site across 39 <sup>th</sup> Avenue. Electronics manufacturing and Electro-plating depicted north of the Site, across 37 <sup>th</sup> Avenue.

<p>Sanborn Fire Map (1988, 1991, 1992, 1993, 1994, 1995, 1999, 2001, 2002) Aerial Photo (1994) Topographic Map (1995)</p>	<p>The southern portion of Lot 65 depicted as machine shop is labeled parking (1988); depicted as shopping plaza and conference center with parking in basement (1991). There does not appear to be any significant changes to the surrounding neighborhood, except that the medical instrument manufacturing is no longer depicted (1988); the unnamed petroleum corporation is no longer depicted (1991). Auto storage depicted to the west, across College Point Boulevard (1999).</p>
<p>Sanborn Fire Map (2003, 2004, 2005, 2006) Aerial Photo (2006, 2009, 2011)</p>	<p>Lot 65 is depicted as Flushing Mall; a portion on 37<sup>th</sup> Avenue is a public school (2003). Lot 16 is no longer improved with a dwelling (2006 Aerial). The garage with gasoline tanks across 37<sup>th</sup> Avenue is no longer depicted (2003). The garage with gasoline tanks immediately adjacent to the Site, along Prince Street is no longer depicted (2009).</p>

The AOCs identified for this Site include:

1. An E-Designation (i.e., environmental requirement) was assigned to Lot 65 of the Site: E-74 for Window Wall Attenuation & Alternate Ventilation, effective as of September 17, 1998. These environmental requirements must be satisfied under the administration of the New York City Office of Environmental Remediation (OER).
2. Former Site Usage: From the mid-1950 until the late 1980's, portions of Lot 65 were utilized as a machine shop and for manufacturing (products manufactured not identified). In addition, a portion of Lot 16 was utilized by a laundry service from 1934 to at least 1951 (possibly until 1975). There is potential that the operations associated with these businesses affected the environmental quality of the subsurface soil and/or groundwater below the Site.
3. Adjacent Property Past Usage, 37-14 to 37-26 Prince Street, Lot C856 (43): a garage utilizing underground storage tanks (USTs) was depicted on historical records from 1934 until 2009. In addition, according to the EDR report Monahan Food Corp of 37-20 Prince Street (Lot C856 (43)), was identified as a large quantity generator of non-listed ignitable wastes in 1986 and 1996 and PCE in 1996 and 1997. There is potential that the operations associated with this business affected the environmental quality of the subsurface soil and/or groundwater below the Site.
4. Historic fill: Information suggests that the Site is most likely underlain by historical urban fill material from an unknown origin.

## **1.5 Summary of Work Performed under the Remedial Investigation**

Roux Associates, Inc., on behalf of Two Fulton Square LLC, performed the following scope of work at the Site:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed twenty-three soil borings across the entire project Site, and collected fifty-seven (plus three duplicate samples) soil samples for chemical analysis from the soil borings to evaluate soil quality. Twelve of the soil borings were installed for the original RI with an additional eleven borings completed for delineation due to petroleum impacted material discovered onsite during the RI;
3. Collected four groundwater samples from four previously installed geotechnical monitoring wells in January 2015 for chemical analysis to evaluate groundwater quality;
4. Installed four groundwater monitoring wells and utilized five existing groundwater monitoring wells throughout the Site to establish groundwater flow; and collected nine groundwater samples in October 2015 for chemical analysis to evaluate groundwater quality; and
5. Installed nine soil vapor probes around Site perimeter and collected nine and one duplicate soil vapor samples and one ambient air sample for chemical analysis.
6. Fifty-six soil borings were installed across the entire project Site and 178 soil samples collected at a frequency of one per 800 cubic yards for the top 16 feet and one per 2,400 cubic yards below 16 feet below land surface for waste characterization analysis in preparation of soil disposal.

## **1.6 Summary of Findings of Remedial Investigation**

A remedial investigation was performed and the results are documented in a companion document called “Remedial Investigation Report, Two Fulton Square”, dated December 2015 (RIR).

1. Elevation of the property ranges from 35 to 59 feet.
2. Depth to groundwater ranges from 26 to 44 feet at the Site.
3. Groundwater flow is generally from east to west beneath the Site.

4. Bedrock was not reached at the final depth of the soil borings, approximately 48 ft bls. Approximate depth to bedrock is 100 ft bls; however, the elevation of the top of bedrock surface may be variable.
5. The stratigraphy of the Site, from the surface down, consists of three to seven feet of fill material consisting of brown fine to coarse sand with gravel and little brick and construction debris, underlain by a layer of brown to orange/brown, fine to coarse sand with little gravel. This layer extends to the water table and is interlaced by thin reddish brown silt and clay lenses ranging in thickness from 6-inches to 5 feet at the water table (approximately 35 ft bls).
6. Soil/fill samples results were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives and Restricted Residential Soil Cleanup Objectives (SCOs) as presented in 6NYCRR Part 375-6.8 and CP51. 24 soil/fill samples collected during the RI showed no PCBs in any sample. Several volatile organic compounds (VOCs) were detected with 1,2,4-trimethylbenzene (4,800 µg/kg) exceeding Unrestricted Use SCOs in one sample and ethylbenzene (max 3,300 µg/kg), naphthalene (max 94,000 µg/kg), xylenes (max 6,500 µg/kg) exceeding Unrestricted Use SCOs in soil boring SB-12. Tetrachloroethene (max 24 µg/kg) and trichloroethene (1.1 µg/kg) were also detected below their Unrestricted Use SCOs. Several semi-volatile organic compounds (SVOCs) consisting of Polycyclic Aromatic Hydrocarbons (PAH) compounds were detected but only naphthalene (max 13,000 µg/kg) exceeded Unrestricted Use SCOs in SB-12. Two pesticides, 4,4'-DDE (7.1 µg/kg) and 4,4'-DDT (8.06 µg/kg) were detected above Unrestricted Use SCOs in one sample. Several metals including arsenic (max 19 mg/kg), chromium (max 45 mg/kg), copper (max 180 mg/kg), lead (max. 79 mg/kg), and nickel (max. 66 mg/kg) were detected exceeding Unrestricted Use SCOs. Of these metals, arsenic and chromium also exceeded Restricted Residential SCOs.
7. Due to gross contamination observed in the northwestern corner of the Site, NYSDEC Spill #1506310 was called in and 11 additional soil borings installed around SB-12 to delineate the extent of the petroleum contamination. The 33 additional soil/fill samples collected showed elevated concentrations of VOCs including acetone (max 1,500 µg/kg), benzene (390 µg/kg), ethylbenzene (max 4,000 µg/kg), naphthalene (max 33,000 µg/kg), xylenes (max 5,100 µg/kg), 2-butanone (max 320 µg/kg), 1,2,4-trimethylbenzene (max 3,800 µg/kg), and 1,2-dichlorobenzene (max 2,100 µg/kg) detected above Unrestricted Use SCOs. Tetrachloroethene was also detected at a maximum of 48 µg/kg. SVOCs including naphthalene (max 37,000 µg/kg) was detected above Unrestricted Use SCOs with benz(a)anthracene (max 37,000 µg/kg), benzo(a)pyrene (max 32,000 µg/kg), benzo(b)fluoranthene (max 44,000 µg/kg) benzo(k)fluoranthene (max 13,000 µg/kg), chrysene (max 39,000 µg/kg), dibenzo(a,h)anthracene (max 6,200 µg/kg), and indeno(1,2,3-cd)pyrene (max 23,000 µg/kg) detected above Restricted Residential SCOs in one shallow sample at SB-23. Total PCBs was detected at a maximum of 58.1 µg/kg in these samples. Two pesticides, 4,4'-DDE (max 16 µg/kg) and 4,4'-DDT (max 55.8 µg/kg) were detected above Unrestricted Use SCOs. Several metals were also detected but only chromium (max 37 mg/kg) and nickel (max 38 mg/kg) were detected above Unrestricted Use SCOs.

8. Groundwater samples collected during the RI were compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQSs). A total of thirteen groundwater samples were collected from across the Site in January 2015 and October 2015. Groundwater samples results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS). Groundwater samples collected during the investigations showed no PCBs in any sample. Five (5) VOCs were detected above GQS, including 1,2-Dichloroethene (max 59 µg/L), chloroform (max 10 µg/L), cis-1,2-Dichloroethene (max 59 µg/L), tetrachloroethene (max 70 µg/L) and trichloroethene (max 130 µg/L). Several SVOCs were detected with benz(a)anthracene (0.11 µg/L), benzo(a)pyrene (0.25 µg/L), benzo(b)fluoranthene (0.46 µg/L), benzo(k)fluoranthene (0.13 µg/L), chrysene (0.29 µg/L), and indeno(1,2,3-cd)pyrene (0.23 µg/L) exceeding GQS in BW-3 and bis(2-ethylhexyl)phthalate (max 11 µg/L) exceeding its GQS in BW-6D. One pesticide, gamma-Chlordane (0.011 µg/L) was detected in RMW-01 at a concentration above GQS. Several dissolved metals were identified in groundwater but only magnesium (max. 74,300 µg/L), manganese (max. 3,874 µg/L), and sodium (max. 681,000 µg/L) exceeded their respective GQS.
9. Soil vapor results during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the New York State Department of Health (NYSDOH) in the NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Soil vapor samples collected during the RI showed elevated levels of petroleum-related VOCs. Total concentrations of petroleum-related VOCs (BTEX) ranged from 4.4 to 6884 µg/m<sup>3</sup>. Toluene was the highest detected compound with a maximum concentration of 6820 µg/m<sup>3</sup> in SV-06. Elevated levels of chlorinated VOCs were also detected with tetrachloroethylene (PCE) detected between 21.6 µg/m<sup>3</sup> and 13,300 µg/m<sup>3</sup>. Trichloroethene (TCE) was also detected between 9.62 µg/m<sup>3</sup> and 117 µg/m<sup>3</sup>. Concentrations for both PCE and TCE were detected well above the monitoring level ranges established within the State DOH soil vapor guidance matrix. 1,1,1-trichloroethane (TCA) was detected in one sample at 2.9 µg/m<sup>3</sup>, below the monitoring level ranges.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal 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**

- Remove contaminant sources causing impact to 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. 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 cellar levels and building foundation is

complete, additional excavation would be performed to ensure complete removal of soil/fill that does not meet Track 1 Unrestricted Use SCOs; and

- No Engineering or Institutional Controls are required for a Track 1 cleanup. As part of development, protective systems including waterproofing/vapor barrier and sub-grade ventilated parking would be installed to prevent potential exposures from soil vapor in the future.

### **Alternative 2:**

- Selection of NYSDEC 6NYCRR Part 375 Restricted Residential Use (Track 2) Soil Cleanup Objectives (SCOs);
- Removal of all soil/fill exceeding Track 2 Restricted Residential Use SCOs and confirmation that Track 2 Restricted Residential Use SCOs have been achieved with post-excavation end point 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 cellar levels and building foundation. According to the proposed development design, the proposed excavation depths range from 40 to 48 feet across the property, with the exception of the Prince Street Tower which will require excavation to a depth of approximately 16 feet below grade. 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 2 Restricted Residential Use SCOs;
- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a waterproofing/vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Installation of an active Sub Slab Depressurization System (SSDS) under the Prince Street Tower building (Site A);
- 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

- Placement of a deed notice to record the ECs/ICs on the deed to ensure that future owners of the Site continue to comply with the SMP, as required.

### **3.1 Threshold Criteria**

#### **Protection of Public Health and the Environment**

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

Alternative 1 would be protective of human health and the environment by removing all soil/fill exceeding Track 1 Unrestricted Use SCOs 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 2 Restricted Residential Use SCOs, as well as by placement of Institutional and Engineering Controls, including a composite cover system, waterproofing/vapor barrier, and a sub-slab depressurization 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 instituting a deed notice on the property would ensure that the composite cover system remains intact and protective of public health. Establishment of Track 2 Restricted Residential Use SCOs 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 and installing a sub-slab depressurization system for the Prince Street Tower.

### **3.2 Balancing Criteria**

#### **Compliance with Standards, Criteria and Guidance (SCGs)**

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

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCOs and Protection of Groundwater SCOs. 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 as part of development. In addition, the three lowest levels of the proposed construction will contain a parking garage with high volume air exchange that conforms to the NYC Building Code.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of soil to meet Track 2 Restricted Residential Use SCOs. 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, as well as installing/operating an active sub-slab depressurization system beneath the Prince Street Commercial Tower. A Site Management Plan would ensure that these controls remained protective for the long term. In addition, the three

lowest levels of the proposed building will contain a sub-grade parking garage with high volume air exchange that conforms to the NYC Building Code.

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 is increased truck traffic. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

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

### **Long-term effectiveness and permanence**

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of Engineering Controls/Institutional Controls (ECs/ICs) that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soil/fill above Track 1 Unrestricted Use SCO's. Removal of on-Site contaminant sources will also prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 2 Restricted Residential Use SCOs; installing a composite cover system across the Site; maintaining use restrictions; establishing an SMP to ensure long-term management of ICs and ECs; and instituting a restrictive declaration 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 SCOs. Alternative 2 would remove all of the historic fill at the Site, and all remaining on-Site soil/fill beneath the new building will meet Track 2 Restricted Residential Use SCOs. The removal of soil to a depth ranging from 40 to 48 feet for the new development and to a depth of 16 feet for the Prince Street Commercial Tower, in both scenarios would lessen the difference in contaminant mass removal between these two alternatives.

### **Implementability**

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

The techniques, materials and equipment to implement both Alternatives 1 and 2 are readily available and have been proven to be effective in remediating the contaminants present on the Site. They use standard equipment and technologies that are well established in the industry. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

### **Cost effectiveness**

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

Since historic fill at the Site was found to extend to a depth of up to seven feet below grade in some locations during the RI, and the new building requires excavation of the entire Site to a depth of 40 to 48 feet (with the exception of Prince Street Commercial Tower, which will be excavated to a depth of 16 ft bls), the costs associated with both Alternative 1 and Alternative 2 will likely be comparable. Costs associated with Alternative 1 could potentially be higher than Alternative 2 if soil with analytes above Track 1 Unrestricted Use SCOs is encountered below the excavation depth required for development. Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on 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 B. 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**

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 the construction of four towers over a podium. The podium will contain three stories with retail. The building footprint area will be approximately 142,000 square feet. The four new towers will consist of a commercial tower (Prince Street Commercial Tower), a mixed-use tower and two residential towers consisting of 307 residential units and community space. There will be three levels of underground parking. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 2 Restricted Residential Use 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 Site is bounded by 37<sup>th</sup> Avenue (and retail commercial properties) to the north, 39<sup>th</sup> Avenue (and retail commercial properties) to the south, Prince Street (and retail commercial properties) to the east and College Point Boulevard (and commercial properties) to the west. The areas surrounding the Site is urban and consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses, as shown on Figure 3. The development would remediate a contaminated lot and provide modern mixed use commercial and residential buildings. The proposed development would clean up the property

and make it safer, create new employment opportunities, 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 2 Restricted Residential Use SCOs, both of which are protective of public health and the environment 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, 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. The Site is in relatively close proximity (approximately 750 feet away from) the Flushing River, a tidal estuary; however, the remediation of the Site will not adversely impact this waterway. 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**

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, included in Appendix C.

### **Selection of the Preferred Remedy**

The preferred remedy for the site is Alternative 1, Track 1 Unrestricted Use SCOs. The Track 1 remedy will remove all soil/fill exceeding Unrestricted Use SCOs throughout the Site, which will be confirmed with post-excavation sampling. No Engineering Controls are required for a Track 1 cleanup. A concrete slab covering the entire site and waterproofing membrane would be installed as part of standard building development and are not considered part of the remedy. Due to elevated soil vapor levels, additional soil vapor management would be required under only the Prince Street Tower (Site A). Thus, Site A will achieve Track 2 Restricted Residential Use SCOs remedy. Use of the active SSDS as a long-term engineering control for vapor mitigation is permitted under a Track 2 remedy.

## **4.0 Remedial Action**

### **4.1 Summary of Preferred Remedial Action**

The preferred remedial action alternative is Alternative 1, the Track 1 remedial action for Site B and Alternative 2, the Track 2 remedial action for Site A. 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) for Site B and Restricted Residential Use (Track 2) SCOs for Site A.
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 for Site B and excavation and removal of soil/fill exceeding Restricted Residential Use (Track 2) SCOs for Site A. The entire footprint of the building area (about 95% of the property) will be excavated to a depth of approximately 40 to 48 feet below grade for development purposes. A small portion of property, Site A (under the Prince Street Commercial Tower), will be excavated to the depth of 16 feet below for development purposes. Approximately 300,000 cubic yards of soil/fill will be removed from the Site and properly disposed at an appropriately registered 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 any 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. Spill closure and any associated groundwater remediation will be managed under NYSDEC authority for Spill 1506310.
11. 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.
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of Track 1 and Track 2 SCOs for Site B and Site A respectively.
13. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
14. 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.
15. 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.
16. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
17. 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 for Site B, the following construction elements implemented as part of new development will constitute Engineering and Institutional

Controls. The following elements constitute Engineering and Institutional Controls for Site A, the Track 2 cleanup:

18. As part of development, construction of an engineered composite cover consisting of a six-inch thick concrete building slab with an 8-inch clean granular sub-base beneath all building areas, 4-inch poured concrete on a 6-inch sub-base in sidewalk areas, and two feet of clean soil in all open space and landscaped areas.
19. As part of development, installation of a vapor barrier system consisting waterproofing 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 20-mil vapor barrier below the slab throughout the full building area and a Grace Bituthene (or equivalent) vapor barrier system outside all sub-grade foundation sidewalls. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.
20. Installation and operation of an active sub-slab depressurization system under the Prince Street tower (Site A). The active SSDS will consist of a gravel trench beneath the concrete slab and above the foundation grade beams in a single lateral in the middle interior space of the new building footprint utilizing 10-ounce geotextile fabric wrapped  $\frac{3}{4}$ -inch gravel with 4-inch diameter schedule 40 perforated PVC pipes aligned horizontally and attached to an Ametek Rotron™ 2-Hp regenerative blower Model No. EN505AX72ML capable of 90 cfm and 45 in. of w.c. located in the maintenance room. The discharge of the blower will be connected to a 6-inch diameter vertical riser pipe, with vapors conveyed via a chase to be vented above the roof of the building (Refer to Plate 1). The regenerative blower will have a knockout tank and be installed in a sound attenuating enclosure with an in-line air filter on the inlet. A warning light will be provided and will be located in the maintenance office (or other location) to notify the building superintendent if the blower is not operating. Two soil vapor monitoring points are proposed to be installed within the Prince Tower building footprint as shown on Plate 2. During start-up of the blower, the soil vapor monitoring points will be used to confirm the presence of sub-slab vacuum.
21. As part of new development, construction and operation of three levels of a sub-cellar parking garage with high volume air exchange in conformance with NYC Building Code (in all new construction, with the exception of Site A, the Prince Street Commercial Tower).
22. Submission of an approved Site Management Plan (SMP) in the Remedial Action Plan (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
23. If Track 1 SCOs are not achieved for Site B, recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and Institutional Controls and a requirement that management of these controls must be in compliance with an approved

SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

## 4.2 Soil Cleanup Objectives and Soil/ Fill Management

Track 1 SCOs are proposed for Site B of this project and SCOs are defined in 6 NYCRR Part 375, Table 6.8(a) Track 1 Unrestricted Use. Track 2 SCOs are proposed for Site A of this project and SCOs are defined in 6 NYCRR Part 375, Table 6.8(b) Track 2 Restricted Residential Use. If Track 1 or 2 SCOs are not achieved, the following Track 4 Site-Specific SCOs will be utilized for this project:

<b><u>Contaminant</u></b>	<b><u>Site-Specific SCO's</u></b>
Total SVOCs	100 ppm
Lead	800 ppm
Mercury	1.5 ppm
Arsenic	23 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 D.

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 location of planned excavations is shown in Plate 1. The total quantity of soil/fill expected to be excavated and disposed off-Site is 300,000 cubic yards. For each disposal facility to be used in the remedial action, a letter from the developer/QEP to the receiving facility requesting approval for disposal and a letter back to the developer/QEP providing approval for disposal will be submitted to OER prior to any transport and disposal of soil at a facility. Additional disposal

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

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
Santilli Commercial Developers LLC, 350 Old Northport Road, Kings Park, NY	Non-hazardous soil meeting NY Part 375 Unrestricted Use and the lower of NY Residential and NY Protection of Groundwater SCOs.	TBD
Calverton Industries LLC, 4331 Middle Country Road, Calverton, NY	Non-hazardous soil meeting NY Part 375 Unrestricted Use and the lower of NY Residential and NY Protection of Groundwater SCOs.	TBD

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

### **End-point Sampling**

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

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

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

### **Confirmation End-point Sampling**

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Confirmation samples will be collected from the base of the excavation at locations to be determined by OER. Once confirmation end-point sampling locations are determined, a Site plan depicting sampling location and designations will be provided in an addendum to this RAWP. To evaluate attainment of Track 1 and Track 2 SCOs, analytes will include VOCs, SVOCs, pesticides, PCBs and metals according to analytical methods described above.

### **Hotspot End-point Sampling**

End-point samples will be collected from the sidewalls and base of excavation at the hotspot location (i.e., in the area of Spill #1506310) identified in the Remedial Investigation, according to the procedure listed below. The hotspot includes SB-12, SB-13, SB-15, SB-18, SB-20, and SB-22 for VOCs and SVOCs-. End-point samples will be analyzed for SCO trigger parameters, to be determined by OER.

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

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
  - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.

- For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
  4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

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

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

### **Quality Assurance/Quality Control**

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 to document that samples are representative of actual conditions at the Site and identify possible cross contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or by laboratory techniques that may have introduced systematic or random errors to the analytical process. QA/QC samples including field

blanks, and trip blanks, and duplicates, will be collected and analyzed at rates in accordance with DER-10.

### **Import of Soils**

Soil import is not planned on this project.

### **Reuse of Onsite Soils**

Soil reuse is not planned on this project.

