113 HAMILTON AVENUE
BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC VCP Project Number 19CVCP079K
NYSDEC Spill # 8904339

Prepared For:
113 Hamilton Avenue LLC
1946 Coney Island Avenue, Brooklyn, NY 11223
sam@renrealty.com
(718) 376-5400

Prepared By:
Advanced Site Restoration, LLC and by
John A. Rhodes, P.E.
62 William Street, 3rd Floor, New York, NY 10005
RLevato@askasr.com/jarhodes1@verizon.net
(212) 809.1110 / (646) 465-2494

June 2019

Table of Contents

1 EXECUTIVE SUMMARY 12

1.1 Site Location and Background 12
1.2 Summary of Redevelopment Plan 12
1.3 Summary of Surrounding Property 13
1.4 Summary of Past Site Uses and Areas of Concern 13
1.5 Summary of Work Performed under the Remedial Investigation 14
1.6 Summary of Findings of the Remedial Investigation 14
1.7 Summary of the Proposed Remedial Action 16

2 COMMUNITY PROTECTION STATEMENT 20

2.1 Project Information 20
2.2 Project Contacts 20
2.3 Remedial Investigation and Cleanup Plan 20
2.4 Identification of Sensitive Land Uses 20
2.5 Qualitative Human Health Exposure Assessment 20
2.5.1 Construction Health and Safety Plan 21
2.5.2 Site Safety Coordinator 21
2.5.3 Worker Training 21
2.6 Community Air Monitoring Plan 21
2.7 Odor, Dust and Noise Control 21
2.8 Quality Assurance 21
2.9 Stormwater Management 22
2.10 Hours of Operation 22
2.11 Signage 22
2.12 Complaint Management 22
2.13 Utility Mark-outs 22
2.14 Soil and Liquid Disposal 22
2.15 Soil Chemical Testing and Screening 22
2.16 Stockpile Management 23
2.17 Trucks and Covers 23
2.18 Imported Material 23
2.19 Equipment Decontamination 23
2.20 Housekeeping 23
2.21 Truck Routing 23
2.22 Final Report 23
2.23 Long-Term Site Management 24

3 REMEDIAL ACTION WORK PLAN 25

3.1 Project Background 25
3.1.1 Site Location and Background 25
3.1.2 Redevelopment Plan 25
3.1.3 Description of Surrounding Property 26
3.1.4 Summary of Past Site Uses and Areas of Concern 26
3.1.5 Summary of Work Performed under the Remedial Investigation 27

3.1.6 Summary of Findings of Remedial Investigation 27
3.2 Remedial Action Objectives 30
3.2.1 Soil 30
3.2.2 Groundwater 30
3.2.3 Soil Vapor 30
3.3 Remedial Alternatives Analysis 31
3.3.1 Alternatives 31
3.3.2 Criteria 33
Selection of the Preferred Remedy 37
3.4 Summary of Preferred Remedial Action 39
3.5 Soil Cleanup Objectives and Soil/ Fill Management 42
3.6 Soil/Fill Excavation and Removal and Groundwater Treatment 42
3.6.1 Disposal Facilities 43
3.6.2 End-point Sampling 43
3.6.3 Quality Assurance/Quality Control 44
3.6.4 Groundwater Treatment 45
3.6.5 Proposed Post Redevelopment Monitoring Well Networking. 45
3.7 Import of Soils 46
3.8 Reuse of Onsite Soils 46
3.9 Engineering Controls 46
3.9.1 Composite Cover System 46
3.9.2 Vapor Barrier System 46
3.9.3 Active Sub-Slab Depressurization System 47
3.10 Institutional Controls 48
4 Site Management Plan 49
5 Qualitative Human Health Exposure Assessment 49
5.1 Known and Potential Contaminant Sources 50
5.2 Summary of Results from the RIR 51
5.3 Receptor Populations 51
5.4 Potential Routes of Exposure 52
5.5 Potential Exposure Points 52
5.6 Overall Human Health Exposure Assessment 52
6 Remedial Action Management 54
6.1 Project Organization and Oversight 54
6.2 Site Security 54
6.3 Work Hours 54
6.4 Construction Health and Safety Plan 54
6.5 Community Air Monitoring Plan 55
6.5.1 VOC Monitoring, Response Levels, and Actions 55
6.5.2 Particulate Monitoring, Response Levels, and Actions 56
6.6 Agency Approvals 56
6.7 Site Preparation 56
6.7.1 Pre-Construction Meeting 56
6.7.2 Mobilization 56
6.7.3 Utility Marker Layouts, Easement Layouts 57
6.7.4 Dewatering 57

6.8 Equipment and Material Staging 57
6.8.1 Stabilized Construction Entrance 57
6.8.2 Truck Inspection Station 58
6.9 Extreme Storm Preparedness and Response Contingency Plan 58
6.9.1 Storm Preparedness 58
6.9.2 Storm Response 58
6.9.3 Storm Response Reporting 59
6.10 Traffic Control 59
6.11 Demobilization 59
6.12 Reporting and Record Keeping 60
6.12.1 Daily reports 60
6.12.2 Record Keeping and Photo Documentation 60
6.12.3 Complaint Management 61
6.13 Deviations from The Remedial Action Work Plan 61
7 Remedial Action Report 61
7.1 Remedial Action Report Certification 63
8 Schedule 65

REMEDIAL ACTION WORK PLAN

TABLE OF CONTENTS

1 EXECUTIVE SUMMARY 12

1.1 Site Location and Background 12
1.2 Summary of Redevelopment Plan 12
1.3 Summary of Surrounding Property 13
1.4 Summary of Past Site Uses and Areas of Concern 13
1.5 Summary of Work Performed under the Remedial Investigation 14
1.6 Summary of Findings of the Remedial Investigation 14
1.7 Summary of the Proposed Remedial Action 16

2 COMMUNITY PROTECTION STATEMENT 20

2.1 Project Information 20
2.2 Project Contacts 20
2.3 Remedial Investigation and Cleanup Plan 20
2.4 Identification of Sensitive Land Uses 20
2.5 Qualitative Human Health Exposure Assessment 20
2.5.1 Health and Safety Plan 21
2.5.2 Site Safety Coordinator 21
2.5.3 Worker Training 21
2.6 Community Air Monitoring Plan 21
2.7 Odor, Dust and Noise Control 21
2.8 Quality Assurance 21
2.9 Stormwater Management 22
2.10 Hours of Operation 22
2.11 Signage 22
2.12 Complaint Management 22
2.13 Utility Mark-outs 22
2.14 Soil and Liquid Disposal 22
2.15 Soil Chemical Testing and Screening 22
2.16 Stockpile Management 23
2.17 Trucks and Covers 23
2.18 Imported Material 23
2.19 Equipment Decontamination 23
2.20 Housekeeping 23
2.21 Truck Routing 23
2.22 Final Report 23
2.23 Long-Term Site Management 24

3 REMEDIAL ACTION WORK PLAN 25

3.1 Project Background 25
3.1.1 Site Location and Background 25
3.1.2 Redevelopment Plan 25
3.1.3 Description of Surrounding Property 26
3.1.4 Summary of Past Site Uses and Areas of Concern 26
3.1.5 Summary of Work Performed under the Remedial Investigation 27
3.1.6 Summary of Findings of Remedial Investigation 27

3.2 Remedial Action Objectives 30
3.2.1 Soil 30
3.2.2 Groundwater 30
3.2.3 Soil Vapor 30
3.3 Remedial Alternatives Analysis 30
3.3.1 Alternatives 31
3.3.2 Criteria 33
4 Remedial Action 37
4.1 Summary of Preferred Remedial Action 39
4.2 Soil Cleanup Objectives and Soil/ Fill Management 42
4.3 Soil/Fill Excavation and Removal and Groundwater Treatment 42
4.3.1 Disposal Facilities 43
4.3.2 End-point Sampling 43
4.3.3 Quality Assurance/Quality Control 44
4.3.4 Groundwater Treatment 45
4.3.5 Proposed Post Redevelopment Monitoring Well Networking. 45
4.4 Import of Soils 46
4.5 Reuse of Onsite Soils 46
4.6 Engineering Controls 46
4.6.1 Composite Cover System 46
4.6.2 Vapor Barrier System 46
4.6.3 Sub-Slab Depressurization System 47
4.7 Institutional Controls 48
5 Site Management Plan 49
6 Qualitative Human Health Exposure Assessment 49
6.1 Known and Potential Contaminant Sources 50
6.2 Nature, Extent, Fate and Transport of Contaminants 51
6.3 Receptor Populations 51
6.4 Potential Routes of Exposure 52
6.5 Potential Exposure Points 52
6.6 Overall Human Health Exposure Assessment 52
7 Remedial Action Management 54
7.1 Project Organization and Oversight 54
7.2 Site Security 54
7.3 Work Hours 54
7.4 Construction Health and Safety Plan 54
7.5 Community Air Monitoring Plan 55
7.5.1 VOC Monitoring, Response Levels, and Actions 55
7.5.2 Particulate Monitoring, Response Levels, and Actions 56
7.6 Agency Approvals 56
7.7 Site Preparation 56
7.7.1 Pre-Construction Meeting 56
7.7.2 Mobilization 56
7.7.3 Utility Marker Layouts, Easement Layouts 57
7.7.4 Dewatering 57
7.8 Equipment and Material Staging 57