## **4.3 Engineering Controls**

The remedial action will achieve Track 1 Unrestricted Use SCOs for Site B and Track 2 Restricted Residential Use SCOs for Site A. No Engineering Controls are required for Site B, however, the following design elements will be incorporated into the project as part of the development for Site B and serve as Engineering Controls to address residual contamination remaining at Site A:

- (1) Composite Cover System
- (2) Soil Vapor Barrier System
- (3) Active Sub-Slab Depressurization System
- (4) Sub-grade Ventilated Parking Garage

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

### **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 reinforced concrete slabs and a parking garage, all of which covers the entire Site. The specific design of this composite cover system will be determined at a future date. An example of possible composite cover system is comprised of 6-inches of reinforced concrete slab underlain by 8 inches of clean sub-

base material in building areas; 4 inches of asphalt pavement underlain by 6 inches of clean sub-base material in parking areas, and 2 feet of clean soil in open space areas. Once design of the composite cover system is complete, a composite cover system plan will be provided in an addendum to this RAWP.

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

### **Vapor Barrier System**

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of a 20-mil geomembrane or its equivalent will be installed beneath the building slab and up the sidewalls according to manufacturer specifications. All penetrations (including the sub-slab depressurization solid 4-inch diameter pipe and soil vapor monitoring points) will be sealed with manufacturer supplied material (i.e., tape).

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

A plan view showing the location of the proposed vapor barrier system will be provided as an addendum to the Remedial Action Work Plan once design is complete. Typical design sections for the vapor barrier on slab and sidewalls will also be provided in the addendum. A detailed description including manufacturer's specifications will be submitted as part of the building design, and can be found in Appendix E. 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 for Site A 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 Prince Street Commercial Tower (Site A) will be mitigated with the construction of an active Sub-Slab Depressurization System (SSDS). The active SSDS will consist of a gravel trench beneath the concrete slab and above the foundation grade beams in a single lateral in the middle interior space of the new building footprint utilizing 10-ounce geotextile fabric wrapped  $\frac{3}{4}$ -inch gravel with 4-inch diameter schedule 40 perforated PVC pipes aligned horizontally and attached to an Ametek Rotron™ 2-Hp regenerative blower Model No. EN505AX72ML capable of 90 cfm and 45 in. of w.c. located in the maintenance room. The discharge of the blower will be connected to a 6-inch diameter vertical riser pipe, with vapors conveyed via a chase to be vented above the roof of the building (Refer to Plate 1). The regenerative blower will have a knockout tank and be installed in a sound attenuating enclosure with an in-line air filter on the inlet. A warning light will be provided and will be located in the maintenance office (or other location) to notify the building superintendent if the blower is not operating. Two soil vapor monitoring points are proposed to be installed within the Prince Tower building footprint as shown on Plate 2. During start-up of the blower, the soil vapor monitoring points will be used to confirm the presence of sub-slab vacuum. The blower cut sheet is provided in Appendix F. The configuration of the anticipated SSDS design for the Site is

shown in Plate 2. Start up and system performance verification procedures would be provided in the Site Management Plan as necessary.

The SSDS is a permanent engineering control for Site A. 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 Plate 2. A typical section of the system is shown in Plate 2.

#### **4.4 Institutional Controls**

A Track 1 remedial action is proposed for Site B and Institutional Controls are not required for Site B. If a Track 1 remedial action is not achieved for Site B, 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 for Site A (and Site B if Track 1 remedial action is not achieved) would be:

- Recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the SMP, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;
- Submittal of a SMP in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, inspection, and certification of ECs and IC's. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determine by OER in the SMP and will comply with RCNY §43-1407(1)(3).

- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for mixed 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 for Site B and Site Management is not required. If a Track 1 remedial action is not achieved for Site B, Site Management will be required and will be the last phase of remediation. Site Management is required for a Track 2 remedial action (Site A). 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 VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk under current and future conditions by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

#### **Known and Potential Contaminant Sources**

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

Soil:

- SVOCs, specifically PAHs; and
- One metal (arsenic) exceeding Restricted Residential Use SCOs
- Pesticides, including 4,4'-DDE, 4,4'-DDT and endrin were identified, but did not exceed Restricted Residential Use SCOs.

Groundwater:

- Chlorinated VOCs, and chloroform;
- SVOCs, specifically PAHs, and one phthalate;

- Metals, including antimony, manganese, magnesium, iron, and sodium; and
- One pesticide in one sample, gamma-Chlordane.

Soil Vapor:

- Tetrachloroethene and Trichloroethene at elevated levels;

## **Nature, Extent, Fate and Transport of Contaminants**

Soil: Soil samples collected during the RI were compared to NYSDEC Part 375 Table 375-6.8(a) and (b) Soil Cleanup Objectives (SCOs) for Unrestricted Use and Restricted Residential Use. Gross contamination was observed in the northwestern corner of the Site which resulted in the opening of NYSDEC Spill # 1506310. The soil investigation detected concentrations of petroleum related VOCs exceeding UUSCOs in deep soil samples in the northwestern corner of the Site. The shallow and deep soil samples from both the RI borings and delineation borings did not contain any exceedances of RRSCOs for VOCs. The shallow soil samples did not contain any exceedances of UUSCOs or RRSCOs for SVOCs in any soil borings with the exception of SB-23, which exceeded UUSCOs and RRSCOs for PAHs. Two of the deep soil samples exceeded UUSCOs for naphthalene only. Three of the deep soil samples from the exceeded both UUSCOs and RRSCOs for benzo[a]anthracene (ranging from 1,100 to 83,000 micrograms per kilogram [ $\mu\text{g}/\text{kg}$ ]) and chrysene (ranging from 10,000 to 13,000  $\mu\text{g}/\text{kg}$ ). Metals including nickel, arsenic, chromium, copper, and lead, were detected at concentrations exceeding the UUSCOs across the Site and at varying depths. In one soil boring, SB-04(16-18), arsenic was detected at a concentration that exceeded the RRSCOs with 19 milligrams per kilogram ( $\text{mg}/\text{kg}$ ). Nickel, chromium, copper, and lead were detected above UUSCOs in the shallow samples. Chromium and nickel were detected at concentrations exceeding their UUSCOs in the deeper soil samples (from 16 to 48 ft bls). There were no detections of PCBs exceeding UUSCOs in soil samples at the Site. Pesticides, including 4,4'-DDE, 4,4'-DDT and endrin, were detected at concentrations exceeding the UUSCOs in four shallow soil samples. The maximum concentration of 4,4'-DDE was 16  $\mu\text{g}/\text{kg}$  and the maximum concentration of 4,4'-DDT was 15.8  $\mu\text{g}/\text{kg}$ , both in SB-18(0-2). The only concentration of endrin was 25.6  $\mu\text{g}/\text{kg}$ , detected in SB-23(0-2). There were no pesticides detected in soil samples at concentrations exceeding RRSCOs.

The presence of VOCs and SVOCs in soil supports the field observations of petroleum contaminated soil, especially in the vicinity of open New York State Department of Environmental Conservation (NYS DEC) Spill 1506310. The observed petroleum impacts in the northwest corner of the Site, were directly underlain by a low permeability silty clay layer. This low permeability layer was approximately 3 to 5 feet above groundwater. A groundwater sample collected from within the “spill area” did not contain any exceedances of VOCs or SVOCs above GQSs. In the vicinity of the “spill area”, BTEX compounds were detected in soil vapor samples.

Groundwater: Groundwater samples collected during the RI were compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQSs). A total of thirteen groundwater samples were collected from across the Site in January 2015 and October 2015. Six groundwater samples exceeded GQSs for chlorinated VOCs. Trichloroethene (TCE) was detected in groundwater samples from BW-8D, BW-3, BW-7D, and RMW-2 at concentrations ranging from 5.4 micrograms per liter ( $\mu\text{g/L}$ ) to 130  $\mu\text{g/L}$ . Tetrachloroethene (PCE) was detected in groundwater samples from BW-8D, BW-2, and RMW-2 at concentrations ranging from 9.3  $\mu\text{g/L}$  to 70  $\mu\text{g/L}$ . Both cis-1,2-dichloroethene and 1,2-dichloroethene (total) were detected at a concentration of 59  $\mu\text{g/L}$  in BW-8D. Chloroform was detected in groundwater at RMW-3 at a concentration of 10  $\mu\text{g/L}$ . SVOCs were detected above GQSs in two groundwater samples. Eight groundwater samples (BW-1, BW-3, BW-6D, BW-7D, BW-8D, RMW-2, RMW-3, and RMW-4), and one duplicate (BW-6D), exceeded GQSs for sodium in both total (ranging from 26,600  $\mu\text{g/L}$  to 514,000  $\mu\text{g/L}$ ) and dissolved phase (ranging from 26,100  $\mu\text{g/L}$  to 681,000  $\mu\text{g/L}$ ). Magnesium concentrations exceeded GQSs in four groundwater samples (BW-1, BW-6D, BW-7D, and BW-8D). Manganese was detected above GQSs in five samples (BW-1, RMW-01, RMW-2, RMW-3, and RMW-4) at concentrations ranging from 862.2  $\mu\text{g/L}$  to 3,510  $\mu\text{g/L}$  for total manganese and 849.1  $\mu\text{g/L}$  to 3,874  $\mu\text{g/L}$  for dissolved manganese. At RMW-01, iron concentrations exceeded in both total (7,240  $\mu\text{g/L}$ ) and dissolved phase (2,220  $\mu\text{g/L}$ ). At BW-8D and RMW-4 only total iron exceeded GQSs at a concentration of 2,460  $\mu\text{g/L}$  and 600  $\mu\text{g/L}$ , respectively. At BW-3, antimony exceeded GQSs with a concentration of 3.51  $\mu\text{g/L}$ . There were no exceedances of PCBs in groundwater samples. One groundwater

sample (RMW-01) exceeded GQSs for pesticides with a detection of gamma-Chlordane at a concentration of 0.011 µg/L.

The highest concentrations of TCE and PCE in groundwater are localized to the southeastern portion of the Site. With groundwater flowing from east to west, these elevated concentrations support the supposition that the likely source of contamination is a result of the historic use of the adjacent property (Lot 43) as a Large Quantity Generator of PCE. These detections of CVOCs above their respective GQSs are not reflected in soil sample results, however, the highest concentration of CVOCs in soil vapor is also concentrated in the southeastern portion of the site, directly downgradient of Lot 43.

Soil Vapor: Soil vapor samples collected during the RI were compared to the Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006. Nine soil vapor samples were collected from the two foot interval above the groundwater table, and analyzed for VOCs using method TO-15. Concentrations of multiple petroleum related (BTEX) and chlorinated VOCs were detected in all nine soil vapor samples. Maximum BTEX concentrations include benzene at 3.45 µg/m<sup>3</sup> in SV-2, ethylbenzene at 298 µg/m<sup>3</sup> in SV-01, toluene at 6,820 µg/m<sup>3</sup> in SV-06, and total xylenes at 1,790 µg/m<sup>3</sup> in SV-01. Soil vapor detections of TCE can be compared to Matrix 1 and PCE and cis-1,2-DCE to Matrix 2. TCE was detected in six soil vapor samples (SV-01, SV-02, SV-03, SV-04, SV-05 and SV-09) at concentrations ranging from 11.8 µg/m<sup>3</sup> in SV-03 to 117 µg/m<sup>3</sup> in SV-01. PCE was detected seven soil vapor samples (SV-01, SV-03, SV-04, SV-05, SV-06, SV-08 and SV-09) at concentrations ranging from 21.6 µg/m<sup>3</sup> in SV-09 to 13,300 µg/m<sup>3</sup> in SV-01. 1,1,1-TCA was detected in SV-03 at a concentration of 0.532 µg/m<sup>3</sup>. Carbon tetrachloride, Cis-1,2-DCE, 1,1-DCE and vinyl chloride were not detected in any soil vapor samples during this RI.

## **Receptor Populations**

On-Site Receptors: The site is currently an active construction site and access to the Site is restricted by an 8 foot high, chained and locked, perimeter fence. Onsite receptors are limited to

construction workers, site representatives, and visitors. Under proposed future conditions, potential on-site receptors include adult and child building residents, workers and visitors.

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

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/ Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools and Daycare Facilities – 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 an active construction site with potential exposure pathways from ingestion, inhalation, or dermal absorption of soil/ fill. 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. Because the Site is currently undeveloped, there is no potential for soil vapor to accumulate on Site.

*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 expected. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

*Proposed Future Conditions:* Under future remediated conditions, all soils in excess of Track 1 or Track 2 SCOs will be removed. The Site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls for Site A (vapor barrier/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 ventilated sub-grade parking garage/passive subsurface vapor barrier system for the buildings. 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 Charles McGuckin (PE), Sin Senh (QEP), and Jessica Collins (Project Manager). The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Charles McGuckin and Sin Senh, respectively.

### **5.2 Site Security**

Site access will be controlled by gated entrances to the fenced property. Site access will be controlled by DOB approved construction fence. For work areas of limited size, barrier tape will be sufficient to delineate and restrict access.

### **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 G. The Site Safety Coordinator will be MaryBeth Lyons. 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 VOCs and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection, for instance, will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park,

or adjacent to a school or residence. Exceedances of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Report.

### **VOC Monitoring, Response Levels, and Actions**

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/m<sup>3</sup>) 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/m<sup>3</sup> 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/m<sup>3</sup> 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/m<sup>3</sup> of the upwind level and in preventing visible dust migration.

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

## **5.6 Agency Approvals**

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

## **5.7 Site Preparation**

### **Pre-Construction Meeting**

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

## **Mobilization**

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

## **Utility Marker Layouts, Easement Layouts**

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

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

## **Dewatering**

Dewatering is anticipated during remediation and construction.

Dewatering will be performed in order to excavate soil and fill material below the water table (expected to be approximately thirty feet below grade). Dewatering for this site will utilize a

pumping system, settling tanks, and possibly a treatment system prior to discharge into the city sewer system. All required permits will be obtained from NYCDEP prior to any discharge of groundwater into the sewer system.

### **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](http://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 4.

## **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.

An alpha-numeric site map will be used to identify locations described in reports submitted to OER and is shown in Plate 1.

## **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 for Site A (and for Site B 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 for Site A (and for Site B 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;
- Recorded Declaration of Covenants and Restrictions (for Site B 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, Charles McGuckin, 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 Two Fulton Square (133-31 39<sup>th</sup> Avenue, Queens, New York) site, site number 16CVCP042Q. I certify to the following:

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

Name

PE License Number

Signature

Date

PE Stamp

I, Sin Senh, am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the Two Fulton Square (133-31 39<sup>th</sup> Avenue, Queens, New York) site, site number 16CVCP042Q. I certify to the following:

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

QEP Name

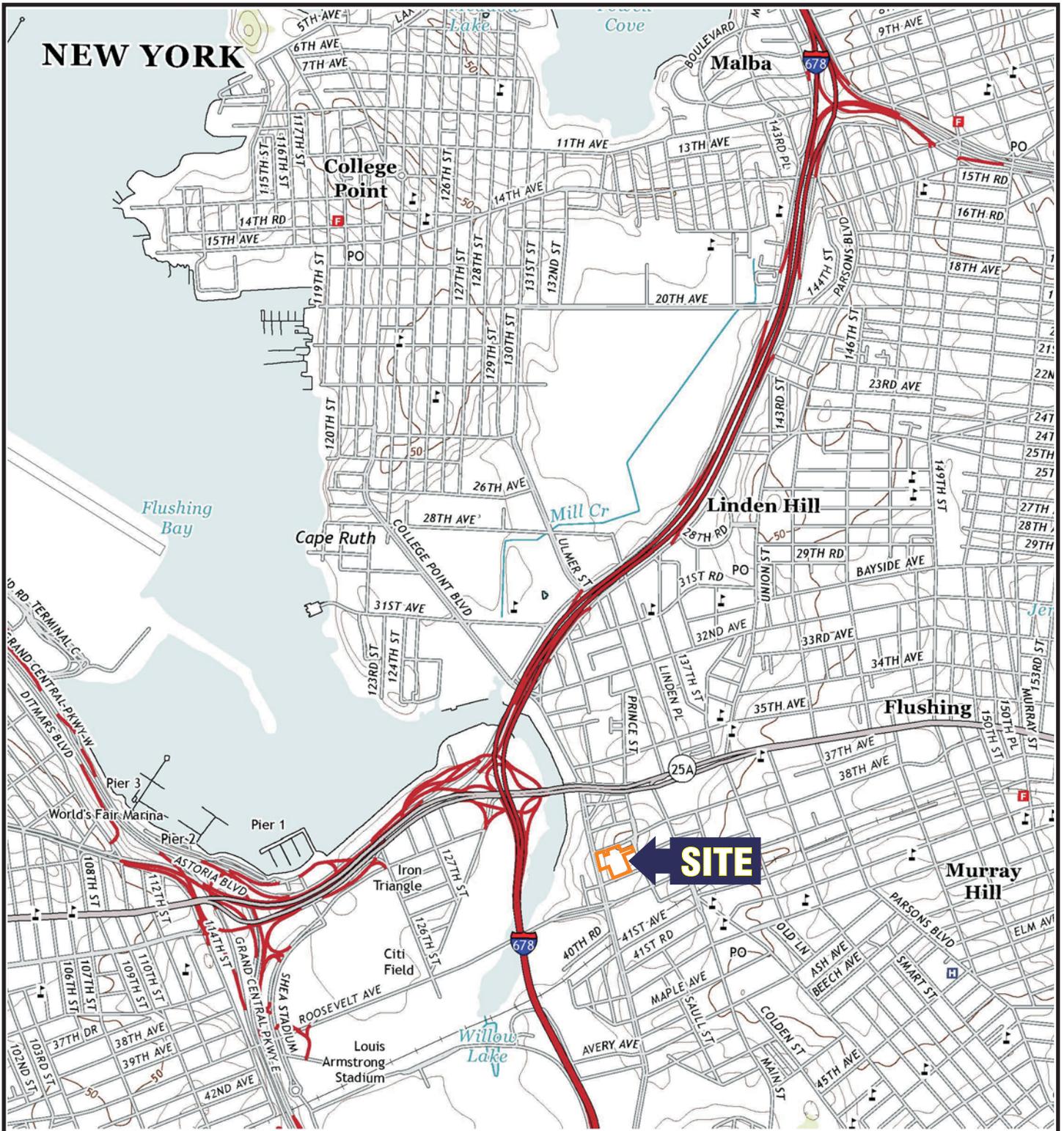
QEP Signature

Date

## 7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, an 18 month remediation period is anticipated.

<b>Schedule Milestone</b>	<b>Weeks from Remedial Action Start</b>	<b>Duration (weeks)</b>
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization	0	-
Remedial Excavation	1	72
Construct Composite Cover System	72	24
Construct Sub-Slab Depressurization System/Install Vapor Barrier	52	28
Demobilization	80	2
Submit Remedial Action Report	80	8



**QUADRANGLE LOCATION**



SOURCE:  
USGS; 2013, FLUSHING, NY  
7.5 Minute Topographic Quadrangle



Title:

**SITE LOCATION MAP**

REMEDIAL ACTION WORK PLAN  
133-31 39TH AVENUE, FLUSHING, NEW YORK 11354

Prepared for:

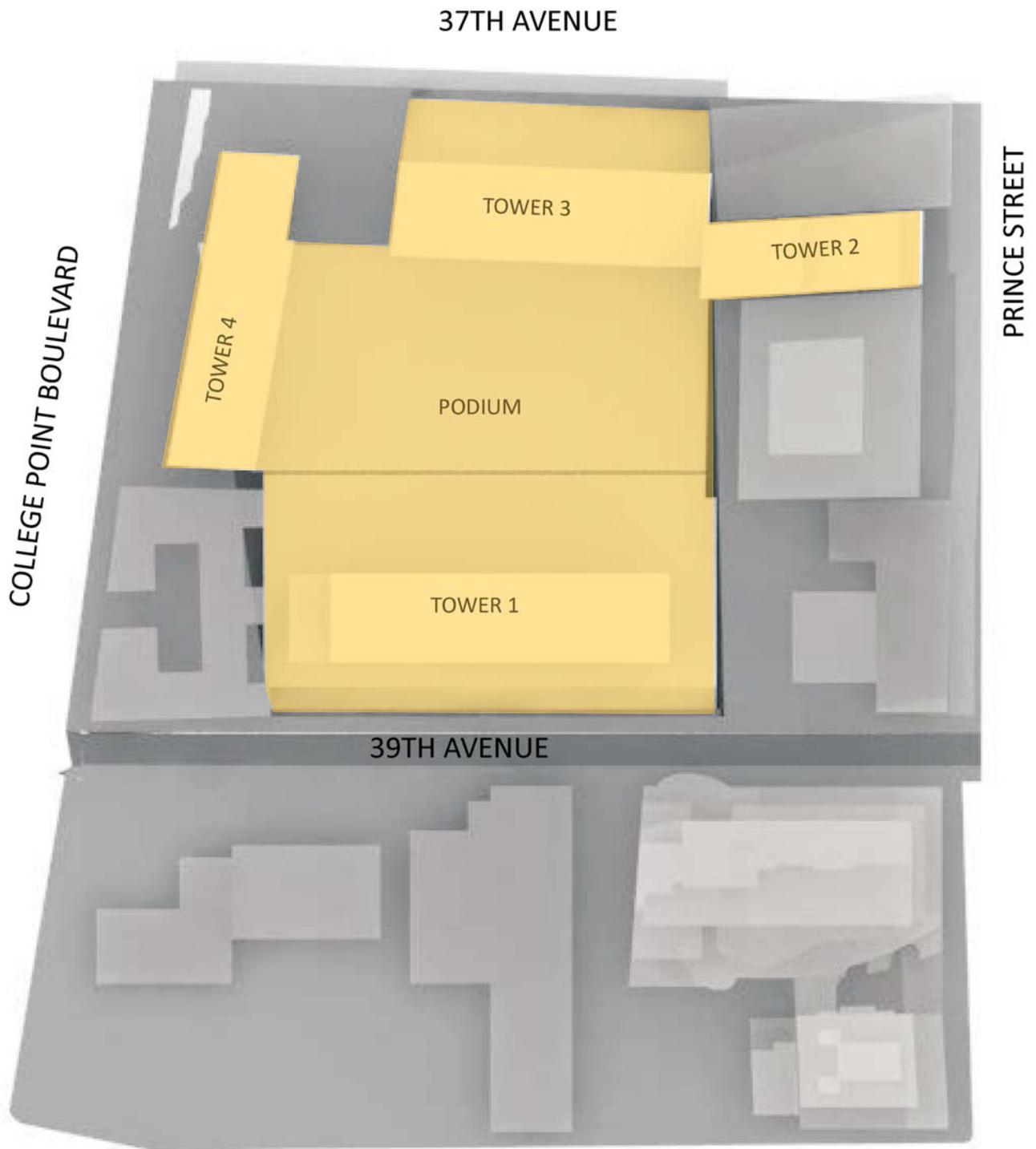
**TWO FULTON SQUARE, LLC**

**ROUX**  
ROUX ASSOCIATES, INC.  
Environmental Consulting  
& Management

Compiled by: L.D.	Date: 01DEC15
Prepared by: B.H.C.	Scale: AS SHOWN
Project Mgr.: J.C.	Project No.: 1633.0008Y000
File: 1633.0008Y115.03.CDR	