7.8.1 Stabilized Construction Entrance ... 57
7.8.2 Truck Inspection Station ... 58
7.9 Extreme Storm Preparedness and Response Contingency Plan ... 58
7.9.1 Storm Preparedness ... 58
7.9.2 Storm Response ... 58
7.9.3 Storm Response Reporting ... 59
7.10 Traffic Control ... 59
7.11 Demobilization ... 59
7.12 Reporting and Record Keeping ... 60
7.12.1 Daily reports ... 60
7.12.2 Record Keeping and Photo Documentation ... 60
7.12.3 Complaint Management ... 61
7.13 Deviations from The Remedial Action Work Plan ... 61
8 Remedial Action Report ... 61
8.1 Remedial Action Report Certification ... 63
9 Schedule ... 65
APPENDIX 1 CITIZEN PARTICIPATION PLAN ... 66
APPENDIX 2 SUSTAINABILITY STATEMENT ... 69
APPENDIX 3 SOIL/MATERIALS MANAGEMENT PLAN ... 71
APPENDIX 4 CONSTRUCTION HEALTH AND SAFETY PLAN ... 77
APPENDIX 5 MANUFACTURER SPECIFICATIONS and WARRANTEE FOR VAPOR BARRIER ... 78
APPENDIX 6 SPECIFICATIONS FOR SUB-SLAB DEPRESSURIZATION SYSTEM .. 91

FIGURES

Figure 1: Site Location Map

Figure 2: Site Location & Surrounding Properties Map

Figure 3: Proposed Monitoring Well Network

Figure 4: Excavation Plan

Figure 5: Vapor Barrier & Composite Cover

Figure 6: SSDS Piping Layout

Figure 7: SSDS Details

Figure 8: Imported Fill

Figure 9: Truck Routing

LIST OF ACRONYMS

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

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

CERTIFICATION

I, John A. Rhodes, 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 113 Hamilton Avenue, Site number 19CVCP079K. 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.

John A. Rhodes, P.E.

PE License Number: 84423

Signature

6/27/2019

Date

I, Richard Levato, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for 113 Hamilton Avenue, site number 19CVCP079K. 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.

_____
Signature

6/27/2019
_____
Date

1 EXECUTIVE SUMMARY

113 Hamilton Avenue LLC on behalf of ExxonMobil Oil Corporation ("ExxonMobil") is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 5,119-square foot site located at 113 Hamilton Avenue in Brooklyn, New York (the "Site"). A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). 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 to applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 113 Hamilton Avenue in Brooklyn, New York and is identified as Block 362 and Lot 1 on the New York City Tax Map. The triangular shaped Site is 5,119-square feet and is bounded by Woodhull Street to the north, the intersection of Columbia Street and Hamilton Street to the south, Columbia Street to the east, and Hamilton Avenue to the west. Currently, the Site is used for an automobile repair facility and contains a 1,477-square foot single-story slab-on-grade concrete building with three (3) service bays located on the northeast portion of the property. An above-ground storage tank (AST) containing used oil is located on the east side of the building on-site. The remainder of the property is used as an asphalt-paved parking lot. Public utilities servicing the Site include subsurface sewer, water, electric, natural gas piping, and telephone lines.

1.2 Summary of Redevelopment Plan

The proposed future use of the Site will consist of a one-story restaurant and bar with a small mezzanine above the kitchen and bathroom area. The building will be approximately 30 feet in height and will contain no basement or landscaped areas. The proposed development will cover the entire footprint of the site which is approximately 5,119 square feet. The ground floor is approximately 4,209 square feet and the mezzanine is approximately 1,310 square feet in size. The remainder of the property will be used for outdoor seating. The current zoning designation is M1-1: manufacturing district. The proposed use is consistent with existing zoning for the property.

The development will require limited excavation to 4 feet below grade to support footings/grade beams. An existing pile cap in the northwest corner of the property will not be disturbed due to concerns of structural integrity. Approximately 90 square foot portion of the site along Hamilton Avenue will be excavated at a slope to 15 feet below grade to accommodate deeper bulk excavation beneath the sidewalk. Approximately 1,666 cubic yards/2,500 tons of soil/fill will be excavated and disposed of during foundation construction. Groundwater is approximately 8.5 feet below grade and excavation will require dewatering

1.3 Summary of Surrounding Property

The Site is located in a mixed residential and commercial area of Brooklyn, New York. Properties immediately surrounding the Site include the following:

- North: Woodhull Street with mixed residential/commercial properties beyond;
- South: Intersection of Columbia Street and Hamilton Avenue followed by a concrete and stone retaining wall with the entrance to the Brooklyn Battery Tunnel beyond;
- East: Columbia Street with mixed residential/commercial properties beyond including several restaurants; and,
- West: Hamilton Avenue followed by the entrance to the Brooklyn Battery Tunnel.

The surrounding land usage is illustrated on Figure 2. There is one (1) sensitive receptor within a 500 - foot radius of the site: A day care named Red Hook Playgroup located at 295 Columbia Street approximately 220 feet northeast from the subject Site.

1.4 Summary of Past Site Uses and Areas of Concern

The Site was utilized as a retail service station with automotive repair shop since at least 1959. Limited data are available regarding historical Site use prior to 1959.