FIGURE

**1**



V:\CAD\PROJECTS\1633\10008Y115\1633\_0008Y115.03.CDR



Title:

## REDEVELOPMENT PLAN

REMEDIAL ACTION WORK PLAN  
133-31 39TH AVENUE, FLUSHING, NEW YORK 11354

Prepared for:

TWO FULTON SQUARE, LLC

<b>ROUX</b> ROUX ASSOCIATES, INC. <i>Environmental Consulting &amp; Management</i>	Compiled by: J.G.	Date: 01DEC15	FIGURE  <b>2</b>
	Prepared by: G.M.	Scale: AS SHOWN	
	Project Mgr.: W.S.	Project No.: 1633.0008Y000	
	File: 1633.0008Y115.03.CDR		



**LEGEND**

 PROJECT BOUNDARY



0  80'  
APPROXIMATE SCALE

Title:

**SURROUNDING LAND USE**

REMEDIAL ACTION WORK PLAN  
133-31 39TH AVENUE, FLUSHING, NEW YORK 11354

Prepared for:

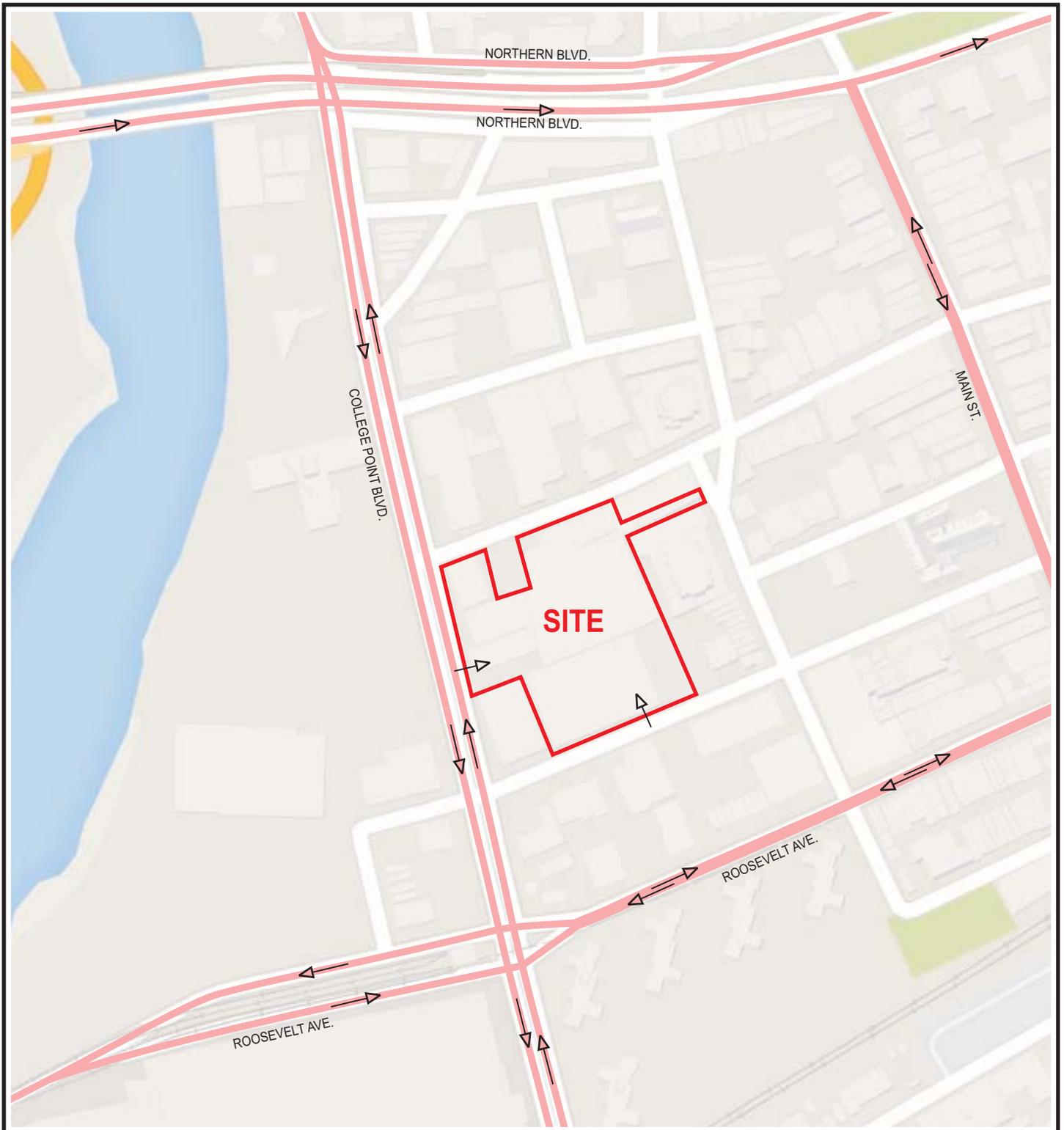
**TWO FULTON SQUARE, LLC**

**ROUX**  
ROUX ASSOCIATES, INC.  
*Environmental Consulting  
& Management*

Compiled by: J.G.	Date: 01DEC15
Prepared by: G.M.	Scale: AS SHOWN
Project Mgr.: W.S.	Project No.: 1633.0008Y000
File: 1633.0008Y115.03.CDR	

FIGURE

**3**



**LEGEND**

-  TRUCK ROUTE
-  SITE BOUNDARY



Title:

**TRUCK ROUTE**

REMEDIAL ACTION WORK PLAN  
133-31 39TH AVENUE, FLUSHING, NEW YORK 11354

Prepared for:

**TWO FULTON SQUARE, LLC**

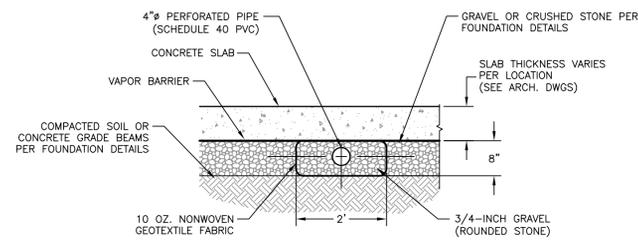
**ROUX**  
ROUX ASSOCIATES, INC.  
*Environmental Consulting  
& Management*

Compiled by: L.D.	Date: 30NOV15
Prepared by: G.M.	Scale: AS SHOWN
Project Mgr.: J.C.	Project No.: 1633.0008Y000
File: 1633.0008Y115.02.CDR	

FIGURE

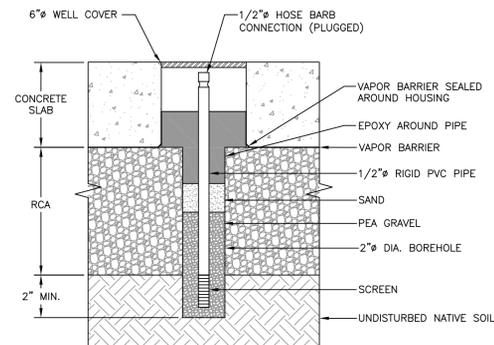
**4**





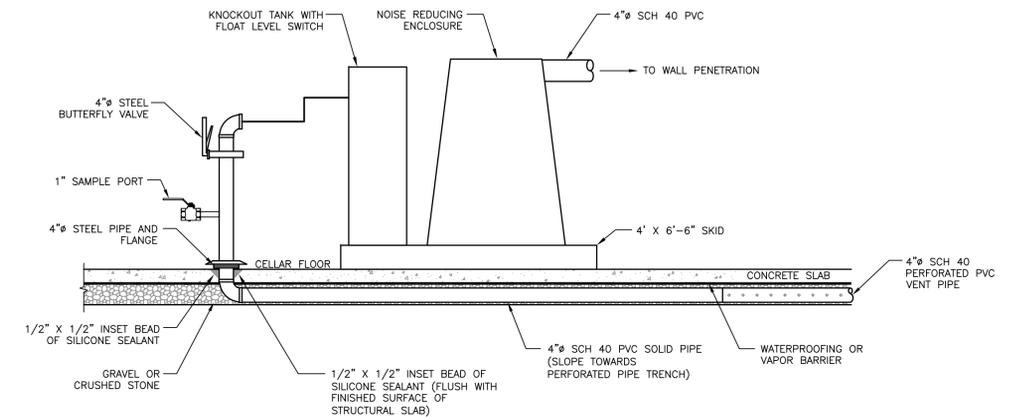
1 SUB-SLAB DEPRESSURIZATION SYSTEM PIPE DETAIL

SCALE: NOT TO SCALE



2 SOIL VAPOR MONITORING POINT DETAIL

SCALE: 1" = 4'



3 BLOWER DETAIL

SCALE: NOT TO SCALE

NOTES

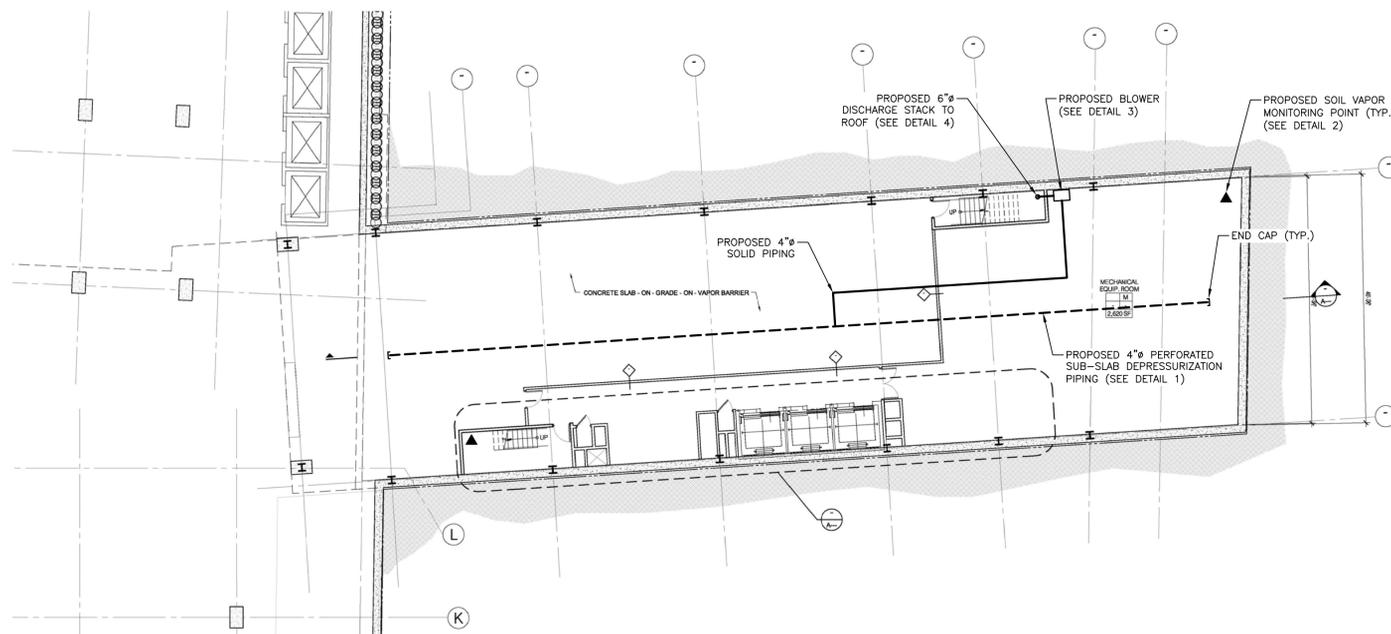
1. CONTRACTOR SHALL COORDINATE WITH PLUMBING, MECHANICAL, CIVIL AND ELECTRICAL CONTRACTORS FOR ALL UTILITY CROSSINGS.
2. THE PERFORATED PIPE MAY BE ROUTED AROUND OR UNDERNEATH ANY UTILITY LINES (SEWER, WATER, GAS), AS REQUIRED AND AS APPROVED BY THE ENGINEER.
3. THE SURFACES TO BE LINED WITH GEOTEXTILE SHALL BE FREE OF ALL ROCKS, STONES, SHARP OBJECTS OR CONSTRUCTION DEBRIS OF ANY KIND.
4. INSTALL GEOTEXTILE NONWOVEN FABRIC DIRECTLY ON FILL. MATERIAL OVERLAPS SHALL BE A MINIMUM OF 12" THE OVERLAPPED SEAMS WILL BE SEALED WITH TAPE.
5. ALL PENETRATIONS THROUGH THE SLAB ON GRADE (SOG) SHALL BE SEALED USING A SILICONE BASED WATERPROOF SEALANT OR EQUIVALENT.

NOTES

1. DEPICTED LOCATIONS OF SOIL VAPOR MONITORING POINTS ARE APPROXIMATE AND SHALL BE COORDINATED AND CONFIRMED WITH TWO FULTON SQUARE, LLC AND THE PRIOR CONSTRUCTION ENGINEER.

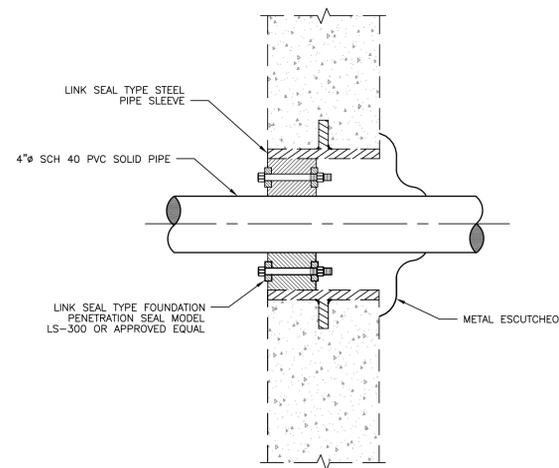
NOTES

1. PROVIDE ELECTRICAL/CONTROL CONDUIT TO BLOWER. COORDINATE WITH ELECTRICAL CONTRACTOR.
2. ELECTRICAL CONDUIT SHALL BE SIZED FOR 230/460 VOLT, THREE PHASE, 20 AMPS 60 HZ, FOR BLOWER MOTOR.
3. THE BLOWER SHALL BE A 2 HP, AMETEK ROTRON MODEL OR APPROVED EQUAL.
4. THE BLOWER SHALL BE PROVIDED WITH A NOISE REDUCING ENCLOSURE MODEL SAE30W2F WITH 1/3 HP VENTILATION FAN OR APPROVED EQUAL.
5. THE BLOWER SKID SHALL INCLUDE ENCLOSURE, CONTROL PANEL, AMETEK ROTRON MODEL MS300DS KNOCKOUT TANK (WITH HIGH LEVEL ALARM), VACUUM RELIEF VALVE, INLINE FILTER GAUGES, AND INTERCONNECTING PIPING/FITTINGS.
6. PROVIDE ALARM LIGHT INDICATING SYSTEM SHUT DOWN. SPECIFIC LOCATION TO BE COORDINATED AND CONFIRMED WITH TWO FULTON SQUARE, LLC AND ROUX ASSOCIATES.



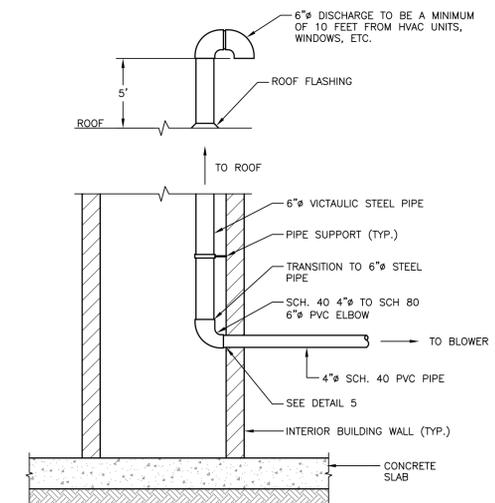
PROPOSED SUB-SLAB DEPRESSURIZATION PIPING

SCALE: 1/16" = 1'



5 WALL PIPE PENETRATION DETAIL

SCALE: NOT TO SCALE



4 VERTICAL RISER TO ROOF DETAIL

NOT TO SCALE

Title:			
<b>SUB-SLAB DEPRESSURIZATION SYSTEM AND DETAILS</b>			
REMEDIAL ACTION WORK PLAN 133-31 39TH AVENUE, FLUSHING, NEW YORK			
Prepared For:			
TWO FULTON SQUARE, LLC			
<b>ROUX</b> ROUX ASSOCIATES, INC. Environmental Consulting and Management	Compiled by: L.D.	Date: 01DEC15	PLATE
	Prepared by: G.M.	Scale: AS SHOWN	
	Project Mgr: J.C.	Project: 1633.0008Y002	<b>2</b>
	File: 1633.0008Y115.01.DWG		

**APPENDIX A**

**PROPOSED DEVELOPMENT PLANS**

## **APPENDIX B**

### **CITIZEN PARTICIPATION PLAN**

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

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

(BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at [brownfields@cityhall.nyc.gov](mailto:brownfields@cityhall.nyc.gov).

**Repositories:** A document repository is maintained online. Internet access to view OER's document repositories is available at public libraries. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. The library nearest the Site is:

Queens Library at Flushing

41-17 Main Street, Flushing, New York 11355

(718) 661-1200

Monday through Thursday- 9:00 AM – 9:00 PM

Friday- 9:00 AM – 7:00 PM

Saturday- 10:00 AM – 5:00 PM

Sunday- 12:00 PM – 5:00 PM

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

**Issues of Public Concern:**

There are no specific issues of concern to stakeholders proximate to the project Site.

**Public Notice and Public Comment:** Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository

information, and important phone and email contact information. All notices will be reviewed and approved by OER prior to distribution and mailed by the Enrollee. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

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

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

## APPENDIX C

### SUSTAINABILITY STATEMENT

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

**Reuse of Clean, Recyclable Materials and Reduced Consumption of Non-Renewable Resources:** Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

**Reduced Energy Consumption and Promotion of Greater Energy Efficiency:** Reduced energy consumption lowers greenhouse gas emissions, improves local air quality, lessens in-city power generation requirements, can lower traffic congestion, and provides substantial cost savings.

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

**Conversion to Clean Fuels:** Use of clean fuel improves NYC's air quality by reducing harmful emissions.

Natural gas will be utilized for fuel in the new building.

An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

**Recontamination Control:** Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.

An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

**Stormwater Retention:** Stormwater retention improves water quality by lowering the rate of combined stormwater and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

An estimate of the enhanced stormwater retention capability of the redevelopment project will be included in the RAR.

**Linkage with Green Building:** Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.

The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

**Paperless Voluntary Cleanup Program:** Two Fulton Square LLC is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic

documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

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

**Trees and Plantings:** Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

## **APPENDIX D**

### **SOIL/MATERIALS MANAGEMENT PLAN**

#### **1.1 Soil Screening Methods**

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

#### **1.2 Stockpile Methods**

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

All stockpile activities will be compliant with applicable laws and regulations. Soil stockpile areas will be appropriately graded to control run-off in accordance with applicable laws and regulations. Stockpiles of excavated soils and other materials shall be located at least of 50 feet from the property boundaries, where possible. Hay bales or equivalent will surround soil stockpiles except for areas where access by equipment is required. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

### **1.3 Characterization of Excavated Materials**

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

### **1.4 Materials Excavation, Load-Out, and Departure**

The PE/QEP overseeing the remedial action will:

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

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

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

## **1.5 Off-Site Materials Transport**

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

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

## **1.6 Materials Disposal Off-Site**

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

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of

all material will include records and approvals for receipt of the material. This information will be presented in the final remedial report.

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

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

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

## **1.7 Materials Reuse On-Site**

Soil and fill that is derived from the property that meets the Soil Cleanup Objectives (SCOs) established in this plan may be reused on-Site. The SCOs for on-Site reuse are listed in Section 4.2 of this cleanup plan. 'Reuse on-Site' means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on land with comparable levels of contaminants in soil/fill material, compliant with

applicable laws and regulations, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this remedial plan are followed. The expected location for placement of reused material is shown in Section 4.2.

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

## **1.8 Demarcation**

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

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

## **1.9 Import of Backfill Soil From Off-Site Sources**

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill

and cover soil quality objectives for this Site. Imported soils will not exceed groundwater protection standards established in Part 375. Imported soils for Track 1 remedial action projects will not exceed Track 1 SCO's.

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

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

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

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the final remedial report. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

## **1.10 Fluids Management**

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

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

## **1.11 Stormwater Pollution Prevention**

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

## **1.12 Contingency Plan for Unknown Contamination Sources**

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER.

Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

## **1.13 Odor, Dust, and Nuisance Control**

### **Odor Control**

All necessary means will be employed to prevent on- and off-Site odor nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open

excavations with tarps and other covers; and (c) use of foams to cover exposed odorous soils. If odors develop and cannot otherwise be controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; and (e) use of chemical odorants in spray or misting systems.

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

## **Dust Control**

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

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

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

## **Other Nuisances**

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

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

**APPENDIX E**

**MANUFACTURER SPECIFICATION FOR WATERPROOFING/VAPOR  
BARRIER**

# Grace Below Grade Waterproofing

## BITUTHENE® SYSTEM 4000

Self-adhesive HDPE waterproofing membrane with super tacky compound for use with patented, water-based Bituthene® System 4000 Surface Conditioner

### Description

Bituthene® System 4000 Waterproofing Membrane is a 1.5 mm (1/16 in.) flexible, pre-formed membrane which combines a high performance, cross laminated, HDPE carrier film with a unique, super tacky, self-adhesive rubberized asphalt compound.

Bituthene® System 4000 Surface Conditioner is a water-based, latex surface treatment which imparts an aggressive, high tack finish to the treated substrate. It is specifically formulated to bind site dust and concrete efflorescence, thereby providing a suitable surface for the Bituthene® System 4000 Waterproofing Membrane.