The following spills are on file with the NYSDEC:

- NYSDEC Spill # 8904339 was assigned on August 1, 1989 due to a gasoline spill affecting the groundwater. The spill number remains open.
- NYSDEC Spill #9312498 was issued on January 24, 1994 in response to a tank tightness test failure. The spill was closed on May 14, 2003.
- NYSDEC Spill #0502047 was opened on May 19, 2005 in response to a used oil spill. The spill was closed on April 26, 2010.
- NYSDEC Spill #0105297 was opened on August 15, 2001 in response to a spill of motor oil. The spill was closed on December 8, 2003.
- NYSDEC Spill #0610200 was issued on December 7, 2006 in response to an unknown spill event. The spill was closed on April 26, 2010.

Investigation and remediation activities associated with NYSDEC Spill #8904339 have been conducted at the Site since August of 1989 to characterize, delineate and remediate soil and groundwater impacts both horizontally and vertically. Work included the installation of 23 groundwater monitoring wells, twelve (12) injection wells, and 21 soil borings.

In July of 1989, a total of fifteen (15) USTs were removed along with 650 tons of petroleum-impacted soils. In April 1997, five (5) tanks, one (1) dispenser island and three (3) hydraulic lifts were removed along with approximately 235 tons of petroleum-impacted soils. Fourteen (14) soil samples and one (1) groundwater sample were collected from the side walls and bottoms of the tank excavations.

Beginning in February 2004, a high vacuum dual-phase extraction (HVDPE)/ enhanced fluid recovery (EFR) events were conducted. Between January 2005 and March 2006, EFR events were conducted on a monthly basis. Between June 2009 and August 2011, chemical oxidation injections were performed. Between October of 2013 and December 2014, Surfactant Enhanced Groundwater Extraction (SEGE) events were conducted to reduce the presence of LPH along the western boundary of the property.

Due to the history of the area, the history of the site, and the results of this RI, the entire Site is considered to be an Area of Concern.

1.5 Summary of Work Performed under the Remedial Investigation

113 Hamilton Avenue LLC on behalf of ExxonMobil had the following scope of work performed:

- Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
- Installed seven (7) soil borings (SB-1 through SB-7) across the Site on January 18th and 19th of 2018 and collected fourteen (14) soil samples in total for chemical analysis: two (2) soil samples from each soil boring were collected to evaluate soil quality;
- Collected four (4) groundwater samples from four (4) existing groundwater monitoring wells (MW-5, MW-11, MW-16, and MW-18). The four (4) groundwater samples were collected for chemical analysis to evaluate groundwater quality;
- Three (3) of the seven (7) soil borings were converted into soil vapor points and two (2) additional soil vapor points were installed. They are labeled as SV-1 through SV-5. All soil vapor points were collected at a 5-foot depth below ground surface (bgs) in strategic locations throughout the site and five (5) soil vapor samples were collected for chemical analysis.

1.6 Summary of Findings of the Remedial Investigation

The findings of the Remedial Investigation are summarized as follow:

1. Elevation of the property is approximately 17 feet relative to mean sea level.
2. Depth to groundwater ranges from 7.76 feet bgs to 9.11 feet bgs at the Site. Groundwater flow is generally south-southwest beneath the Site. Bedrock was not encountered during the RI at the Site.
3. The stratigraphy of the site, from the surface down, consists of approximately three feet of fill material underlain by layers of varying thickness of black, gray, light to medium brown sand mixed with gravel and other fragments to a depth of 10 feet bgs.
4. Soil/fill samples results were compared to New York State Department of Environmental Conservation (NYSDEC) Part 375 Table 375-6.8 Unrestricted Use Soil Cleanup Objectives and Restricted Residential Use Soil Cleanup Objectives (SCOs). Soil sample results indicated:
    a) Only one (1) volatile organic compounds (VOC) compound, Acetone, in four (4) soil samples (maximum 200 µg/kg) was detected above Unrestricted Use SCOs and below

Restricted Residential Use SCOs. The detection of acetone was indicated by Phoenix as a laboratory solvent and is not indicative of contaminant found at the site.

b) Seven (7) semi-volatile organic compounds (SVOC) compounds including Benzo(a)pyrene (maximum of 2,800 µg/kg), benzo(a) anthracene (maximum of 3,400 µg/kg), benzo(b)fluoranthene (maximum of 2,700 µg/kg), benzo(k)fluoranthene (maximum of 2,100 µg/kg), chrysene (maximum of 3,500 µg/kg), Dibenzo-a,h-anthracene (maximum of 520 µg/kg), and indeno(1,2,3-cd) pyrene (maximum of 1,800 µg/kg) were detected above Restricted Residential Use SCOs in four (4) out of the fourteen (14) soil samples.

c) One (1) pesticide compound, 4,4'-DDE, was detected above Unrestricted Use SCOs but below Restricted Residential Use SCOs in two (2) soil samples with a maximum concentration level of 18 µg/kg.

d) PCB analytical data indicated two (2) compounds Aroclor1260 and Aroclor1254 above Unrestricted Use SCOs but well below Restricted Residential Use SCOs with a maximum concentration level of 130 µg/kg and 750 µg/kg; respectively.

e) Three (3) TAL Metal Compounds including Lead (maximum of 1,310 mg/kg), Barium (maximum of 1,260 mg/kg), and Mercury (maximum of 1.67 mg/kg) were detected above Restricted Residential Use SCOs.