Conveniently packaged in each roll of membrane, Bituthene® System 4000 Surface Conditioner promotes good initial adhesion and, more importantly, excellent permanent adhesion of the Bituthene® System 4000 Waterproofing Membrane. The VOC (Volatile Organic Compound) content of this product is 100 g/L.

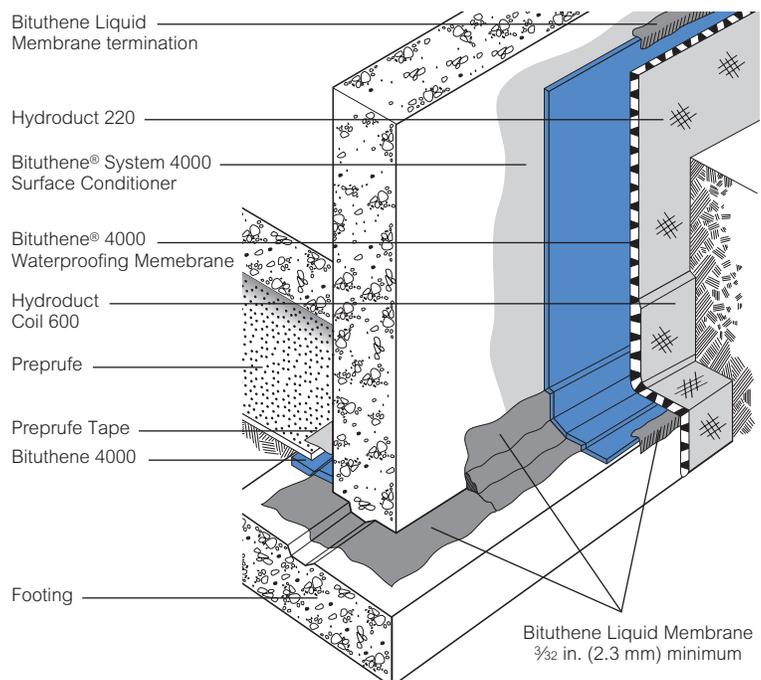
Architectural and Industrial Maintenance Regulations limit the VOC content in products classified as Architectural Coatings. Refer to Technical Letters at [graceconstruction.com](http://graceconstruction.com) for most current list of allowable limits.

### Advantages

- **Excellent adhesion**—special adhesive compound engineered to work with high tack System 4000 Surface Conditioner
- **Cold applied**—simple application to substrates, especially at low temperatures
- **Reduced inventory and handling costs**—System 4000 Surface Conditioner is included with each roll of membrane
- **Wide application temperature range**—excellent bond to self and substrate from 25°F (-4°C) and above

### Product Advantages

- Excellent adhesion
- Cold applied
- Reduced inventory and handling costs
- Wide application temperature range
- Overlap security
- Cross laminated, high density polyethylene carrier film
- Flexible
- Ripcord®



Drawings are for illustration purposes only. Please refer to [graceconstruction.com](http://graceconstruction.com) for specific application details.

- **Overlap security**—minimizes margin for error under site conditions
- **Cross laminated, high density polyethylene carrier film**—provides high tear strength, puncture and impact resistance
- **Flexible**—accommodates minor structural movements and will bridge shrinkage cracks
- **Ripcord**<sup>®</sup>—this split release on demand feature allows the splitting of the release paper into two (2) pieces for ease of installation in detailed areas

## Use

Bituthene<sup>®</sup> membrane is ideal for waterproofing concrete, masonry and wood surfaces where in-service temperatures will not exceed 135°F (57°C). It can be applied to foundation walls, tunnels, earth sheltered structures and split slab construction, both above and below grade. (For above grade applications, see *Above Grade Waterproofing Bituthene<sup>®</sup> System 4000.*)

Bituthene<sup>®</sup> waterproofing membrane is 1/16 in. (1.5 mm) thick, 3 ft (0.9 m) wide and 66.7 ft (20 m) long and is supplied in rolls. It is unrolled sticky side down onto concrete slabs or applied onto vertical concrete faces primed with Bituthene<sup>®</sup> System 4000 Surface Conditioner. Continuity is achieved by overlapping a minimum 2 in. (50 mm) and firmly rolling the joint.

Bituthene<sup>®</sup> membrane is extremely flexible. It is capable of bridging shrinkage cracks in the concrete and will accommodate minor differential movement throughout the service life of the structure.

## Application Procedures

### Safety, Storage and Handling Information

Bituthene<sup>®</sup> products must be handled properly. Vapors from solvent-based primers and mastic are harmful and flammable.

For these products, the best available information on safe handling, storage, personal protection, health and environmental considerations has been gathered. Material Safety Data Sheets (MSDS) are available at [graceconstruction.com](http://graceconstruction.com) and users should acquaint themselves with this information. Carefully read detailed precaution statements on product labels and the MSDS before use.

### Surface Preparation

Surfaces should be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Concrete must be properly dried (minimum 7 days for normal structural concrete and 14 days for lightweight structural concrete).

**If time is critical, Bituthene<sup>®</sup> Primer B2 or Bituthene<sup>®</sup> Primer B2 LVC may be used to allow priming and installation of membrane on damp surfaces or green concrete. Priming may begin in this case as soon as the concrete will maintain structural integrity.** Use form release agents which will not transfer to the concrete. Remove forms as soon as possible from below horizontal slabs to prevent entrapment of excess moisture. Excess moisture may lead to blistering of the membrane. Cure concrete with clear, resin-based curing compounds which do not contain oil, wax or pigment. Except with Bituthene<sup>®</sup> Primer B2 or Bituthene<sup>®</sup> Primer B2 LVC, allow concrete to thoroughly dry following rain. Do not apply any products to frozen concrete.

Repair defects such as spalled or poorly consolidated areas. Remove sharp protrusions and form match lines. On masonry surfaces, apply a parge coat to rough concrete block and brick walls or trowel cut mortar joints flush to the face of the concrete blocks.

### Temperature

- Apply Bituthene<sup>®</sup> System 4000 Membrane and Conditioner only in dry weather and when air and surface temperatures are 25°F (-4°C) or above.
- Apply Bituthene<sup>®</sup> Primer B2 or Bituthene<sup>®</sup> Primer B2 LVC in dry weather above 25°F (-4°C). (See separate product information sheet.)

### Conditioning

Bituthene<sup>®</sup> System 4000 Surface Conditioner is ready to use and can be applied by spray or roller. For best results, use a pump-type air sprayer with fan tip nozzle, like the Bituthene<sup>®</sup> System 4000 Surface Conditioner Sprayer, to apply the surface conditioner.

Apply Bituthene<sup>®</sup> System 4000 Surface Conditioner to clean, dry, frost-free surfaces at a coverage rate of 300 ft<sup>2</sup>/gal (7.4 m<sup>2</sup>/L). Coverage should be uniform. Surface conditioner should not be applied so heavily that it puddles or runs. **Do not apply conditioner to Bituthene<sup>®</sup> membrane.**

Allow Bituthene<sup>®</sup> System 4000 Surface Conditioner to dry one hour or until substrate returns to its original color. At low temperatures or in high humidity conditions, dry time may be longer.

Bituthene<sup>®</sup> System 4000 Surface Conditioner is clear when dry and may be slightly tacky. In general, conditioning should be limited to what can be covered within 24 hours. In situations where long dry times may prevail, substrates may be conditioned in advance. Substrates should be reconditioned if significant dirt or dust accumulates.

Before surface conditioner dries, tools should be cleaned with water. After surface conditioner dries, tools should be cleaned with mineral spirits. Mineral spirits is a combustible liquid which should be used only in accordance with manufacturer's recommendations. **Do not use solvents to clean hands or skin.**

### Corner Details

The treatment of corners varies depending on the location of the corner. For detailed information on Bituthene® Liquid Membrane, see separate product information sheet.

- At wall to footing inside corners—  
**Option 1:** Apply membrane to within 1 in. (25 mm) of base of wall. Treat the inside corner by installing a ¾ in. (20 mm) fillet of Bituthene® Liquid Membrane. Extend Bituthene® Liquid Membrane at least 2½ in. (65 mm) onto footing, and 2½ in. (65 mm) onto wall membrane.  
**Option 2:** Treat the inside corner by installing a ¾ in. (20 mm) fillet of Bituthene® Liquid Membrane. Apply 12 in. (300 mm) wide strip of sheet membrane centered over fillet. Apply wall membrane over inside corner and extend 6 in. (150 mm) onto footing. Apply 1 in. (25 mm) wide troweling of Bituthene® Liquid Membrane over all terminations and seams within 12 in. (300 mm) of corner.
- At footings where the elevation of the floor slab is 6 in. (150 mm) or more above the footing, treat the inside corner either by the above two methods or terminate the membrane at the base of the wall. Seal the termination with Bituthene® Liquid Membrane.

### Joints

Properly seal all joints with waterstop, joint filler and sealant as required. Bituthene® membranes are not intended to function as the primary joint seal. Allow sealants to fully cure. Pre-strip all slab and wall cracks over ¼ in. (1.5 mm) wide and all construction and control joints with 9 in. (230 mm) wide sheet membrane strip.

### Application on Horizontal Surfaces

(Note: Preprufe® pre-applied membranes are strongly recommended for below slab or for any application where the membrane is applied before concreting. See Preprufe® waterproofing membrane product information sheets.)

Apply membrane from the low point to the high point so that laps shed water. Overlap all seams at least 2 in. (50 mm). Stagger all end laps. Roll the entire membrane firmly and completely as soon as possible. Use a linoleum roller or standard water-filled garden roller less than 30 in. (760 mm) wide, weighing a minimum of 75 lbs (34 kg) when filled. Cover the

face of the roller with a resilient material such as a ½ in. (13 mm) plastic foam or two wraps of indoor-outdoor carpet to allow the membrane to fully contact the primed substrate. Seal all T-joints and membrane terminations with Bituthene® Liquid Membrane at the end of the day.

### Protrusions and Drains

Apply membrane to within 1 in. (25 mm) of the base of the protrusion. Apply Bituthene® Liquid Membrane 0.1 in. (2.5 mm) thick around protrusion. Bituthene® Liquid Membrane should extend over the membrane a minimum of 2½ in. (65 mm) and up the penetration to just below the finished height of the wearing course.

### Vertical Surfaces

Apply membrane in lengths up to 8 ft (2.5 m). Overlap all seams at least 2 in. (50 mm). On higher walls apply membrane in two or more sections with the upper overlapping the lower by at least 2 in. (50 mm). Roll all membrane with a hand roller.

Terminate the membrane at grade level. Press the membrane firmly to the wall with the butt end of a hardwood tool such as a hammer handle or secure into a reglet. Failure to use heavy pressure at terminations can result in a poor seal. A termination bar may be used to ensure a tight seal. Terminate the membrane at the base of the wall if the bottom of the interior floor slab is at least 6 in. (150 mm) above the footing. Otherwise, use appropriate inside corner detail where the wall and footing meet.

### Membrane Repairs

Patch tears and inadequately lapped seams with membrane. Clean membrane with a damp cloth and dry. Slit fishmouths and repair with a patch extending 6 in. (150 mm) in all directions from the slit and seal edges of the patch with Bituthene® Liquid Membrane. Inspect the membrane thoroughly before covering and make any repairs.

### Drainage

Hydroduct® drainage composites are recommended for both active drainage and protection of the membrane. See Hydroduct® product information sheets.

### Protection of Membrane

Protect Bituthene® membranes to avoid damage from other trades, construction materials or backfill. Place protection immediately in temperatures above 77°F (25°C) to avoid potential for blisters.

- On vertical applications, use Hydroduct® 220 Drainage Composite. Adhere Hydroduct® 220 Drainage Composite to membrane with Preprufe® Detail Tape. Alternative methods of protection are to use 1 in. (25 mm) expanded polystyrene or ¼ in. (6 mm) extruded

polystyrene that has a minimum compressive strength of 8 lbs/in.<sup>2</sup> (55 kN/m<sup>2</sup>). Such alternatives do not provide positive drainage to the system. If ¼ in. (6 mm) extruded polystyrene protection board is used, backfill should not contain sharp rock or aggregate over 2 in. (50 mm) in diameter. Adhere polystyrene protection board with Preprufe® Detail Tape.

- In mud slab waterproofing, or other applications where positive drainage is not desired and where reinforced concrete slabs are placed over the membrane, the use of ¼ in. (6 mm) hardboard or 2 layers of ⅛ in. (3 mm) hardboard is recommended.

## Insulation

Always apply Bituthene® membrane directly to primed or conditioned structural substrates. Insulation, if used, must be applied over the membrane. Do not apply Bituthene® membranes over lightweight insulating concrete.

## Backfill

Place backfill as soon as possible. Use care during backfill operation to avoid damage to the waterproofing

system. Follow generally accepted practices for backfilling and compaction. Backfill should be added and compacted in 6 in. (150 mm) to 12 in. (300 mm) lifts.

For areas which cannot be fully compacted, a termination bar is recommended across the top termination of the membrane.

## Placing Steel

When placing steel over properly protected membrane, use concrete bar supports (dobies) or chairs with plastic tips or rolled feet to prevent damage from sharp edges. Use special care when using wire mesh, especially if the mesh is curled.

## Approvals

- City of Los Angeles Research Report RR 24386
- Miami-Dade County Code Report NOA 04-0114.03
- U.S. Department of Housing and Urban Development (HUD) HUD Materials Release 628E

### Bituthene System 4000 Surface Conditioner Sprayer

The Bituthene® System 4000 Surface Conditioner Sprayer is a professional grade, polyethylene, pump-type, compressed air sprayer with a brass fan tip nozzle. It has a 2 gal (7.6 L) capacity. The nozzle orifice and spray pattern have been specifically engineered for the optimum application of Bituthene® System 4000 Surface Conditioner.

Hold nozzle 18 in. (450 mm) from substrate and squeeze handle to spray. Spray in a sweeping motion until substrate is uniformly covered.

Sprayer should be repressurized by pumping as needed. For best results, sprayer should be maintained at high pressure during spraying.

To release pressure, invert the sprayer and spray until all compressed air is released.



### Maintenance

The Bituthene® System 4000 Surface Conditioner Sprayer should perform without trouble for an extended period if maintained properly.

Sprayer should not be used to store Bituthene® System 4000 Surface Conditioner. The sprayer should be flushed with clean water immediately after spraying. For breaks in the spray operation of one hour or less, invert the sprayer and squeeze the spray handle until only air comes from the nozzle. This will avoid clogging.

Should the sprayer need repairs or parts, call the maintenance telephone number on the sprayer tank (800-323-0620).

- Bituthene® 4000 Membranes carry a Underwriters' Laboratory Class A Fire Rating (Building Materials Directory, File #R7910) when used in either of the following constructions:

—Limited to noncombustible decks at inclines not exceeding  $\frac{1}{4}$  in. (6 mm) to the horizontal 1 ft (0.3 m). One layer of Bituthene® waterproofing membrane, followed by one layer of  $\frac{1}{8}$  in. (3 mm) protection board, encased in 2 in. (50 mm) minimum concrete monolithic pour.

—Limited to noncombustible decks at inclines not exceeding  $\frac{1}{4}$  in. (6 mm) to the horizontal 1 ft (0.3 m). One layer of Bituthene® waterproofing membrane, followed by one layer of DOW Styrofoam PD Insulation Board [2 in. (50 mm) thick]. This is covered with one layer of 2 ft x 2 ft x 2 in. (0.6 m x 0.6 m x 50 mm) of concrete paver topping.

## Warranty

Five year material warranties covering Bituthene® and Hydroduct® products are available upon request. Contact your Grace sales representative for details.

## Technical Services

Support is provided by full time, technically trained Grace representatives and technical service personnel, backed by a central research and development staff.

## Supply

<b>Bituthene® System 4000</b>	3 ft x 66.7 ft roll (200 ft <sup>2</sup> ) [0.9 m x 20 m (18.6 m <sup>2</sup> )]
Roll weight	83 lbs (38 kg) gross
Palletization	25 rolls per pallet
Storage	Store upright in dry conditions below 95°F (+35°C).
<b>System 4000 Surface Conditioner</b>	1 x 0.625 gal (2.3 L) bottle in each roll of System 4000 Membrane
<b>Ancillary Products</b>	
Surface Conditioner Sprayer	2 gal (7.6 L) capacity professional grade sprayer with specially engineered nozzle
Bituthene® Liquid Membrane	1.5 gal (5.7 L) pail/125 pails per pallet or 4 gal (15.1 L) pail/48 pails per pallet
Preprufe® Detail Tape	2 in. x 50 ft (50 mm x 15 m) roll/16 rolls per carton
Bituthene® Mastic	Twelve 30 oz (0.9 L) tubes/carton or 5 gal (18.9 L) pail/36 pails per pallet
<b>Complementary Material</b>	
Hydroduct®	See separate data sheets

**Equipment by others:** Soft broom, utility knife, brush or roller for priming

## Physical Properties for Bituthene® System 4000 Waterproofing Membrane

Property	Typical Value	Test Method
Color	Dark gray-black	
Thickness	1/16 in. (1.5 mm) nominal	ASTM D3767—method A
Flexibility, 180° bend over 1 in. (25 mm) mandrel at -25°F (-32°C)	Unaffected	ASTM D1970
Tensile strength, membrane, die C	325 lbs/in. <sup>2</sup> (2240 kPa) minimum	ASTM D412 modified <sup>1</sup>
Tensile strength, film	5,000 lbs/in. <sup>2</sup> (34.5 MPa) minimum	ASTM D882 modified <sup>1</sup>
Elongation, ultimate failure of rubberized asphalt	300% minimum	ASTM D412 modified <sup>1</sup>
Crack cycling at -25°F (-32°C), 100 cycles	Unaffected	ASTM C836
Lap adhesion at minimum application temperature	5 lbs/in. (880 N/m)	ASTM D1876 modified <sup>2</sup>
Peel strength	9 lbs/in. (1576 N/m)	ASTM D903 modified <sup>3</sup>
Puncture resistance, membrane	50 lbs (222 N) minimum	ASTM E154
Resistance to hydrostatic head	231 ft (71 m) of water	ASTM D5385
Permeance	0.05 perms (2.9 ng/m <sup>2</sup> sPa) maximum	ASTM E96, section 12—water method
Water absorption	0.1% maximum	ASTM D570

### Footnotes:

1. The test is run at a rate of 2 in. (50 mm) per minute.
2. The test is conducted 15 minutes after the lap is formed and run at a rate of 2 in. (50 mm) per minute at 40°F (5°C).
3. The 180° peel strength is run at a rate of 12 in. (300 mm) per minute.

## Physical Properties for Bituthene® System 4000 Surface Conditioner

Property	Typical Value
Solvent type	Water
Flash point	>140°F (>60°C)
VOC* content	91 g/L
Application temperature	25°F (-4°C) and above
Freeze thaw stability	5 cycles (minimum)
Freezing point (as packaged)	14°F (-10°C)
Dry time (hours)	1 hour**

\* Volatile Organic Compound

\*\* Dry time will vary with weather conditions

[www.graceconstruction.com](http://www.graceconstruction.com)

**For technical assistance call toll free at 866-333-3SBM (3726)**

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# Grace Below Grade Waterproofing

## PREPRUFE® 300R PLUS & 160R PLUS

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

### Description

Preprufe® 300R Plus & 160R Plus membranes are unique composite sheets comprised of a thick HDPE film, pressure sensitive adhesive and weather resistant protective coating. Designed with Advanced Bond Technology™ and a dual adhesive ZipLap™, Preprufe Plus membranes form a unique, integral bond to poured concrete, preventing both the ingress and lateral migration of water while providing a robust barrier to water, moisture and gas.

Release liner free and designed for efficient, reliable installation, the Preprufe Plus ZipLap allows for an adhesive to adhesive bond at seam overlaps and delivers superior performance in harsh conditions without the need for specialized equipment, heat or power.

The Preprufe R Plus System includes:

- **Preprufe® 300R Plus**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe® 160R Plus**—thinner grade for blindside, zero property line applications against soil retention systems. Vertical use only.
- **Preprufe® Tape LT**—for covering cut edges, roll ends, penetrations and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C)).
- **Preprufe® Tape HC**—for covering cut edges, roll ends, penetrations and detailing (minimum 50°F (10°C)).
- **Preprufe® CJ Tape LT**— for construction joints, and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C)).
- **Preprufe® CJ Tape HC**— for construction joints, and detailing (minimum 50°F (10°C)).
- **Bituthene® Liquid Membrane**—for sealing around penetrations, etc.
- **Adcor™ ES**—waterstop for joints in concrete walls and floors
- **Preprufe® Tieback Covers**—preformed cover for soil retention wall tieback heads
- **Preprufe® Preformed Corners**—preformed inside and outside corners

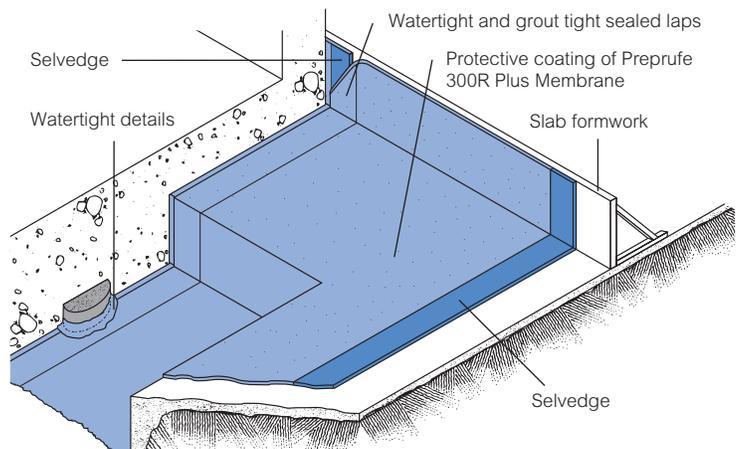
Preprufe® 300R Plus & 160R Plus membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast

directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be turned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene® self-adhesive membrane or Procor® fluid-applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

### Advantages

- **Forms a unique continuous adhesive bond to concrete poured against it**—prevents water migration and makes it unaffected by ground settlement beneath slabs
- **Fully-adhered adhesive to adhesive watertight ZipLaps** and easy to execute detailing
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **Easy roll/kick out installation**—reduces installation time and cost
- **Release liner free**—expedites installation and reduces construction site waste
- **Solar reflective**—reduced temperature gain
- **Simple and quick to install**—requiring no priming or fillets
- **Can be applied to permanent formwork**—allows maximum use of confined sites
- **Self protecting**—can be trafficked immediately after application and ready for immediate placing of reinforcement



Drawings are for illustration purposes only. Please refer to [graceconstruction.com](http://graceconstruction.com) for specific application details.

- **Unaffected by wet conditions**—cannot activate prematurely
- **Inherently waterproof, non-reactive system:**
  - not reliant on confining pressures or hydration
  - unaffected by freeze/thaw, wet/dry cycling
- **Chemical resistant**—effective in most types of soils and waters, protects structure from salt or sulphate attack

## Installation

The most current application instructions, detail drawings and technical letters can be viewed at [graceconstruction.com](http://graceconstruction.com). For other technical information contact your local Grace representative.

Preprufe® Plus membranes have colored zip strips at the top and bottom of the seam area on the edge of the roll. Both zip strips cover an aggressive adhesive. Once the yellow zip strip on the top of the membrane and the blue zip strip on the bottom of the membrane are removed, a strong adhesive bond is achieved in the overlap area. This Preprufe® ZipLap™ provides an enhanced sealing of the overlaps in harsh conditions combined with a fast and easy way of execution without specialized equipment, heat or power.

### Substrate Preparation

**All surfaces**—It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability (see Figure 1).

**Horizontal**—The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

**Vertical**—Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment.

### Membrane Installation

Preprufe® Plus membranes can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe Plus product in cold or marginal weather conditions <40°F (<4°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, Preprufe Plus Low Temperature (LT) membrane is available for low temperature applications. Refer to Preprufe Plus LT data sheet and Grace Tech Letter 16 for more information.

**Horizontal substrates**—Kick out or roll out the membrane HDPE film side to the substrate with the yellow zip strip facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave yellow and blue zip strips on the membrane until overlap procedure is completed.

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the yellow zip strip. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the yellow and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Ensure a

continuous bond is achieved without creases and roll firmly with a heavy roller.

Refer to Grace Tech Letter 15 for information on suitable rebar chairs for Preprufe products.

**Vertical substrates**—Mechanically fasten the membrane vertically using fasteners appropriate for the substrate with the yellow zip strip facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the yellow zip strip.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the yellow and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Roll firmly to ensure a watertight seal.

**Roll ends and cut edges**—Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap edges and roll firmly (see Figure 2). Immediately remove tinted plastic release liner from the tape.

### Details

Detail drawings are available at [graceconstruction.com](http://graceconstruction.com).

### Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Repair small punctures (0.5 in. (12 mm) or less) and slices by applying Preprufe Tape centered over the damaged area. Repair holes and large punctures by applying a patch of Preprufe® Plus membrane, which extends 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with Preprufe Tape. Any areas of damaged adhesive should be covered with Preprufe Tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape. All Preprufe Tape must be rolled firmly and the tinted release liner removed. Alternatively, use a hot air gun or similar to activate the adhesive using caution not to damage the membranes and firmly roll lap to achieve continuity.

### Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe® Tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete. Provide temporary protection from concrete over splash for areas of the Preprufe membrane that are adjacent to a concrete pour.

Figure 1

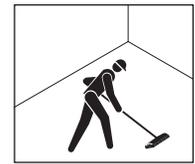
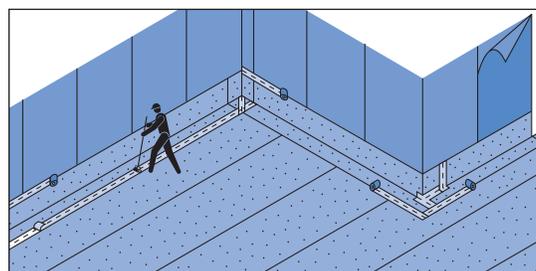
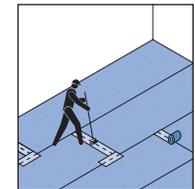


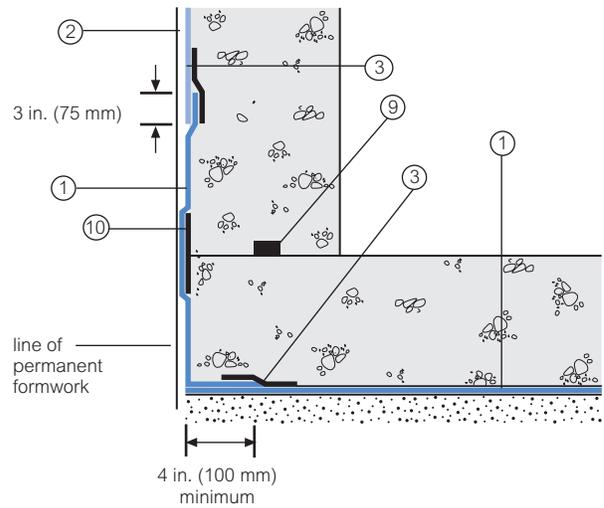
Figure 2



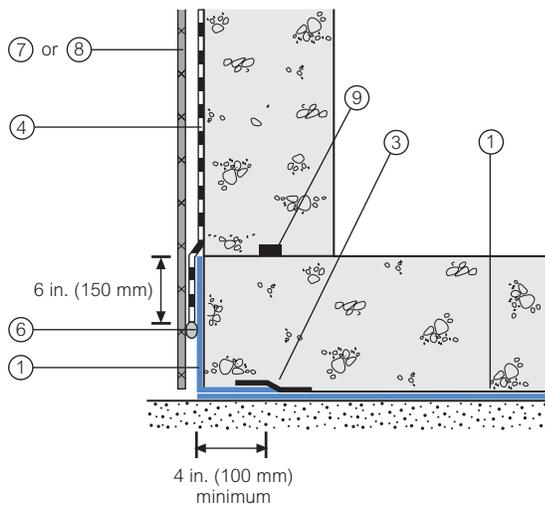
## Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at [graceconstruction.com](http://graceconstruction.com).  
For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

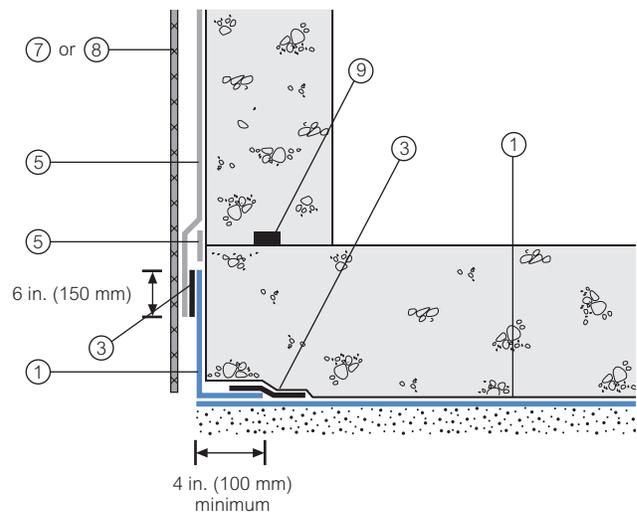
### Wall base detail against permanent shutter



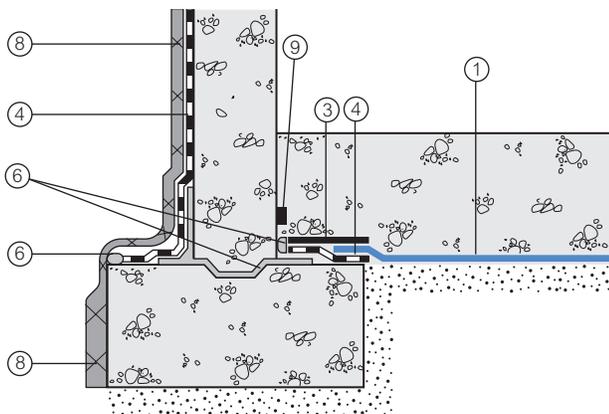
### Bituthene® wall base detail (Option 1)



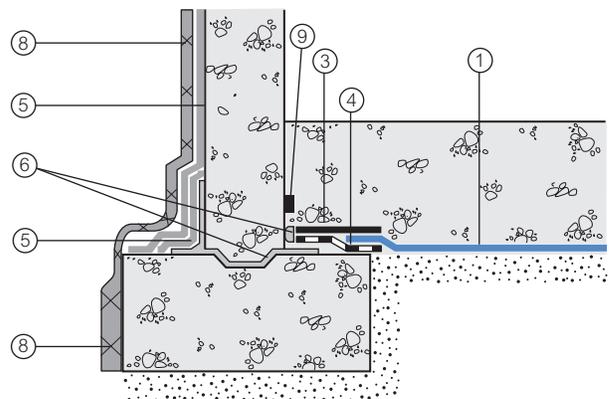
### Procor® wall base detail (Option 1)



### Bituthene® wall base detail (Option 2)



### Procor® wall base detail (Option 2)



- 1 Preprufe® 300R Plus
- 2 Preprufe® 160R Plus
- 3 Preprufe® Tape
- 4 Bituthene®

- 5 Procor®
- 6 Bituthene® Liquid Membrane
- 7 Approved Protection Course

- 8 Hydroduct®
- 9 Adcor™ ES
- 10 Preprufe® CJ Tape

## Supply

Dimensions (Nominal)	Preprufe 300R Plus Membrane	Preprufe 160R Plus Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	3 ft. 10 in. x 102 ft. (1.17m x 31.15m)	3 ft. 10 in. x 120 ft. (1.17m x 36.6m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft <sup>2</sup> (36 m <sup>2</sup> )	460 ft <sup>2</sup> (42 m <sup>2</sup> )	
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)	4.3 lbs (2 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)

## Physical Properties

Property	Typical Value 300R Plus	Typical Value 160R Plus	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385, modified <sup>1</sup>
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385, modified <sup>2</sup>
Elongation	500%	500%	ASTM D412, modified <sup>3</sup>
Tensile strength, film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836 <sup>4</sup>
Puncture resistance	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903, modified <sup>5</sup>
Lap peel adhesion at 72°F (22°C)	8 lbs/in. (1408 N/m)	8 lbs/in. (1408 N/m)	ASTM D1876, modified <sup>6</sup>
Lap peel adhesion at 40°F (4°C)	8 lbs/in. (1408 N/m)	8 lbs/in. (1408 N/m)	ASTM D1876, modified <sup>6</sup>
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa x s x m <sup>2</sup> ))	0.01 perms (0.6 ng/(Pa x s x m <sup>2</sup> ))	ASTM E96, method B

### Footnotes:

- Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
- Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
- Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
- Concrete is cast against the Preprufe membrane and allowed to cure (7 days minimum)
- Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
- The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute at 72°F (22°C).

### Removal of Formwork

Preprufe® membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems, see Grace Tech Letter 13 for information on forming systems used with Preprufe products.

A minimum concrete compressive strength of 3000 psi (20 N/mm<sup>2</sup>) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

Refer to Grace Tech Letter 17 for information on removal of formwork for Preprufe products.

### Specification Clauses

Preprufe® 300R Plus or 160R Plus membranes shall be applied with its protective coating presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe® products. All Preprufe system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor® fluid-applied membrane with Preprufe product.

### Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be lifted and carried by a minimum of two persons.

[www.graceconstruction.com](http://www.graceconstruction.com)

For technical assistance call toll free at 866-333-3SBM (3726)

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We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.-Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending.  
PF-189A Printed in U.S.A. 12/14 GCS/PDF

**GRACE**

# VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier



## Product Description

VaporBlock® Plus™ 20 is a seven-layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission. VaporBlock® Plus™ 20 is a highly resilient underslab / vertical wall barrier designed to restrict naturally occurring gases such as radon and/or methane from migrating through the ground and concrete slab. VaporBlock® Plus™ 20 is more than 100 times less permeable than typical high-performance polyethylene vapor retarders against Methane, Radon and other harmful VOCs.

VaporBlock® Plus™ 20 is one of the most effective underslab gas barriers in the building industry today far exceeding ASTM E-1745 (Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs) Class A, B and C requirements. Available in a 20 (Class A) mil thicknesses designed to meet the most stringent requirements. VaporBlock® Plus™ 20 is produced within the strict guidelines of our ISO 9001:2008 Certified Management System.

## Product Use

VaporBlock® Plus™ 20 resists gas and moisture migration into the building envelop when properly installed to provide protection from toxic/harmful chemicals. It can be installed as part of a passive or active control system extending across the entire building including floors, walls and crawl spaces. When installed as a passive system it is recommended to also include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans.

VaporBlock® Plus™ 20 works to protect your flooring and other moisture-sensitive furnishings in the building's interior from moisture and water vapor migration, greatly reducing condensation, mold and degradation.

## Size & Packaging

VaporBlock® Plus™ 20 is available in 10' x 150' rolls to maximize coverage. All rolls are folded on heavy-duty cores for ease in handling and installation. Other custom sizes with factory welded seams are available based on minimum volume requirements. Installation instructions and ASTM E-1745 classifications accompany each roll.



Under-Slab Vapor/Gas Retarder

## Product

## Part #

VaporBlock Plus 20 ..... VBP20

## APPLICATIONS

- |                 |                                |
|-----------------|--------------------------------|
| Radon Barrier   | Under-Slab Vapor Retarder      |
| Methane Barrier | Foundation Wall Vapor Retarder |
| VOC Barrier     |                                |

**VaporBlock® Plus™**  
UNDERSLAB VAPOR RETARDER / GAS BARRIER

# VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

PROPERTIES	TEST METHOD	VAPORBLOCK PLUS 20	
		IMPERIAL	METRIC
APPEARANCE		White/Gold	
THICKNESS, NOMINAL		20 mil	0.51 mm
WEIGHT		102 lbs/MSF	498 g/m <sup>2</sup>
CLASSIFICATION	ASTM E 1745	CLASS A, B & C	
TENSILE STRENGTH LBF/IN (N/CM) AVERAGE MD & TD (NEW MATERIAL)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
IMPACT RESISTANCE	ASTM D 1709	2600 g	
MAXIMUM USE TEMPERATURE		180° F	82° C
MINIMUM USE TEMPERATURE		-70° F	-57° C
PERMEANCE (NEW MATERIAL)	ASTM E 154 Section 7 ASTM E 96 Procedure B	0.0098 Perms grains/(ft <sup>2</sup> ·hr·in·Hg)	0.0064 Perms g/(24hr·m <sup>2</sup> ·mm Hg)
(AFTER CONDITIONING) PERMS (SAME MEASUREMENT AS ABOVE PERMEANCE)	ASTM E 154 Section 8, E96 Section 11, E96 Section 12, E96 Section 13, E96	0.0079 0.0079 0.0097 0.0113	0.0052 0.0052 0.0064 0.0074
WVTR	ASTM E 96 Procedure B	0.0040 grains/hr-ft <sup>2</sup>	0.0028 gm/hr-m <sup>2</sup>
RADON DIFFUSION COEFFICIENT	K124/02/95	< 1.1 x 10 <sup>-13</sup> m <sup>2</sup> /s	
METHANE PERMEANCE	ASTM D 1434	< 1.7 x 10 <sup>-10</sup> m <sup>2</sup> /d·atm 0.32 GTR (Gas Transmission Rate) ml/m <sup>2</sup> ·D·ATM	

## VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.

Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.

ASTM E-1643 also provides general installation information for vapor retarders.

**VaporBlock® Plus™**  
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VaporBlock® Plus™ is a seven-layer co-extruded barrier made using high quality virgin-grade polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission.

Note: To the best of our knowledge, unless otherwise stated, these are typical property values and are intended as guides only, not as specification limits. Chemical resistance, odor transmission, longevity as well as other performance criteria is not implied or given and actual testing must be performed for applicability in specific applications and/or conditions. RAVEN INDUSTRIES MAKES NO WARRANTIES AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and disclaims all liability for resulting loss or damage. Limited Warranty available at [www.RavenEFD.com](http://www.RavenEFD.com)



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## **APPENDIX F**

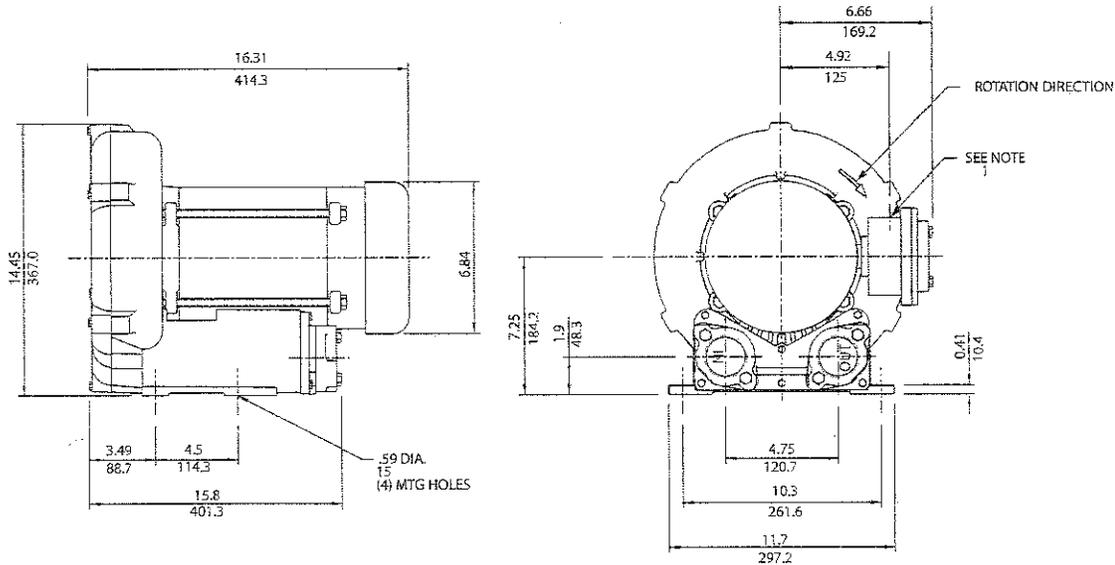
### **MANUFACTURER SPECIFICATIONS FOR BLOWER**

**Environmental / Chemical Processing Blowers**

**EN 505 & CP 505**

2.0 / 2.5 HP Sealed Regenerative w/Explosion-Proof Motor

**ROTRON®**



**NOTES**

- 1 > TERMINAL BOX CONNECTOR HOLE 3/4" NPT.
- 2 DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
- 3 CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

Specification	Units	Part/Model Number			
		EN505AX58ML 038177	EN505AX72ML 038176	CP505FS58MLR 080655	CP505FS72MLR 038962
Motor Enclosure - Shaft Mtl.	-	Explosion-proof-CS	Explosion-proof-CS	Chem XP-SS	Chem XP-SS
Horsepower	-	2.0	2.0	2.0	2.0
Phase - Frequency	-	Single-60 hz	Three-60 hz	Single-60 hz	Three-60 hz
Voltage	AC	115/230	230/460	115/230	230/460
Motor Nameplate Amps	Amps (A)	22/11	5.8/2.9	22/11	5.8/2.9
Max. Blower Amps	Amps (A)	24/12	6.4/3.2	24/12	6.4/3.2
Inrush Amps	Amps (A)	112/56	56/28	112/56	56/28
Service Factor	-	1.0	1.0	1.0	1.0
Starter Size	-	1/0	0/0	1/0	0/0
Thermal Protection	-	Class B - Pilot Duty	Class B - Pilot Duty	Class B - Pilot Duty	Class B - Pilot Duty
XP Motor Class - Group	-	I-D, II-F&G	I-D, II-F&G	I-D, II-F&G	I-D, II-F&G
Shipping Weight	Lbs	92	84	92	84
	Kg	41.7	38.1	41.7	38.1

**Voltage** - ROTRON motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

**Operating Temperatures** - Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

**Maximum Blower Amps** - Corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

**XP Motor Class - Group** - See Explosive Atmosphere Classification Chart in Section I

*This document is for informational purposes only and should not be considered as a binding description of the products or their performance in all applications. The performance data on this page depicts typical performance under controlled laboratory conditions. AMETEK is not responsible for blowers driven beyond factory specified speed, temperature, pressure, flow or without proper alignment. Actual performance will vary depending on the operating environment and application. AMETEK products are not designed for and should not be used in medical life support applications. AMETEK reserves the right to revise its products without notification. The above characteristics represent standard products. For product designed to meet specific applications, contact AMETEK Technical & Industrial Products Sales department.*

## Environmental / Chemical Processing Blowers

### EN 505 & CP 505

2.0 / 2.5 HP Sealed Regenerative w/Explosion-Proof Motor

#### FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- Maximum flow: 150 SCFM
- Maximum pressure: 75 IWG
- Maximum vacuum: 70 IWG
- Standard motor: 2.0 HP, explosion-proof
- Cast aluminum blower housing, impeller, cover & manifold; cast iron flanges (threaded); teflon® lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- Sealed blower assembly
- Quiet operation within OSHA standards

#### MOTOR OPTIONS

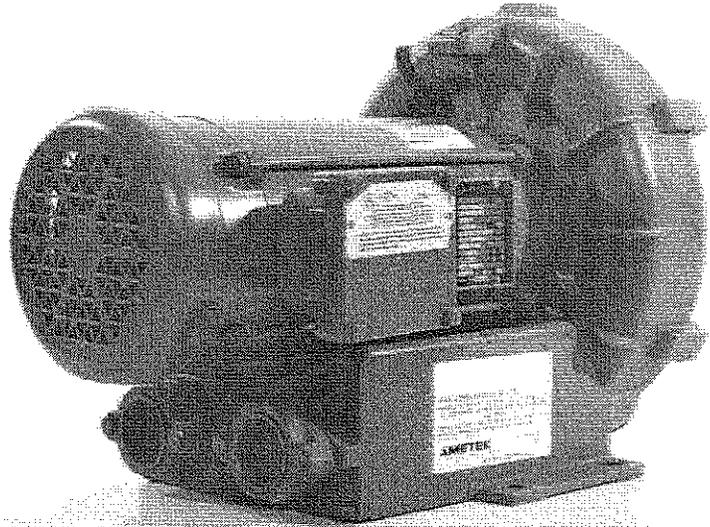
- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepower for application-specific needs