5. Groundwater sample results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS) and Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (SGVs) for Class GA (drinking water). Groundwater sample results indicated:

a) Pesticide compounds were not detected in any of the four (4) groundwater samples analyzed.

b) VOCs including 1,2,4-trimethylbenzene (maximum 240 µg/l), benzene (maximum 770 µg/l), ethylbenzene (maximum 320 µg/l), isopropylbenzene (maximum 83 µg/l), xylenes (maximum 450 µg/l) naphthalene (maximum 87 µg/l), n-propylbenzene (maximum 170 µg/l), and toluene (maximum 69 µg/l) were detected above GQS. Total concentration levels for VOCs ranged from non-detect at MW-5 to 2,039 µg/l at MW-16.

c) Only one (1) SVOC compound Naphthalene exceeded GQS with a maximum concentration level of 250 µg/l at MW-16.

d) Nine Dissolved Metal were detected above GQS including Arsenic (maximum of 0.115 mg/L), Cadmium (maximum of 0.005 mg/L), Chromium (maximum of 0.019 mg/L), Iron (maximum of 65.6 mg/L), Lead (maximum of 0.057 mg/L), Manganese (maximum of 5.16 mg/L), Magnesium (maximum of 50.1 mg/L), Nickel (maximum of 0.12 mg/L) and Sodium (maximum of 740 mg/L) that exceeded of the NYSDEC guidance values.

e) PCB results indicated the presence of one (1) PCB compound (PCB-1260) that exceeded GQS with a maximum concentration level of 3.6 µg/l in MW-16.

6. Soil vapor samples collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006, updated May 2017. Soil vapor samples collected during the RI indicated the detection of several VOC compounds in all five (5) soil vapor samples analyzed as:

    a) The VOC compounds Trichloroethene (TCE) and Tetrachloroethene (PCE) were detected with TCE at a maximum concentration level of 41.9 $\mu g/m^3$ and PCE at a maximum concentration level of1480 $\mu g/m^3$. PCE and TCE concentrations within the monitor/mitigate levels established within the soil vapor guidance matrices and although not a direct comparison standard, TCE and PCE were detected at concentrations exceeding the NYSDOH Air Guideline Value (AGVs) of 2 and 30 $\mu g/m^3$, respectively.

    b) Petroleum based BTEX (benzene, toluene, ethylbenzene, xylenes) compounds were detected in all five (5) soil vapor samples analyzed. The total BTEX concentration levels ranged from 36.2 $\mu g/m^3$ in SV-3 to 271.31 $\mu g/m^3$ in SV-5. The gasoline additive methyl tert-butyl benzene (MTBE) was detected in three (3) of five (5) soil vapor samples collected ranging from 3.36 $\mu g/m^3$ in SV-5 to 41.8 $\mu g/m^3$ in SV-1.

1.7 Summary of the Proposed Remedial Action

The proposed remedial action ("RA") 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 preferred remedy for the site is Alternative 2, Restricted Commercial Use SCOs. Data generated during the site investigation support the conclusion that Alternative 1 is not achievable as part of the property will only be excavated 4 feet for development purposes. The Alternative 2 remedy will remove all soil/fill exceeding Restricted Commercial Use SCOs throughout the Site, which will be confirmed with post-excavation sampling. Engineering Controls including a composite cover, vapor barrier system and active sub-slab depressurization system are required. Use restrictions will be imposed and a deed restriction placed on the property to document the installation and continued operation of an active SSDS.

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 during ground intrusive work;
3. Selection of NYSDEC 6 NYCRR Part 375-6 Restricted Commercial Soil Cleanup Objectives (RCSCOs);

4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking, staking excavation areas & off-site permits;
5. Completion of a Waste Characterization Study prior to excavation activities will aid the management of excavated materials. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s);
6. Construction of a retaining wall, sheet piles or shoring, along Hamilton Street, with reduced permeability by grouting or with the use of plastic sheeting;
7. Excavation and removal of soil/fill exceeding Restricted Commercial SCOs. The soils on-site shall initially be excavated to a depth of six (6) feet bgs across the entire Site subject to any observance of safety consideration of utility lines, with a goal of removing a substantial amount of source materials. Then, a trapezoidal area approximate 90 feet long and 16 feet wide will be subsequently excavated to a maximum depth of 15 feet below surface grade (bsg) which is approximately three (3) feet into groundwater. This deep excavation will be sloped northward rising from 15 feet to six (6) feet bsg where it will intersect with a shallow excavation to expand the area on the interior of the Site that had been previously spot excavated, and to meet the excavation requirements for foundations and other aspects of the proposed redevelopment. During the excavation activity it is estimated that approximately 2,500 tons of soil will be removed;
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of non-contaminated material and non-contaminated materials;
9. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities;
10. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
11. Collection and analysis of four (4) end-point samples to evaluate the performance of the remedy with respect to attainment of commercial SCOs.
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
14. As the excavation will extend three (3) feet into groundwater along Hamilton Avenue, dewatering is required. Dewatering will be performed in compliance with city, state, and federal laws and regulations. Effluent from the dewatering will either be containerized for off-site disposal at a licensed facility 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;
15. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, will be in compliance with applicable laws and regulations;