#### BLOWER OPTIONS

- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

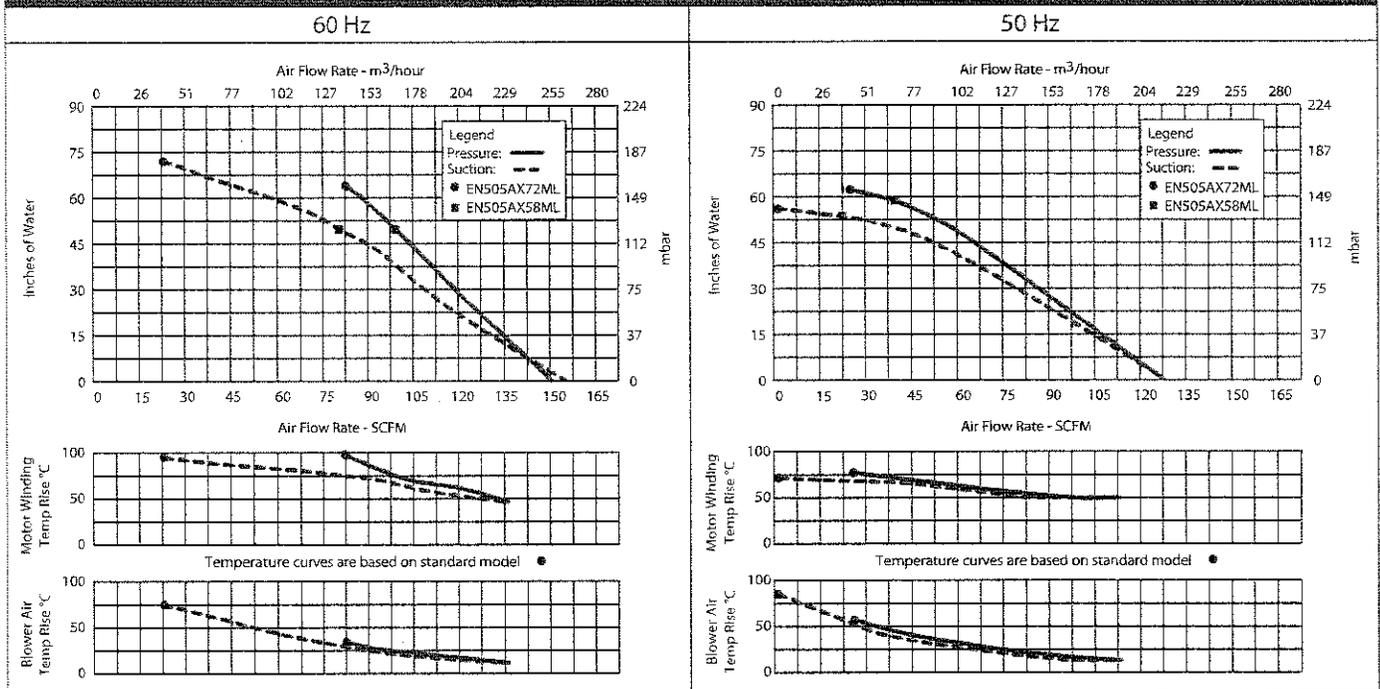
#### ACCESSORIES

- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package



# ROTRON®

### Blower Performance at Standard Conditions



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## **APPENDIX G**

### **CONSTRUCTION HEALTH AND SAFETY PLAN**

August 25, 2015

# **CONSTRUCTION HEALTH AND SAFETY PLAN**

**133-31 39th Avenue  
(Block 4972, Lot(s) 8, 10, 16, 65)  
Flushing, Queens, New York**

*Prepared for*

**TWO FULTON SQUARE LLC  
136-20 38th Avenue, 12th Floor  
Flushing, New York 11354**

**ROUX ASSOCIATES, INC.**

*Environmental Consulting & Management*

---



*209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600*

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**TABLE**

1. Toxicological, Physical and Chemical Properties of Compounds Potentially Present at the Site

**FIGURE**

1. Hospital Route Map

## **1.0 INTRODUCTION**

This Site-specific construction Health and Safety Plan (construction HASP) has been prepared to address activities to be performed during the implementation of the Remedial Investigation (RI) at the property identified as Block 4972 and Lot(s) 8, 10, 16, and 65 with the site address 133-31 39<sup>th</sup> Avenue in the Flushing neighborhood of Queens, New York (Site). Relevant portions of Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 and 1926.62 were used as guidance while preparing this construction HASP.

The designated Site Health and Safety Officer (SHSO) will be responsible for implementing the construction HASP. Compliance with this construction HASP is required of all workers who may potentially encounter soil at the Site (hereinafter referred to as Site Workers), including the Contractor's employees, subcontractors to the Contractor, subcontractors to the Owner's representative, and onsite workers for the Construction Manager. In the event that a Site Worker does not follow these procedures, he or she will be required to leave the Site immediately. The content of this construction HASP may change or undergo revisions based upon changes in the technical scope of work, the results of monitoring, and/or additional information made available to health and safety personnel. Any proposed changes must be reviewed and approved by the Corporate Safety Supervisor, and the SHSO implementing the changes to the construction HASP. As of the date of this construction HASP the Contractor has not been selected; the name and contact information for the Contractor will be provided to New York City Office of Environmental Remediation (NYCOER) once selected.

Upon entering the Site, all visitors will be required to sign in and read and comply with the provisions of this construction HASP. In the event that a visitor does not follow these procedures, he or she will be required to leave the Site immediately.

### **1.1 Scope of Work**

The planned redevelopment of the Site entails the construction of a mixed-use development that includes a hotel, residential buildings, an office building, underground parking and retail spaces.

### **1.2 Emergency and Project Management Contact Information**

Provided below is a list of telephone numbers for use in the event of an emergency onsite.

Emergency Medical Service .....911  
Police: New York City Police Department (NYPD) .....911  
Hospital: New York-Presbyterian/Queens .....(718) 670-2000  
National Response Center .....(800) 424-8802  
Poison Control Center .....(800) 222-1222  
Chemtrec .....(800) 262-8200  
Fire: New York City Fire Department (FDNY) .....911  
New York City Office of Emergency Management .....911  
Center for Disease Control .....(800) 311-3435  
USEPA (Region II) .....(212) 637-5000  
NYSDEC Emergency Spill Response .....(800) 457-7362

The following table includes the contact information for Site management and health and safety personnel.

<b>Title</b>	<b>Contact</b>	<b>Company Name</b>	<b>Business Phone</b>	<b>Cellular Phone</b>
General Superintendent	TBD	TBD	TBD	TBD
Site Superintendent	TBD	TBD	TBD	TBD
Assistant Site Superintendent	TBD	TBD	TBD	TBD
Corporate Safety Supervisor	Joseph Gentile	Roux Associates, Inc.	(856) 832-3768	(610) 423-3220
Site Health and Safety Officer	MaryBeth Lyons	Roux Associates, Inc.	(631) 630-2410	(516) 776-4599
Construction Manager	TBD	TBD	TBD	TBD
Owner's Onsite Representative	Guy Bodenbug	Top 8 Construction	(718) 888-0600	(646) 335-7312
Owner's Representative	Tom Barone	Top 8 Construction	(718) 888-0600	(917) 335-5996

### 1.3 Address of New York-Presbyterian/Queens

56-45 Main Street  
Flushing, New York 11355  
(718) 670-2000

## **Directions from Site to New York-Presbyterian/Queens**

Head south on College Point Boulevard

Go 0.5 miles and turn left onto Blossom Avenue

Go 0.1 miles and Blossom Avenue turns right and becomes Crommelin Avenue

Go 0.1 miles and Crommelin Avenue turns slightly left and becomes Dahlia Avenue

Go 0.1 miles and turn right onto Main Street

Go 486 feet and New York-Presbyterian/Queens will be on the left. Address is 56-45 Main Street

Directions to the hospital are included in Figure 1.

## **1.4 Emergency Equipment**

The following is a list of emergency equipment to be kept onsite at all times:

- First Aid Kit
- ABC Fire Extinguisher
- Absorbent Pads
- Air Horns
- Oil Dry
- Eye Wash

## **1.5 Spills**

Spills associated with site activities may be attributed to project-specific heavy equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to Site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of Site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure that equipment is functioning properly. In the event of a spill, Site personnel will immediately notify the NYSDEC (1-800-457-7362) and a spill number will be generated.

## **2.0 HEALTH AND SAFETY STAFF**

This section briefly describes the health and safety responsibilities for the excavation work to be implemented at the Site. The following staff is responsible for ensuring compliance with the HASP.

### **2.1 General/Site Superintendent (GSS) – SkyMaterials**

- Has the overall responsibility for the health and safety of Site Workers.
- Ensures that adequate resources are provided to the field health and safety staff to carry out their responsibilities as outlined below.

### **2.2 Corporate Safety Supervisor (CSS) – Joseph Gentile**

- Implements the HASP.
- Performs or oversees Site-specific training and approves revised or new safety protocols or field operations.
- Coordinates revisions of this HASP with GSS.
- Responsible for the development of new task safety protocols and procedures and resolution of any outstanding safety issues which may arise during the completion of Site work.

### **2.3 Site Health and Safety Officer (SHSO) – MaryBeth Lyons**

- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment (PPE).
- Conducts initial onsite specific training prior to Site Workers commencing work.
- Conducts and documents daily and periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Immediately notifies the GSS and CSS of all accident/incidents.
- At the end of each day, communicates the tasks completed to the designated representatives, the next day's planned activities, any third party issues, changes of work plans, and/or changes in level of PPE.
- Determines upgrading or downgrading of PPE based on Site conditions and/or real time monitoring results.

- Ensures that monitoring instruments are calibrated daily or as the manufacturer's instructions determine.
- Reports to the GSS and CSS to provide summaries of field operations and progress.
- Submits and maintains all documentation required in this HASP and any other pertinent health and safety documentation.

#### **2.4 Site Workers**

- Reports any unsafe or potentially hazardous conditions to the SHSO.
- Maintains knowledge of the information, instructions, and emergency response actions contained in the HASP.
- Complies with rules, regulations, and procedures as set forth in this HASP, including any revisions that are instituted.
- Prevents admittance to work Site by unauthorized personnel.

### **3.0 SITE DESCRIPTION AND BACKGROUND**

The Site comprises four separate parcels identified on the New York tax map as Block 4972, Lots 8, 10, 16, and 65. The Site is located in the Flushing neighborhood of Queens, New York. The Site is located in a mixed residential and commercial zoned area and is abutted by 37<sup>th</sup> Avenue (and retail commercial properties) to the north, 39<sup>th</sup> Avenue (and retail commercial properties) to the south, Prince Street (and retail commercial properties) to the east and College Point Boulevard (and a residential tower) to the west.

The Site had been improved with dwellings throughout the years. According to the 1934 Sanborn Fire Insurance Map, a portion of Lot 16 was improved with a building labeled 'Laundry' and was last depicted on the 1951 Sanborn Fire Insurance Map (but may have been present until sometime prior to 1975). By 1951, Lot 10 is improved with three plumbing supplies warehouses and by 1966 the building layout for Lot 65 is constructed. According to the 1980 Sanborn Fire Insurance Map, Lot 65 was utilized by a machine shop (1954) and as a manufacturing facility (1956) until approximately 1988 (then utilized as the shopping plaza and parking). During this time frame the space currently utilized as a senior care facility was utilized by Rayex Corp., a sunglass manufacturer. In 1975, Lot 16 was improved with a one-story warehouse (no other details regarding products stored was given).

The surrounding area was improved with dwellings, carpenter shop, church, saloons, barns and a grocery store. Similar properties were developed through the 1920s. According to the 1934 Sanborn Fire Insurance Map, the current residential tower on the corner of 39<sup>th</sup> Avenue and College Point Boulevard is depicted. In addition, a garage with gasoline tanks and a repair shop occupied the residential/office space building (37-14 to 37-26 Prince Street) from approximately 1934 until 2009. Another garage with gasoline tanks is depicted at the property located northeast of the Site, across 37<sup>th</sup> Avenue from approximately 1934 until 2003. An unnamed petroleum corporation was depicted across College Point Boulevard from 1951 until 1991, utilized seven buried gasoline and fuel oil tanks. According to the 1980 Sanborn Fire Insurance Map, an auto repair facility (until approximately 2003), medical instrument manufacturing (until approximately 1988) and film processing (1980 only) were noted south of the Site across 39<sup>th</sup> Avenue. Electronics manufacturing and Electro-plating were depicted north of the Site, across 37<sup>th</sup> Avenue (until at least 2006).

Lot 8 (37-25 College Point Boulevard) is currently owned by Two Fulton Square LLC, and comprises a 4,200 square foot concrete parking area. The northern portion of Lot 8 borders Lot 10; the southern portion borders a residential tower; Lot 65 is to the east and College Point Boulevard to the west. Lot 8 was last utilized as residence until approximately 2006.

Lot 10 (37-19 College Point Boulevard) is currently owned by Two Fulton Square LLC, and comprises 17,500 square feet of land. The northern portion of Lot 10 borders Lot 16 with Lot 8 to the south, Lot 65 to the east and College Point Boulevard to the west. Lot 10 is currently occupied by NY Great Stone, Hua Mei Steel, Inc., Hua Mei Steel Doors, Inc. and Hua Mei Doors, Inc. utilizing a one-story brick, concrete and steel column building with poured concrete floor. The building takes up a majority of the lot; a concrete parking area and loading dock are along College Point Boulevard. The Lot 10 building comprises office space, showrooms, materials storage, and work areas to fabricate doors, steel (mostly for railings).

Lot 16 (37-05 College Point Boulevard) is currently owned by Two Fulton Square LLC. The northern portion of Lot 16 borders 37<sup>th</sup> Avenue; the southern portion borders Lot 10; a vacant property is to the east and College Point Boulevard to the west. The building, occupied by Elegant Tile and Kitchen, Inc., encompasses the entire lot (7,945 square feet) utilizing a one-story brick, concrete and steel column building with poured concrete floor. The building comprises office space and work areas, material storage, and restrooms. The Lot 16 building comprises restrooms, office space, showrooms, materials storage, and work areas.

Lot 65 (133-31 39<sup>th</sup> Avenue) is currently owned by Two Fulton Square LLC and comprises approximately 2.8 acres of land utilized by Flushing Mall and New York Golden Eagle Senior Corp., a senior care facility, which is accessed on Prince Street. Along 37<sup>th</sup> Avenue, a vacant lot lies between Lots 16 and 65; retail business are to the east of Flushing Mall and north of the senior care facility. Additional office buildings, hotel, and retail businesses are located along 39<sup>th</sup> Avenue and Prince Street, located east of Flushing Mall and south of the senior care facility. The building on Lot 65 is two-stories for the mall space and one-story for the senior care facility. Building construction consists of brick, concrete, and steel column building with poured concrete floor and a sub-level parking garage (not associated with the senior care facility). The Flushing Mall contains approximately 100 separate units according to the NYCOER website. The type

units include, but are not limited to restaurants, photography studios, travel agents, jewelers, sunglass boutique, and clothing sales.

### **3.1 Summary of Environmental Conditions**

In August 2014, Roux Associates performed a Phase I ESA based on potential environmental concerns, which may influence redevelopment construction.

The following recognized environmental conditions (RECs) in connection with the Site were identified as a result of the completion of this Phase I ESA:

1. An E-designation (i.e., environmental requirement) was assigned to Lot 65 of the Site: E-74 for Window Wall Attenuation and Alternate Ventilation, effective as of September 17, 1998. These environmental requirements must be satisfied under the administration of the New York City Office of Environmental Remediation (OER).
2. Former Site Usage: from the mid-1950s until the late 1980s, portions of Lot 65 were utilized as a machine shop and for manufacturing (products manufactured not identified). In addition, a portion of Lot 16 was utilized by a laundry service from 1934 to at least 1951 (possibly until 1975). There is potential that the operations associated with these businesses affected the environmental quality of the subsurface soil and/or groundwater below the Site.

Adjacent Property Past Usage, 37-14 to 37-26 Prince Street, Lot C856 (43): a garage utilizing underground storage tanks (USTs) was depicted on historical records from 1934 until 2009. In addition, according to the EDR report Monahan Food Corp of 37-20 Prince Street (Lot C856 (43)), was identified as a large quantity generator of non-listed ignitable wastes in 1986 and 1996 and PCE in 1996 and 1997. There is potential that the operations associated with this business affected the environmental quality of the subsurface soil and/or groundwater below the Site.

The following historical recognized environmental conditions (HRECs) in connection with the Site were identified as a result of the completion of this Phase I ESA:

1. Lot 65 of the Site is listed as being associated with a registered Underground Storage Tank (UST) under provision of the New York State Department of Environmental Conservation (NYSDEC) Petroleum Bulk Storage (PBS) program. PBS No. 2-601710 was assigned to Linzer Products, Inc., 133-30 37<sup>th</sup> Avenue, for a 10,000 single walled steel No. 2 fuel oil UST was installed on December 1, 1993 and removed on January 1, 1994.
2. Lot 65 of the Site is associated with the NYSDEC Spill No. 9009651, which was assigned to 133-30 37<sup>th</sup> Avenue on November 19, 1992 and was considered closed by the NYSDEC on February 4, 1998.

3. The LTANK property listed Pittston/Metro Col. Pt., located at College Point Boulevard and 37th Avenue (i.e., Tax Block 4963 Lot 75) was assigned NYSDEC Spill No. 8000814 for a tank failure affecting groundwater. The spill was closed on October 29, 1987 by the NYSDEC; however, deemed uncollectible. Due to the proximity to Flushing Creek the groundwater may be affected by tidal influence and may have affected the environmental quality of the subsurface soil and/or groundwater below Lot 65 of the Site. Additional *de minimis* spills were assigned to this property (NYSDEC Spill No. 8707613 for a tank test failure, closed on December 5, 1987 and NYSDEC Spill No. 8803431 for a tank overflow, closed on July; 21, 1988).

Although not technically defined as RECs, the following is a list of potential environmental concerns at the Site that could potentially impact subsurface conditions at the Site:

- Information suggests that the Site is most likely underlain by historical urban fill material from an unknown origin.
- Any subsurface materials encountered should be handled and/or disposed according to all applicable regulations.
- Any suspected lead-based paint or asbestos-containing materials should be properly managed, if the materials are to be disturbed during future redevelopment activities.

#### **4.0 POTENTIAL HAZARDS RELATED TO FILL/SOIL**

This section provides a brief summary of the potential Compounds of Concern and related hazards at the Site.

##### **4.1 General**

The following information is presented in order to identify the types of materials that may be encountered at the Site. The detailed information on these materials was obtained from:

- SAX's Dangerous Properties of Industrial Materials – Lewis Eight Edition
- Chemical Hazards of the Workplace – Proctor/Hughes
- Condensed Chemical Dictionary – Hawley
- Rapid Guide to Hazardous Chemical in the Workplace – Lewis 1990
- NIOSH Pocket Guide to Chemical Hazards – 2005
- ACGIH TLV Values and Biological Exposure Indices
- OSHA 29 CFR 1910.1000

Several chemicals may potentially be present in soils and groundwater at the Site, based on historic operations conducted at the Site that have been identified. The Summary of Toxicological Data is found in Table 1 and is provided for review of chemicals that may be encountered. The Summary of Toxicological Data Sheets provides information such as the chemicals characteristics, health hazards, protection, and exposure limits.

##### **4.2 Compounds of Concern**

Lead-based paints may be found on painted surfaces in building structures built prior to 1978 (when the manufacturing of lead-based paint was banned). Since the existing and former buildings were constructed prior to this year, lead-based paint may be present in the existing structure.

The toxicological, physical, and chemical properties of potential contaminants are presented in Table 1.

### **4.3 Hazard Assessment**

The potential to encounter hazards related to surficial soil and groundwater is dependent upon the type of work activity performed and the duration and location of the work activity. Such hazards could include ingestion, inhalation and/or skin contact with chemicals that could cause: dermatitis, skin burns, or asphyxiation.

Physical hazards that may be encountered during Site work include; heat and cold stress, exposure to excessive noise, loss of limbs, being crushed, head injuries, punctures, cuts, falls, electrocution, bruises, structural integrity of buildings, asbestos and lead paint exposure, and other physical hazards due to motor vehicle operation, heavy equipment and power tools. The potential for Site Workers to be exposed to chemical hazards may occur during excavation, truck, and equipment cleaning activities.

Biological hazards may exist during Site activities. These hazards include exposure to insect bites/stings, animals and animal wastes, mold and blood borne pathogens.

Prior to the beginning of each new phase of work, an activity hazard analysis will be prepared by the SHSO with assistance from the GSS/CSS. The analysis will address the hazards for each activity performed in the phase and will present the procedures and safeguards necessary to eliminate the hazards or reduce the risk.

### **4.4 Exposure Pathways and Assessment**

Exposure to these compounds during ongoing activities may occur through inhalation of dust particles and by way of dermal absorption and accidental ingestion by either direct or indirect cross-contamination activities.

For groundwater, the most common exposure may occur via accidental ingestion or dermal absorption. Inhalation of dust particles can occur during adverse weather conditions (high or changing wind directions) or during operations that may generate airborne dust such as excavation and loading of Fill or Site grading. Dust control measures such as applying water to roadways and excavations will be implemented when visible dust is generated, in accordance with this construction HASP. Where dust control measures are not feasible or effective, respiratory protection will be used (see Section 7.0 for monitoring procedures and action levels).

#### 4.5 Additional Precautions

Inhalation and dermal absorption contact with LBP materials is possible during demolition activities at the Site. In addition, dermal absorption or skin contact with Site soils is possible during intrusive activities. The use of PPE and proper vehicle and Site Worker cleaning procedures should significantly reduce the risk of skin contact. The potential for accidental ingestion of Site soils/groundwater is expected to be remote when good hygiene practices are used.

#### 4.6 Hazard Assessment and Mitigation

<b>Task</b>	<b>Hazards</b>	<b>Risk of Exposure</b>	<b>Action Taken</b>
Mobilization/Demobilization	Inhalation/Skin Contact	Low	Proper PPE will be worn. No eating or drinking will be permitted in active work areas.
Site Building Demolition	Inhalation/Skin Contact	Low	Proper PPE will be worn. No eating or drinking will be permitted in active work areas.
Excavation and Loading of Soil	Inhalation/Skin Contact	Low	Proper PPE will be worn and Site Workers will remain upwind of excavation or loading areas, if possible. No eating or drinking will be permitted in active work areas.
Dewatering	Skin Contact	Low	Proper PPE will be worn. No eating or drinking will be permitted in active work areas.
Vehicle/Equipment Cleaning	Inhalation/Skin Contact	Low	Proper PPE will be worn during vehicle cleaning and worker shall remain upwind, if possible. No eating or drinking will be permitted in active work areas.