16. Spill closure and any associated groundwater remediation will be managed under NYSDEC authority for Spill 8904339. Spill remediation requirements include:
    a. Removal of one (1) known AST. Removal of all other UST's that are encountered during soil/fill removal actions. Registration of tank(s) and reporting of any petroleum spills associated with UST's, as warranted;
    b. Over excavation of petroleum contaminated soil/fill to remove grossly contaminated soils to the extent feasible;
    c. Collection of post excavation end-point and side-wall soil samples as per NYSDEC DER-10 Guidance which requires one bottom sample/900 sf and one sidewall sample each 30 linear feet. As the excavation will extend three (3) feet into groundwater, only side wall samples are proposed; and
    d. Groundwater Treatment and Monitoring including following components:
        i. Pumping and treatment of groundwater in conjunction with the Hamilton Avenue sidewalk excavation;
        ii. Application of compounds designed to enhance the biodegradation of residual contaminants in the groundwater in conjunction with the Hamilton Avenue sidewalk excavation;
        iii. Decommission all existing onsite monitoring wells in addition to wells located in or near the Hamilton Avenue sidewalk excavation followed by installation of replacement monitoring wells;
        iv. Groundwater monitoring in accordance with the SMP. A new monitoring well network will be comprised of two (2) existing wells, one (1) upgradient and the other side-gradient; three (3) newly installed downgradient wells; and one (1) existing downgradient well.
17. This RAWP does not alter or interfere with the remedial action for the petroleum spill. A separate Spill closure report may be prepared and submitted to NYSDEC, if warranted based on the results of the investigation;
18. Placement of clean fill in all excavated areas (to the extent needed for the development backfill) and a composite cover system over the entire Site to prevent exposure to remaining soil/fill. The engineered composite cover would consist of an eight (8) inch thick concrete building slab, directly underlain by a 12-inch clean granular sub-base beneath all building areas and four (4) inches of poured concrete on a six (6) inch sub-base comprising the sidewalk along Hamilton Avenue;
19. Installation of a vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor. The Vapor Barrier will consist of a "2-product system" comprised of 4EVERCRETE and IMPENECRETE, a spray on product, both manufactured by ECI Environmental Coatings, Inc.
20. Installation and operation of an active Sub Slab Depressurization System (SSDS). The SSDS will consist of a network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The gas permeable layer will consistent of a

12-inch thick layer of 6-inch crushed stone and 6-inch pea gravel. The perforated pipes will consist of schedule 40 4-inch PVC pipe connected through a solid header and 4-inch steel riser pipe to a hardwired RadonAway XP201 blower on the roof of the building. A pressure gauge and alarm will be located in an accessible area in the first floor. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building. The testing and monitoring of the SSDS will be done by ExxonMobil consultants and will report the findings to the NYSDEC and NYSDOH as part of their remediation program;

21. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended. ;
22. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site; and
23. 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, NYSDEC and NYSDOH-approval. The deed restriction will also document the installation, and continued operation, of the active SSDS. The deed restriction for the active SSDS can be removed if OER, NYSDEC and NYSDOH determines that the active SSDS has achieved its goals and is no longer warranted.

2 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.

2.1 Project Information

- Site Address: 113 Hamilton Avenue, Brooklyn, NY
- NYC Voluntary Cleanup Program Project Number: 19CVCP079K

2.2 Project Contacts

- OER Project Manager: Sarah Pong, 212-788-8841
- Site Project Manager: Richard Levato, 212-809-1110
- Site Safety Officer: Guy Blazo, 212-809-1110
- Professional Engineer in Responsible Charge: John Rhodes, PE, 646 465 2494
- Online Document Repository: https://a002-epic.nyc.gov/app/workspace/5167/docrepository

2.3 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.

2.4 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.

2.5 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.

2.5.1 Construction 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.

2.5.2 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.

2.5.3 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.

2.6 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’).

2.7 Odor, Dust and Noise Control

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

2.8 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.

2.9 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.

2.10 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.

2.11 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.

2.12 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.

2.13 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.

2.14 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.

2.15 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.

2.16 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.

2.17 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.

2.18 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.

2.19 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.

2.20 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.

2.21 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.

2.22 Final Report

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

2.23 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 (SMP) calls for continued inspection of protective controls, such as Site covers. The SMP 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.

3 REMEDIAL ACTION WORK PLAN

3.1 Project Background

113 Hamilton Avenue LLC on behalf of ExxonMobil 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 113 Hamilton Avenue in Brooklyn, New York (the "Site"). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

3.1.1 Site Location and Background

The Site is located at 113 Hamilton Avenue in Brooklyn, New York and is identified as Block 362 and Lot 1 on the New York City Tax Map. Figure 1 shows the Site location. The triangular shaped Site is 5,119-square feet and is bounded by Woodhull Street to the north, the intersection of Columbia Street and Hamilton Street to the south, Columbia Street to the east, and Hamilton Avenue to the west. A map of the Site boundary is shown in Figure 2. Currently, the Site is used for an automobile repair facility and contains a 1,477-square foot single-story slab-on-grade concrete building with three (3) service bays located on the northeast portion of the property. An above-ground storage tank (AST) containing used oil is located on the east side of the building on-site. The remainder of the property is used as an asphalt-paved parking lot. Public utilities servicing the Site include subsurface sewer, water, electric, natural gas piping, and telephone lines.

3.1.2 Redevelopment Plan

The proposed future use of the Site will consist of a one-story restaurant and bar with a small mezzanine above the kitchen and bathroom area. The building will be approximately 30 feet in height and will contain no basement or landscaped areas. The proposed development will cover the entire footprint of the site which is approximately 5,119 square feet. The ground floor is approximately 4,209 square feet and the mezzanine is approximately 1,310 square feet in size. The remainder of the property will be used for outdoor seating.

The development will require limited excavation to 4 feet below grade to support footings/grade beams. An existing pile cap in the northwest corner of the property will not be disturbed due to concerns of structural integrity. Approximately 90 square foot portion of the site along Hamilton Avenue will be excavated at a slope to 15 feet below grade to accommodate deeper bulk excavation beneath the sidewalk. Approximately 1,666 cubic yards/2,500 tons of soil/fill will be excavated and disposed of during foundation construction. Groundwater is approximately 8.5 feet below grade and excavation will require dewatering.

The layout of the proposed site development is presented in Figure 5. The current zoning designation is M1-1: manufacturing district. The proposed use is consistent with existing zoning for the property.

3.1.3 Description of Surrounding Property

The Site is located in a mixed residential and commercial area of Brooklyn, New York. Properties immediately surrounding the Site include the following:

North: Woodhull Street with mixed residential/commercial properties beyond;

South: Intersection of Columbia Street and Hamilton Avenue followed by a concrete and stone retaining wall with the entrance to the Brooklyn Battery Tunnel beyond;

East: Columbia Street with mixed residential/commercial properties beyond including several restaurants; and,

West: Hamilton Avenue followed by the entrance to the Brooklyn Battery Tunnel.

The surrounding land usage is illustrated on Figure 2. There is one (1) sensitive receptor within a 500 - foot radius of the site: A day care named Red Hook Playground located at 295 Columbia Street approximately 220 feet from the subject Site.

3.1.4 Summary of Past Site Uses and Areas of Concern

The Site was utilized as a retail service station with automotive repair shop since at least 1959. Limited data are available regarding historical Site use prior to 1959.

The following spills are on file with the NYSDEC:

- NYSDEC Spill # 8904339 was assigned on August 1, 1989 due to a gasoline spill affecting the groundwater. The spill number remains open.
- NYSDEC Spill #9312498 was issued on January 24, 1994 in response to a tank tightness test failure. The spill was closed on May 14, 2003.
- NYSDEC Spill #0502047 was opened on May 19, 2005 in response to a used oil spill. The spill was closed on April 26, 2010.
- NYSDEC Spill #0105297 was opened on August 15, 2001 in response to a spill of motor oil. The spill was closed on December 8, 2003.
- NYSDEC Spill #0610200 was issued on December 7, 2006 in response to an unknown spill event. The spill was closed on April 26, 2010.

Investigation and remediation activities associated with NYSDEC Spill #8904339 have been conducted at the Site since August of 1989 to characterize, delineate and remediate soil and groundwater impacts both horizontally and vertically. Work included the installation of 23 groundwater monitoring wells, twelve (12) injection wells, and 21 soil borings.

In July of 1989, a total of fifteen (15) USTs were removed along with 650 tons of petroleum-impacted soils. In April 1997, five (5) tanks, one (1) dispenser island and three (3) hydraulic lifts were removed

along with approximately 235 tons of petroleum-impacted soils. Fourteen (14) soil samples and one (1) groundwater sample were collected from the side walls and bottoms of the tank excavations.

Beginning in February 2004, a high vacuum dual-phase extraction (HVDPE)/ enhanced fluid recovery (EFR) events were conducted. Between January 2005 and March 2006, EFR events were conducted on a monthly basis. Between June 2009 and August 2011, chemical oxidation injections were performed. Between October of 2013 and December 2014, Surfactant Enhanced Groundwater Extraction (SEGE) events were conducted to reduce the presence of LPH along the western boundary of the property.

Due to the history of the area, the history of the site, and the results of the RI, the entire Site is considered to be an Area of Concern.