## **5.0 TRAINING**

This section details the training requirement for Site Workers.

### **5.1 Site-Specific Training**

Prior to the commencement of field activities, the SHSO, GSS, or CSS will provide Site-specific training to all Site Workers. Site Workers will receive training that will specifically address the activities, procedures, monitoring, and equipment for Site operations. It will include Site layout, hazards, fire prevention and response, first aid equipment locations and emergency services at the Site, and will highlight all provisions contained within this construction HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity. This training may be conducted in conjunction with other Site training or meetings.

### **5.2 Onsite Safety Meetings**

Safety meetings will take place to discuss potential safety concerns for the upcoming activities. At a minimum, the appropriate field supervisors or foremen for all workers will conduct at least one formal daily safety meeting in the morning; however, additional meetings or briefings may be necessary as a result of changing conditions or modifying tasks. Copies of the daily safety meeting sign in sheet and a description of items discussed will be provided to the CSS and will be kept at the Site.

The meetings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety audits by the Contractor or other involved parties. These meetings may be conducted in conjunction with other Site training or meetings.

Visitors onsite must be made aware of the hazards onsite in a Site-specific safety briefing and sign a statement indicating that they will comply with the applicable requirements of this HASP.

### **5.3 First Aid and CPR**

The SHSO will identify those individuals having first aid and CPR training to assist with emergency medical treatment during field activities, if necessary. The training will be consistent with the requirements of the American Red Cross. Certification and appropriate training documentation will be kept with the Site Workers' records by the SHSO.

## **6.0 SITE CONTROL AND PERSONAL PROTECTIVE EQUIPMENT**

This section provides a detailed description of the Site control measures and personal PPE procedures to be implemented at the Site. It is important to note that this construction HASP has been drafted to apply to work in Level D or modified Level D only. If the monitoring results require Level C protection or higher, all Site work will immediately cease until activities can be completed with workers trained in accordance with 29 CFR 1910.120.

### **6.1 Site Control**

Based on the Site history, there is a potential for historic fill in surficial soil onsite. In addition, LBP have been potentially identified in various areas of the Site buildings. As such, the Site, from land surface down to the native soil, will be considered the work area with respect to this construction HASP.

### **6.2 Personal Protective Equipment**

The level of protection worn by Site Workers will be enforced by the SHSO. The level of protection may be upgraded at the discretion of the SHSO. All decisions on the level of protection will be based upon a conservative interpretation by the SHSO of the information provided by air monitoring results and/or other appropriate information. Any changes in the level of protection shall be recorded in the health and safety field logbook. If the level of respiratory protection needs to be upgraded, the Contractor will immediately contact the Construction Manager and Owner's Representative.

The level of PPE for work on the Site is Level D PPE, which includes the following:

- Work uniform (long pants, sleeved shirt)
- Hard hat
- Steel-toed, steel-shanked work boots
- Safety glasses
- Boot covers (as needed)
- Hearing protection (as needed)
- Reflective safety vest

If required by the SHSO, modified Level D PPE may also be used at the Site during specific activities, consisting of the following:

- Regular Tyvek coveralls (Poly-coated Tyvek as required)
- Outer gloves: leather, cotton, neoprene or nitrile (as required)
- Inner gloves: latex or nitrile (doubled) as required
- Chemical resistant boots over work boots (as required)
- Steel-toed, steel-shanked work boots
- Hard hat
- Safety glasses
- Hearing protection, as needed
- Reflective safety vest

### **6.3 Site Control for Unexpected Conditions**

In the event that unexpected conditions or hazardous waste is encountered, thereby requiring workers trained in accordance with 29 CFR 1910.120, the following four-zone approach will be employed in order to prevent the spread of the contamination from the area containing the unexpected condition and to protect Site Workers. The four-zones include the Exclusion Zone, the Contamination Reduction Zone, the Remediated Zone, and the Support Zone. A stepped remedial approach will be managed and the zones modified as the work progresses. Each of the areas will be defined through the use of control barricades and/or construction/hazard fencing. A clearly marked delineation between the zones will be maintained. Signage will be posted to further identify and delineate these areas.

The following subsections describe the four zones that will be utilized in the event that unexpected conditions or contamination is discovered at the Site.

#### **6.3.1 Exclusion Zone**

The area where the unexpected condition is discovered would be considered the Exclusion Zone (EZ). All excavation and handling of contaminated materials generated as a result of the discovery of an unexpected condition would take place within the EZ. This zone will be clearly

delineated by hay bales, jersey barriers, and/or similar methods. Safety tape may be used as secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The SHSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Site Workers will not be allowed in the EZ without:

- A buddy (co-worker)
- Appropriate PPE
- Medical authorization
- Training certification

### **6.3.2 Contamination Reduction Zone**

A Contamination Reduction Zone (CRZ) will be established between the EZ and the property limits. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for decontamination of Site Workers and equipment. The CRZ will be used for general Site entry and egress, in addition to access for heavy equipment and emergency support services. Site Workers will not be allowed in the CRZ without:

- A buddy (co-worker)
- Appropriate PPE
- Medical authorization
- Training certification

### **6.3.3 Remediated Zone**

A Remediated Zone (RZ) will be established in portions of the Site where the remediation has been completed and only general construction work will be performed. Setup of the RZ will consist of implementing several measures designed to reduce the risk of workers' exposure and prevent non-trained workers from entering the non-remediated zone. Non-trained workers will work only in areas where the potential for exposure has been minimized by removal of all hazardous materials. The remediated zone will then be separated from the non-remediated zone by installing and maintaining temporary plywood or other construction fences along the boundary between the two zones. If potentially impacted material is uncovered in the RZ, all non-trained workers will be removed and the SHSO will assess the potential risks. If, at any other time, the

risk of exposure increases while non-trained workers are present in the RZ, the non-trained workers will be removed. At all times, when non-trained workers are present in the RZ, air monitoring for the presence of VOCs will be conducted in the RZ, as well as at the fence line of the non-remediated zone.

#### **6.3.4 Support Zone**

The Support Zone (SZ) will be an uncontaminated area that will be the field support area for the Site operations. The SZ will contain the temporary project trailers and provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated Site Workers or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. Meteorological conditions will be observed and noted from this zone, as well as those factors pertinent to heat and cold stress.

## **7.0 MONITORING PROCEDURES**

A Community Air Monitoring Plan (CAMP) will be conducted in the active work areas by Roux Associates during all excavation/truck loading activities, or as mandated by the SHSO.

According to the August 2014, Roux Associates Phase I ESA, the potential for historical contamination of the soil and groundwater exists across the Site. Since the site redevelopment includes excavation, soil stockpiling, and backfill activities, particulates will be monitored. Although VOCs were either non-detect (ND) or below NYSDEC TAGM 4046 guidance levels, limited VOC monitoring is included as part of the CAMP.

The monitoring program will monitor for particulates at the upwind and downwind perimeters of the work area during ground intrusive activities. The design of the CAMP is intended to provide a measure of protection for the downwind community and onsite workers not directly involved with the subject work activities from potential airborne contaminant releases as a direct result of remedial work and demolition activities.

Monitoring will be performed to verify the adequacy of the Level D respiratory protection, to aid in Site layout, and to document monitoring results. If air monitoring in these areas indicates the presence of potentially hazardous materials, control measures will be implemented. All monitoring instruments shall be operated by qualified personnel only and will be calibrated prior to use daily or more often, as necessary. No excavation or truck loading activities will be performed without the presence of the SHSO or designated approved substitute at the Site, and without air monitoring. The SHSO is responsible for ensuring that appropriate monitoring, levels of protection, and safety procedures are followed.

### **7.1 Instrumentation**

The following monitoring instruments will be available for use during field operations, as necessary. There will be a minimum of two of each piece of equipment on the Site at all times:

- Photoionization Detector (PID) with 10.6 EV probe, Flame Ionization Detector (FID), or equivalent.
- Dust/Particulate Monitor DustTrak 8530, or equivalent.

A PID and/or FID equipped organic vapor meter shall be used to monitor VOCs in and around active work areas during excavation and truck loading activities. VOCs shall also be measured upwind of the work areas to determine background concentrations.

A particulate monitor shall be used to measure concentrations of dust and particulate matter in and around the active work areas. Particulates shall also be measured upwind of the work areas to determine background concentrations.

All instruments shall be calibrated daily prior to use in accordance with the manufacturer's procedures. Calibration records shall be documented and recorded daily.

The frequency of monitoring should be determined by the SHSO after consultation with the CSS/GSS. The rationale for any modification must be documented and maintained by the SHSO in the onsite health and safety files.

## **7.2 Action Levels**

Action levels for the upgrading of PPE requirements in the construction HASP will apply to all Site work during excavation and truck loading activities at the Site. These action levels are for known contaminants measured using direct reading instruments in the Breathing Zone (BZ) for VOCs and particulates. The BZ will be determined by the SHSO, but is typically 4 to 5 feet above the work area surface or elevation.

An air horn will be readily available in the Site trailer. An additional air horn will be located in the work area to alert Site Workers to an emergency situation. In the event of an emergency or the need to upgrade the level of personal protection, sharp blasts of the air horn will be sounded. If the level of respiratory protection needs to be upgraded, the Contractor will immediately contact the Construction Manager and Owner's Representative.

## **8.0 VEHICLE/SITE WORKER CLEANING AREAS AND DISPOSAL PROCEDURES**

This section details the specific vehicle/Site Worker cleaning and waste disposal procedures to be implemented at the Site during the excavation and truck loading activities.

### **8.1 Contamination Prevention**

Contamination prevention should minimize worker exposure and help to avoid spreading Site derived soil onto the public roadways. Procedures for prevention include:

#### Site Workers

- Do not walk through areas of soil.
- Do not directly handle or touch soil.
- No eating or drinking in the soil areas.
- Particular care should be taken to protect any skin injuries.
- Stay upwind of dust.
- Do not use cigarettes, cosmetics, gum, etc., in areas of soil.

#### Heavy Equipment

- Care should be taken to limit the amount of soil that comes in contact with heavy equipment (tires).
- If tools used in soil are to be placed on equipment for transport to an area where all soil has been removed or to be cleaned, plastic should be used to keep the equipment clean.
- Dust control measures, including water misting, will be used on roads inside the Site boundaries.

### **8.2 Site Worker Cleaning Procedures**

All Site Workers shall pass through a cleaning procedure when exiting the active work areas in the Fill; including washing their hands and removing any loose soil from their clothing and boots. This will be accomplished in the designated Site Worker Cleaning Area to be located adjacent to active work areas in the soil. A field wash station for Site Workers, equipment, and PPE shall be set up and maintained by the Contractor. This will include a gross wash and rinse for boots worn in soil areas and, as necessary, equipment and facilities for Site Workers to wash their hands, arms, neck, and face after exiting areas of soil.

### **8.3 Vehicle Cleaning Area/Stabilized Construction Entrances**

One or more temporary vehicle cleaning areas will be constructed to clean disposal trucks and other vehicles and equipment prior to leaving the Site. This area will reduce the amount of soil that disposal trucks and other vehicles spread onto the public roadway. The vehicle cleaning area will be constructed of gravel and will be of sufficient size to prevent vehicles from spreading Fill/Soils onto the public roads and/or previously excavated areas of the Site where all soil has been removed. Before any disposal truck or other vehicle leaves the Site, the sides and wheels will be inspected. If any soils are observed on the wheels or body of the truck, they will be removed and collected for disposal using a shovel, broom, and/or other hand tools in the designated vehicle cleaning area. This will reduce the potential for disposal trucks to spread Site-derived material onto the public streets. This vehicle cleaning area may be upgraded to include wet vehicle cleaning procedures (i.e., power washing or steam cleaning), if deemed necessary by the SHSO, CSS, and/or GSS.

In addition, all equipment used for excavation and other earthwork activities (i.e., excavators, bulldozers, backhoes, etc.) which comes in contact with Fill shall be cleaned at the vehicle cleaning area prior to:

- Crossing into areas of the Site where no soil is present; and
- Leaving the Site.

No equipment will be allowed to leave the Site prior to the SHSO or Site Superintendent's inspection and verification that the equipment was properly cleaned.

### **8.4 Disposal Procedures**

A system of segregating all waste will be developed by the SHSO. All discarded materials, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading Fill, creating a sanitary hazard, or causing litter to be left onsite. If any potentially contaminated materials (e.g., clothing, gloves, etc.) are generated, they will be bagged or drummed, as necessary, labeled, and segregated for disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal as domestic waste.

## **9.0 HANDLING OF POTENTIAL HAZARDOUS MATERIALS**

Based on the results of previously-conducted soil and groundwater investigations, hazardous materials are not expected to be encountered.

## 10.0 EMERGENCY PLAN

The emergency plan outlined in this section will be understood by all Site Workers prior to the start of work so that, should an emergency occur, all parties will know how to respond. During an emergency, the SHSO will perform air monitoring as needed and will assist responding emergency personnel with health and safety information related to the Site. Site Workers will endeavor to keep non-essential personnel away from the incident until the appropriate emergency personnel arrive. At that time, the emergency personnel will take control of the Site. Site Workers may be asked to lend assistance to emergency personnel such as during evacuations, help with the injured, etc.

### 10.1 Emergency Response Numbers

The following sections provide emergency response and project management phone numbers. Emergencies encountered on this Site will be responded to via offsite emergency services personnel and Site Workers. The following master phone list will be prominently posted at the Contractor's construction trailer designated as the Site command post.

Emergency Medical Service .....	911
<u>Police</u> : New York City Police Department (NYPD) .....	911
<u>Hospital</u> : New York-Presbyterian/Queens .....	(718) 670-2000
National Response Center .....	(800) 424-8802
Poison Control Center .....	(800) 222-1222
Chemtrec .....	(800) 262-8200
<u>Fire</u> : New York City Fire Department (FDNY) .....	911
New York City Office of Emergency Management .....	911
Center for Disease Control .....	(800) 311-3435
USEPA (Region II) .....	(212) 637-5000
NYSDEC Emergency Spill Response .....	(800) 457-7362

The table in Section 1.2 provides the contact information for Project Management and Health and Safety Personnel.

### 10.2 Emergency Evacuation

Evacuation procedures will be discussed prior to the start of work and periodically during safety meetings. In the event of an emergency situation, such as fire or an explosion, an air horn or other

appropriate device will be sounded for three (3) sharp blasts, indicating the initiation of evacuation procedures. The emergency evacuation route shall be clearly posted in the appropriate Site trailers. Under no circumstances will incoming Site Workers or visitors be allowed to proceed into the area once the emergency signal has been given. Once the alarm has been sounded, the SHSO or GSS must ensure that access for emergency equipment is provided and that all combustion apparatuses have been shut down. All Site Workers will assemble outside of the active work areas and away from the area of danger and the fire department and other emergency response personnel will be notified by telephone of the emergency.

### **10.3 Injury to Site Workers**

Emergency first aid shall be applied onsite as appropriate. In the event that additional medical attention is necessary, the injured worker should be brought to the emergency room at the hospital. If the Site worker is unable to be brought to the hospital, 911 should be called and an ambulance sent to the Site.

### **10.4 Site Worker Exposure**

The following describes the appropriate mitigation measures to be followed in the event that Site Workers are exposed to contaminants.

<u>Skin Contact:</u>	Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then clean or remove PPE and provide appropriate medical attention, if necessary. Eyes should be rinsed for 15 minutes upon chemical contamination.
<u>Inhalation:</u>	Move to fresh air and/or, if necessary, clean or remove PPE and transport to emergency medical facility.
<u>Ingestion:</u>	Clean or remove PPE and transport to emergency medical facility, if necessary.
<u>Puncture Wound or Laceration:</u>	Clean or remove PPE and transport to emergency medical facility, if necessary.





**SHSO CERTIFICATION OF HOSPITAL DIRECTIONS**

Name of SHSO: \_\_\_\_\_

Date: \_\_\_\_\_

This is to certify that on \_\_\_\_\_, I personally drove the route to New York-Presbyterian/Queens as listed in the HASP. The Map Routing and Directions were/were not as listed in the plan. Listed below were conditions that resulted in different directions.

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Site Health and Safety Officer

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**Construction Health and Safety Plan**  
***133-31 39<sup>th</sup> Avenue (Block 4972, Lot(s) 8, 10, 16, 65)***  
***Flushing, Queens, New York***

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**TABLE**

- 1. Toxicological, Physical and Chemical Properties of Compounds Potentially Present at the Site**

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at Two Fulton Square, 133-31 39th Avenue, Flushing, NY**

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,1,1-Trichloroethane	71-55-6	TWA 350 ppm STEL 440 ppm C 440 ppm	C 350 ppm (1900 mg/m <sup>3</sup> ) [15-minute]	TWA 350 ppm (1900 mg/m <sup>3</sup> )	700 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eyes, skin, central nervous system, cardiovascular system, liver	Colorless liquid with a mild, chloroform-like odor. BP: 165°F UEL: 12.5% LEL: 7.5%
1,1,2-Trichloroethane	79-00-5	TWA 10 ppm	Ca TWA 10 ppm (45 mg/m <sup>3</sup> ) [skin]	TWA 10 ppm (45 mg/m <sup>3</sup> ) [skin]	Ca [100 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis; [potential occupational carcinogen]	Eyes, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, chloroform-like odor. BP: 237°F UEL: 15.5% LEL: 6%
1,1-Dichloroethane	75-34-3	TWA 100 ppm	TWA 100 ppm (400 mg/m <sup>3</sup> )	TWA 100 ppm (400 mg/m <sup>3</sup> )	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation skin; central nervous system depression; liver, kidney, lung damage	Skin, liver, kidneys, lungs, central nervous system	Colorless, oily liquid with a chloroform-like odor. BP: 135°F F.P.: 2°F UEL: 11.4% LEL: 5.4%
1,1-Dichloroethene	75-35-4	TWA 5 ppm	Ca (lowest feasible concentration)	TWA 1ppm	Ca [N.D.]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor. BP: 89°F F.P.: -2°F UEL: 15.5% LEL: 6.5% Class IA Flammable Liquid
1,2,4-Trimethylbenzene	95-63-6	None established	TWA 25 ppm (125mg/m <sup>3</sup> )	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 337°F F.L.P.: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable liquid
1,2,4-Trimethylbenzene	95-63-6	TWA 25 ppm (125 mg/n TWA 25 ppm (125 mg/m <sup>3</sup> )	TWA 25 ppm (125 mg/m <sup>3</sup> )	None established	N.D.	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 337°F F.L.P.: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable Liquid
1,2-Dichlorobenzene	95-50-1	TWA 25 ppm STEL 50 ppm	C 50 ppm (300 mg/m <sup>3</sup> )	C 50 ppm (300 mg/m <sup>3</sup> )	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; liver, kidney damage; skin blisters	Eyes, skin, respiratory system, liver, kidneys	Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide] BP: 357°F F.L.P.: 151°F UEL: 9.2% LEL: 2.2% Class IIIA Combustible Liquid
1,2-Dichloroethane	107-06-2	TWA 10 ppm	Ca TWA 1 ppm (4 mg/m <sup>3</sup> ) STEL 2 ppm (8 mg/m <sup>3</sup> )	TWA 50 ppm C 100 ppm 200 ppm [5-minute maximum peak in any 3 hours]	Ca [50 ppm]	inhalation, ingestion, skin absorption, skin and/or eye contact	Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]	Eyes, skin, kidneys, liver, central nervous system, cardiovascular system	Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.] BP: 182°F F.L.P.: 56°F UEL: 16% LEL: 6.2% Class IB Flammable Liquid

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at Two Fulton Square, 133-31 39th Avenue, Flushing, NY**

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,2-Dichloroethene (total)	540-59-0	TWA 200 ppm (790 mg/m <sup>3</sup> )	TWA 200 ppm (790 mg/m <sup>3</sup> )	TWA 200 ppm (790 mg/m <sup>3</sup> )	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor BP: 118-140°F FL.P: 36-39°F UEL: 12.8% LEL: 5.6% Class IB Flammable Liquid
1,3,5-Trimethylbenzene	108-67-8	None established	TWA 25 ppm (125mg/m <sup>3</sup> )	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 329°F FL.P: 122°F Class II Flammable liquid
1,3,5-Trimethylbenzene	108-67-8	TWA 25 ppm (125 mg/m <sup>3</sup> )	TWA 25 ppm (125 mg/m <sup>3</sup> )	None established	N.D.	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 329°F FL.P: 122°F Class II Flammable Liquid
1,4-Dichlorobenzene	106-46-7	TWA 10 ppm	Ca	TWA 75 ppm (450 mg/m <sup>3</sup> )	Ca [150 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Liver, respiratory system, eyes, kidneys, skin	Colorless or white crystalline solid with a mothball-like odor. [insecticide] BP: 345°F FL.P: 150°F LEL: 2.5% Combustible Solid
2,4-Dimethylphenol	105-67-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system, mouth, throat, stomach; dizziness, weakness, fatigue, nausea, headache; systemic damage; moderate to severe eye injury.	Skin, CVS, eyes, CNS	Clear, colorless liquid with a faint ether or chloroform-like odor BP: 178°F
2-Butanone (MEK)	78-93-3	TWA 200 ppm (590 mg/m <sup>3</sup> ) STEL 300 ppm (885 mg/m <sup>3</sup> )	TWA 200 ppm (590 mg/m <sup>3</sup> ) STEL 300 ppm (885 mg/m <sup>3</sup> )	TWA 200 ppm (590 mg/m <sup>3</sup> )	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor. BP: 175°F FL.P: 16°F UEL(200°F): 11.4% LEL(200°F): 1.4% Class IB Flammable Liquid
Acenaphthene	83-32-9	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system	Eyes, skin, respiratory system	Brown solid
Acetone	67-64-1	TWA 500 ppm STEL 50 ppm	TWA 250 ppm (590 mg/m <sup>3</sup> )	TWA 1000 ppm (2400 mg/m <sup>3</sup> )	2500 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a fragrant, mint-like odor BP: 133°F FL.P: 0°F UEL: 12.8% LEL: 2.5% Class IB Flammable Liquid

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at Two Fulton Square, 133-31 39th Avenue, Flushing, NY**

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Anthracene	65996-93-2	TWA 0.2 mg/m <sup>3</sup>	Ca TWA 0.1 mg/m <sup>3</sup> (cyclohexane-extractable fraction)	TWA 0.2 mg/m <sup>3</sup> (benzene-soluble fraction)	Ca [80 mg/m <sup>3</sup> ]	inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue. Combustible Solids
Antimony	7440-36-0	TWA 0.5 mg/m <sup>3</sup>	TWA 0.5 mg/m <sup>3</sup>	TWA 0.5 mg/m <sup>3</sup>	50 mg/m <sup>3</sup> (as Sb)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Eyes, skin, respiratory system, cardiovascular system	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder. BP: 2975°F
Arsenic (inorganic)	7440-38-2 (metal)	TWA 0.01 mg/m <sup>3</sup>	Ca C 0.002 mg/m <sup>3</sup> [15-min]	TWA 0.010 mg/m <sup>3</sup>	Ca [5 mg/m <sup>3</sup> (as As)]	Inhalation; ingestion; skin absorption; skin and/or eye contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]	Liver, kidneys, skin, lungs, lymphatic sys	Metal: silver-gray or tin-white, brittle, odorless solid BP: sublimes
Asbestos	1332-21-4	TWA 0.1 f/cc	Ca 100,000 fibers/m <sup>3</sup>	TWA 0.1 fiber/cm <sup>3</sup>	Ca [IDLH value has not been determined]	Inhalation; ingestion; skin and/or eye contact	Asbestosis (chronic exposure), dyspnea, interstitial fibrosis, restricted pulmonary function, finger clubbing, irritation eyes, [potential occupational carcinogen]	Respiratory system, eyes,	White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite), fibrous, odorless solids. BP: decomposes
Asphalt fumes	8052-42-4	TWA 0.5 mg/m <sup>3</sup> (fumes)	Ca C 5 mg/m <sup>3</sup> [15 min]	None established	Ca [IDLH value has not been determined]	Skin absorption; inhalation; skin and/or eye contact	Irritation eyes, resp sys	Eyes, respiratory system	Black or dark brown cement-like substance Combustible solid
Barium	7440-39-3	TWA 0.5 mg/m <sup>3</sup>	None established	TWA 0.5 mg/m <sup>3</sup>	None established	Inhalation, ingestion, skin contact	Irritation skin, respiratory system, digestive system	Skin, eyes, respiratory system	Yellow white powder BP: 1640 C
Benzene	71-43-2	TWA 0.5 ppm STEL 2.5 ppm	Ca TWA 0.1 ppm STEL 1 ppm	TWA 1 ppm STEL 5 ppm	Ca [500 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, blood, central nervous system, bone marrow	Colorless to light yellow liquid with an aromatic odor [Note: Solid below 42 °F] BP: 176°F FLPt = 12°F LEL: 1.2% UEL: 7.8% Class B Flammable liquid
Benzo[a]anthracene	56-55-3	None established	None established	None established	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	Irritation eyes, skin, respiratory system, CNS	Skin	Pale Yellow crystal, solid BP: 438 C
Benzo[a]pyrene	50-32-8	None established	TWA 0.1 mg/m <sup>3</sup>	TWA 0.2 mg/m <sup>3</sup>	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	POISON. This material is an experimental carcinogen, mutagen, tumorigen, neoplastigen and teratogen. It is a probable carcinogen in humans and a known human mutagen. IARC Group 2A carcinogen. It is believed to cause bladder, skin and lung cancer. Exposure to it may damage the developing foetus. May cause reproductive damage. Skin, respiratory and eye irritant or burns.	Skin, eye, bladder, lung, reproductive	Yellow crystals or powder [found in cigarette smoke, coal tar, fuel exhaust gas and in many other sources] BP: 495 C

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at Two Fulton Square, 133-31 39th Avenue, Flushing, NY**

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Benzo[b]fluoranthene	205-99-2	None established	TWA 0.1 mg/m <sup>3</sup>	TWA 0.2 mg/m <sup>3</sup>	None established	Inhalation; ingestion; skin and/or eye contact	No data were identified on the toxicity of benzo[b]fluoranthene to humans. Based on results of studies in animals, IARC concluded that benzo[b]fluoranthene is possibly carcinogenic to humans	Respiratory system, skin, bladder, kidneys	Off-white to tan powder
Benzo[k]fluoranthene	207-08-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory tract, gastrointestinal; fatal if swallowed, inhaled, absorbed through the skin; vomiting, nausea, diarrhea	Lungs, respiratory system	Yellow crystals BP: 480 C
Beryllium	7440-41-7 (metal)	TWA 0.002 mg/m <sup>3</sup>	Ca C 0.0005 mg/m <sup>3</sup>	TWA 0.002 mg/m <sup>3</sup> C 0.005 mg/m <sup>3</sup> (30 minutes) with a maximum peak of 0.025 mg/m <sup>3</sup>	Ca [4 mg/m <sup>3</sup> (as Be)]	inhalation, skin and/or eye contact	Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen]	Eyes, skin, respiratory system	Metal: A hard, brittle, gray-white solid. BP: 4532°F
Bis(2-ethylhexyl) phthalate	117-81-7	TWA 5 mg/m <sup>3</sup>	TWA 5 mg/m <sup>3</sup> STEL 10 mg/m <sup>3</sup> (do not exceed during any 15-minute work period)	TWA 5 mg/m <sup>3</sup>	None established	inhalation, skin and/or eye contact	Irritation eyes, skin, nose, throat; affect the nervous system and liver; damage to male reproductive glands	Eyes, skin, nose, respiratory system, nervous system, reproductive system, liver	Colorless to light colored, thick liquid with slight odor
Butane	106-97-8	TWA 1000 ppm	TWA 800 ppm (1900 mg/m <sup>3</sup> )	None established	None established	inhalation, skin and/or eye contact (liquid)	Drowsiness, narcosis, asphyxia; liquid: frostbite	central nervous system	Colorless gas with a gasoline-like or natural gas odor. BP: 31°F UEL: 8.4% LEL: 1.6% Flammable Gas
Cadmium	7440-43-9 (metal)	TWA 0.01 mg/m <sup>3</sup>	Ca	TWA 0.005 mg/m <sup>3</sup>	Ca [9 mg/m <sup>3</sup> (as Cd)]	inhalation, ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	respiratory system, kidneys, prostate, blood	Metal: Silver-white, blue-tinged lustrous, odorless solid. BP: 1409°F
Carbon Disulfide	75-15-0	TWA 1 ppm	TWA 1 ppm (3 mg/m <sup>3</sup> ) STEL 10 ppm (30 mg/m <sup>3</sup> ) [skin]	TWA 20 ppm C 30 ppm 100 ppm (30-minute maximum peak)	500 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Dizziness, headache, poor sleep, lassitude (weakness, exhaustion), anxiety, anorexia, weight loss; psychosis; polyneuropathy; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects	central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system	Colorless to faint-yellow liquid with a sweet ether-like odor. BP: 116°F Fl.P: -22°F UEL: 50.0% LEL: 1.3% Class IB Flammable Liquid
Chlorobenzene	108-90-7	TWA 10 ppm	None established	TWA 75 ppm (350 mg/m <sup>3</sup> )	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eyes, skin, respiratory system, central nervous system, liver	Colorless liquid with an almond-like odor BP: 270°F Fl.P: 82°F UEL: 9.6% LEL: 1.3%

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at Two Fulton Square, 133-31 39th Avenue, Flushing, NY**

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Chloroethane	75-00-3	TWA 100ppm	Handle with caution in the workplace	TWA 1000 ppm (2600 mg/m <sup>3</sup> )	3800 ppm [10%LEL]	inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact	Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage	Liver, kidneys, respiratory system, cardiovascular system, central nervous system	Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. BP: 54°F FLP: NA (Gas) -58°F (Liquid) UEL: 15.4% LEL: 3.8% Flammable Gas
Chloroform	67-66-3	TWA 10 ppm	Ca	C 50 ppm (240 mg/m <sup>3</sup> )	Ca [500 ppm]	inhalation, skin	Irritation eyes, skin; dizziness,	Liver, kidneys, heart, eyes,	Colorless liquid with a pleasant odor
Kerosene	8008-20-6	TWA 200 mg/m <sup>3</sup>	TWA 100 mg/m <sup>3</sup>	None established	IDLH value has not been determined	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system	Colorless to yellowish, oily liquid with a strong, characteristic odor. BP: 347-617°F FLP: 100-162°F UEL: 5% LEL: 0.7% Class II Combustible Liquid
Lead	7439-92-1	TWA 0.05 mg/m <sup>3</sup>	TWA (8-hour) 0.050 mg/m <sup>3</sup>	TWA 0.050 mg/m <sup>3</sup>	100 mg/m <sup>3</sup> (as Pb)	inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid. BP: 3164°F Noncombustible Solid in bulk form
Manganese	7439-96-5 (metal)	TWA 0.2 mg/m <sup>3</sup>	TWA 1 mg/m <sup>3</sup> STEL 3 mg/m <sup>3</sup>	C 5 mg/m <sup>3</sup>	500 mg/m <sup>3</sup> (as Mn)	inhalation, ingestion	Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage	respiratory system, central nervous system, blood, kidneys	A lustrous, brittle, silvery solid. BP: 3564°F
Mercury (organo) alkyl compounds (as Hg)	7439-97-6	TWA 0.01 mg/m <sup>3</sup> STEL 0.03 mg/m <sup>3</sup> [skin]	TWA 0.01 mg/m <sup>3</sup> STEL 0.03 mg/m <sup>3</sup> [skin]	TWA 0.01 mg/m <sup>3</sup> C 0.04 mg/m <sup>3</sup>	2 mg/m <sup>3</sup> (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	Paresthesia; ataxia, dysarthria; vision hearing disturbance; spasticity, jerking limbs; dizziness; salivation; lacrimation (discharge of tears); nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance; kidney injury; possible teratogenic effects	Eyes, skin, central nervous system, peripheral nervous system, kidneys	Appearance and odor vary depending upon the specific (organo) alkyl mercury compound
Mercury compounds [except (organo) alkyls] (as Hg) Mercury	7439-97-6	TWA 0.025 mg/m <sup>3</sup> (elemental and inorganic forms)	Hg Vapor: TWA 0.05 mg/m <sup>3</sup> [skin] Other: C 0.1 mg/m <sup>3</sup> [skin]	TWA 0.1 mg/m <sup>3</sup>	10 mg/m <sup>3</sup> (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eyes, skin, respiratory system, central nervous system, kidneys	Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.] BP: 674°F
Methyl tert-butyl ether (MTBE)	1634-04-4	TWA 50 ppm	No established REL	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, mucous membrane, respiratory; dizziness, nausea, headache, intoxication	Eyes, skin, mucous membrane, respiratory system, central nervous system	Colorless liquid BP: 55.2 C

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at Two Fulton Square, 133-31 39th Avenue, Flushing, NY**

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Methylene Chloride	75-09-2	TWA 50 ppm, A3 - suspected human carcinogen	Ca	TWA 25 ppm STEL 125 ppm	Ca [2300 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingle limbs; nausea; [potential occupational carcinogen]	Eyes, skin, cardiovascular system, central nervous system	Colorless liquid with a chloroform-like odor BP: 104°F UEL: 23% LEL: 13%
Naphtha (coal tar)	8030-30-6	None established	TWA 100 ppm (400 mg/m <sup>3</sup> )	TWA 100 ppm (400 mg/m <sup>3</sup> )	1000 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; dizziness, drowsiness; dermatitis; in animals: liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Reddish-brown, mobile liquid with an aromatic odor BP: 320-428°F Fl.P: 100-109°F Class II Combustible Liquid
Naphthalene	91-20-3	TWA 10 ppm STEL 15 ppm	TWA 10 ppm (50 mg/m <sup>3</sup> ) STEL 15 ppm (75 mg/m <sup>3</sup> )	TWA 10 ppm (50 mg/m <sup>3</sup> )	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	Colorless to brown solid with an odor of mothballs. BP: 424°F Fl.P: 174°F UEL: 5.9% LEL: 0.9%
n-Butylbenzene	104-51-8	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS depression, lung damage; nausea, vomiting, headache, dizziness, weakness, loss of coordination, blurred vision, drowsiness, confusion, disorientation	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a sweet odor BP: 183 C Fl.P: 59 C UEL: 5.8% LEL: 0.8%
Nickel	7440-02-0 (Metal)	TWA 1.5 mg/m <sup>3</sup> (elemental) TWA 0.1 mg/m <sup>3</sup> (soluble inorganic compounds) TWA 0.2 mg/m <sup>3</sup> (insoluble inorganic compounds) TWA 0.1 mg/m <sup>3</sup> (Nickel subsulfide)	Ca TWA 0.015 mg/m <sup>3</sup>	TWA 1 mg/m <sup>3</sup>	Ca [10 mg/m <sup>3</sup> (as Ni)]	inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin	Metal: Lustrous, silvery, odorless solid. BP: 5139°F
Nitrobenzene	98-95-3	TWA 1 ppm	TWA 1 ppm (5 mg/m <sup>3</sup> ) [skin]	TWA 1 ppm (5 mg/m <sup>3</sup> ) [skin]	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; anoxia; dermatitis; anemia; methemoglobinemia; in animals: liver, kidney damage; testicular effects	Eyes, skin, blood, liver, kidneys, cardiovascular system, reproductive system	Yellow, oily liquid with a pungent odor like paste shoe polish. BP: 411°F Fl.P: 190°F LEL(200°F): 1.8%
n-Propylbenzene	103-65-1	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Harmful if swallowed, Irritation eyes, skin, digestive tract, respiratory tract, central nervous system	Eyes, skin, central nervous system, respiratory system	colorless or light yellow liquid BP: 159 C Fl.P: 47 C UEL: 6% LEL: 0.8%
Petroleum hydrocarbons(Petroleum distillates)	8002-05-9	None established	TWA 350 mg/m <sup>3</sup> C 1800 mg/m <sup>3</sup> [15 min]	TWA 500 ppm (2000 mg/m <sup>3</sup> )	1,100 [10% LEL]	Inhalation; ingestion; skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, drowsiness, headache, nausea; dried/cracked skin; chemical pneumonitis	CNS, eyes, respiratory system, skin	Colorless liquid with a gasoline or kerosene-like odor BP: 86-460°F Fl. Pt = -40 to -86°F UEL: 5.9% LEL: 1.1% Flammable liquid

**Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at Two Fulton Square, 133-31 39th Avenue, Flushing, NY**

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Phenol	108-95-2	TWA 5 ppm	TWA 5 ppm (19 mg/m <sup>3</sup> ) C 15.6 ppm (60 mg/m <sup>3</sup> ) [15-minute] [skin]	TWA 5 ppm (19 mg/m <sup>3</sup> ) [skin]	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis;	Eyes, skin, respiratory system, liver, kidneys	Colorless to light-pink, crystalline solid with a sweet, acrid odor. BP: 359°F UEL: 8.6% LEL: 1.8%
Xylene (m, o & p isomers)	108-38-3, 95-47-6, 106-42-3	TWA 100 ppm (435 mg/m <sup>3</sup> ) STEL 150 ppm	TWA 100 ppm (435 mg/m <sup>3</sup> )	TWA 100 ppm (435 mg/m <sup>3</sup> )	900 ppm	Skin absorption, inhalation, ingestion, skin, and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys	Colorless liquid with an aromatic odor BP: 282°F, 292°F, 281°F Fl. Pt. 82°F, 90°F, 81°F LEL: 1.1%, 0.9%, 1.1% UEL: 7.0%, 6.7%, 7.0% Class C Flammable Liquid
Zinc	7440-66-6	TWA 10 mg/m <sup>3</sup> (Inhalable fraction)	None established	TWA 10 mg/m <sup>3</sup> (for zinc oxide fume)	None established	skin and/or eye contact, inhalation, ingestion	Irritation eyes, skin, respiratory tract; gastrointestinal disturbances	Eyes, skin, respiratory system	Bluish gray solid BP: 1664.6°F Flammable

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**Abbreviations:**

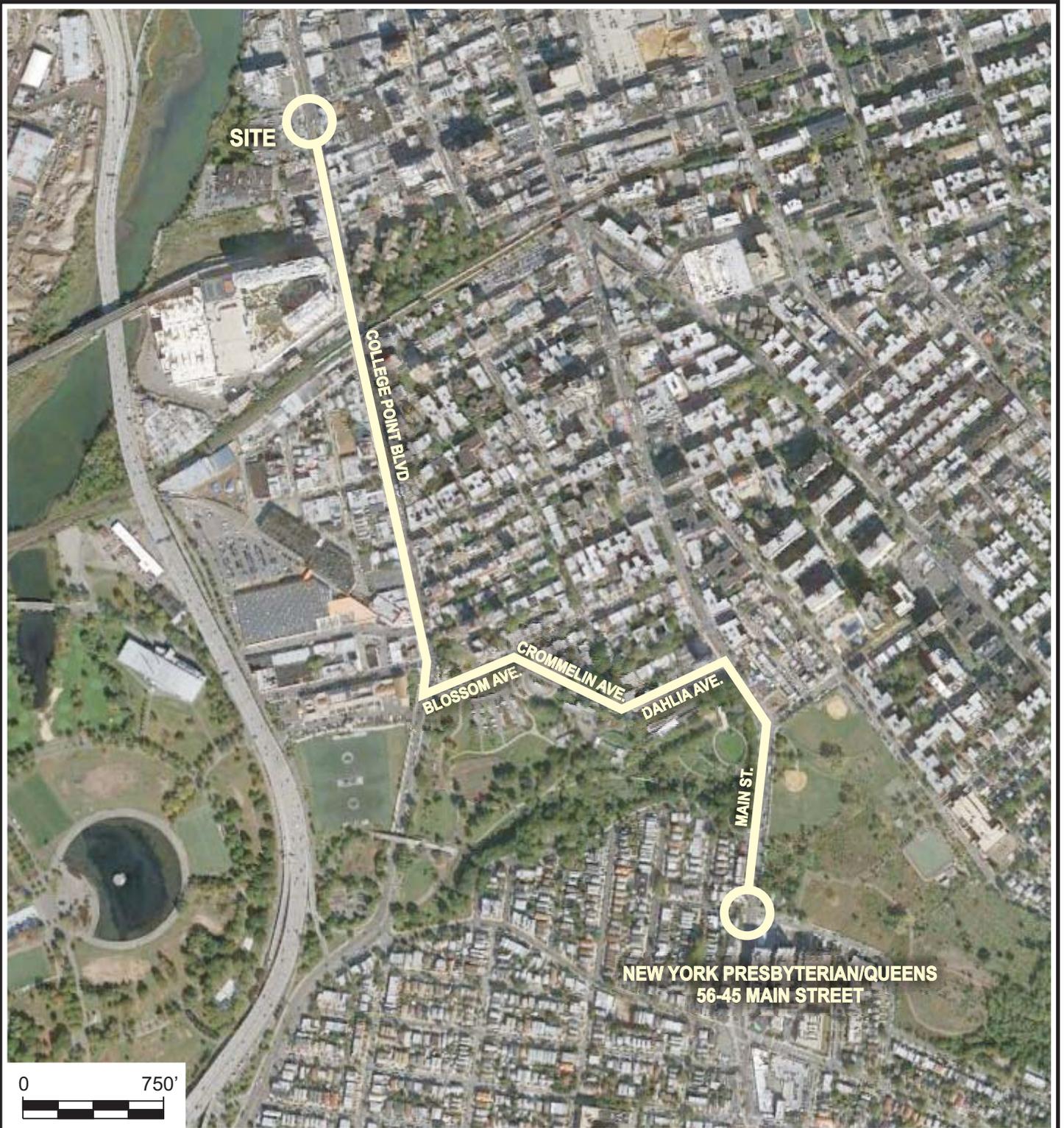
ACGIH – American Conference of Governmental Industrial Hygienists.  
BP – boiling point at 1 atmosphere, °F  
C – Ceiling, is a concentration that should not be exceeded during and part of the working exposure.  
Ca - considered by NIOSH to be a potential occupational carcinogen  
CAS# Chemical Abstracts Service registry number which is unique for each chemical.  
Fl. Pt. – Flash point  
which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without  
LEL – Lower explosive (flammable) limit in air, % by volume (at room temperature)  
mg/m<sup>3</sup> – Milligrams of substance per cubic meter of air  
NIOSH -National Institute for Occupational Safety and Health.  
OSHA – Occupational Safety and Health Administration  
PEL - OSHA Permissible Exposure Limit (usually) a time weighted average concentration that must not be exceeded during any 8 hour work shift of a 40 hr work week.  
ppm – parts per million  
REL – NIOSH Recommended Limit indicated a time weighted average concentration that must not be exceeded during any 10 hour work shift of a 40 hr work week  
STEL – Short-term exposure limit  
TLV -ACGIH Threshold Limit Values (usually 8 hour time weighted average concentrations).  
TWA – 8-hour, time-weighted average  
UEL – Upper explosive (flammable) limit in air, % by volume (at room temperature)

**Construction Health and Safety Plan**  
***133-31 39<sup>th</sup> Avenue (Block 4972, Lot(s) 8, 10, 16, 65)***  
***Flushing, Queens, New York***

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**FIGURE**

**1. Hospital Route Map**



**DIRECTIONS FROM SITE TO NY PRESBYTERIAN/QUEENS**

- HEAD SOUTH ON COLLEGE POINT BLVD
- GO 0.5 MI. AND TURN LEFT ONTO BLOSSOM AVE.
- GO 0.1 MI. AND BLOSSOM BECOMES CROMMELIN AVE.
- GO 0.1 MI. AND CREMMELIN AVE TURNS LEFT AND BECOMES DAHLIA AVE.
- GO 0.1 MI. AND TURN RIGHT ONTO MAIN ST.
- GO 486 FEET AND NEW YORK PRESBYTERIAN/QUEENS HOSPITAL WILL BE ON LEFT. ADDRESS IS 56-45 MAIN STREET.



Title:

**HOSPITAL ROUTE MAP**

TWO FULTON SQUARE  
FLUSHING, NEW YORK

Prepared for:

TWO FULTON SQUARE, LLC



ROUX ASSOCIATES, INC.  
Environmental Consulting  
& Management

Compiled by: M.L.	Date: 20AUG15
Prepared by: G.M.	Scale: AS SHOWN
Project Mgr.: J.C.	Project No.: 1633.0008Y002
File: 1633.0008Y107.01.CDR	

FIGURE

**1**