3.1.5 Summary of Work Performed under the Remedial Investigation

113 Hamilton Avenue LLC on behalf of ExxonMobil had the following scope of work performed:

- Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
- Installed seven (7) soil borings (SB-1 through SB-7) across the Site on January 18th and 19th of 2018 and collected fourteen (14) soil samples in total for chemical analysis: two (2) soil samples from each soil boring were collected to evaluate soil quality;
- Collected four (4) groundwater samples from four (4) existing groundwater monitoring wells (MW-5, MW-11, MW-16, and MW-18). The four (4) groundwater samples were collected for chemical analysis to evaluate groundwater quality;
- Three (3) of the seven (7) soil borings were converted into soil vapor points and two (2) additional soil vapor points were installed. They are labeled as SV-1 through SV-5. All soil vapor points were collected at a 5-foot depth below ground surface (bgs) in strategic locations throughout the site and five (5) soil vapor samples were collected for chemical analysis.

3.1.6 Summary of Findings of Remedial Investigation

A remedial investigation was performed, and the results are documented in a companion document called “Remedial Investigation Report, 113 Hamilton Avenue, Brooklyn, NY”, dated February 2018 (RIR).

The findings of the Remedial Investigation are summarized as follow:

1. Elevation of the property is approximately 17 feet relative to mean sea level.
2. Depth to groundwater ranges from 7.76 feet bgs to 9.11 feet bgs at the Site. Groundwater flow is generally south-southwest beneath the Site. Bedrock was not encountered during the RI at the Site.
3. The stratigraphy of the site, from the surface down, consists of approximately three feet of fill material underlain by layers of varying thickness of black, gray, light to medium brown sand mixed with gravel and other fragments to a depth of 10 feet bgs.

4. Soil/fill samples results were compared to New York State Department of Environmental Conservation (NYSDEC) Part 375 Table 375-6.8 Unrestricted Use Soil Cleanup Objectives and Restricted Residential Use Soil Cleanup Objectives (SCOs). Soil sample results indicated:

    f) Only one (1) volatile organic compounds (VOC) compound, Acetone, in four (4) soil samples (maximum 200 µg/kg) was detected above Unrestricted Use SCOs and below Restricted Residential Use SCOs. The detection of acetone was indicated by Phoenix as a laboratory solvent and is not indicative of contaminant found at the site.

    g) Seven (7) semi-volatile organic compounds (SVOC) compounds including Benzo(a)pyrene (maximum of 2,800 µg/kg), benzo(a) anthracene (maximum of 3,400 µg/kg), benzo(b)fluoranthene (maximum of 2,700 µg/kg), benzo(k)fluoranthene (maximum of 2,100 µg/kg), chrysene (maximum of 3,500 µg/kg), Dibenzo-a,h-anthracene (maximum of 520 µg/kg), and indeno(1,2,3-cd) pyrene (maximum of 1,800 µg/kg) were detected above Restricted Residential Use SCOs in four (4) out of the fourteen (14) soil samples.

    h) One (1) pesticide compound, 4,4'-DDE, was detected above Unrestricted Use SCOs but below Restricted Residential Use SCOs in two (2) soil samples with a maximum concentration level of 18 µg/kg.

    i) PCB analytical data indicated two (2) compounds Aroclor1260 and Aroclor1254 above Unrestricted Use SCOs but well below Restricted Residential Use SCOs with a maximum concentration level of 130 µg/kg and 750 µg/kg; respectively.

    j) Three (3) TAL Metal Compounds including Lead (maximum of 1,310 mg/kg), Barium (maximum of 1,260 mg/kg), and Mercury (maximum of 1.67 mg/kg) were detected above Restricted Residential Use SCOs.

5. Groundwater sample results were compared to New York State 6NYCRR Part 703.5 Class GA groundwater quality standards (GQS) and Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (SGVs) for Class GA (drinking water). Groundwater sample results indicated:

    f) Pesticide compounds were not detected in any of the four (4) groundwater samples analyzed.

    g) VOCs including 1,2,4-trimethylbenzene (maximum 240 µg/l), benzene (maximum 770 µg/l), ethylbenzene (maximum 320 µg/l), isopropylbenzene (maximum 83 µg/l), xylenes (maximum 450 µg/l) naphthalene (maximum 87 µg/l), n-propylbenzene (maximum 170 µg/l), and toluene (maximum 69 µg/l) were detected above GQS. Total concentration levels for VOCs ranged from non-detect at MW-5 to 2,039 µg/l at MW-16.

    h) Only one (1) SVOC compound Naphthalene exceeded GQS with a maximum concentration level of 250 µg/l at MW-16.

    i) Nine Dissolved Metal were detected above GQS including Arsenic (maximum of 0.115 mg/L), Cadmium (maximum of 0.005 mg/L), Chromium (maximum of 0.019 mg/L), Iron

(maximum of 65.6 mg/L), Lead (maximum of 0.057 mg/L), Manganese (maximum of 5.16 mg/L), Magnesium (maximum of 50.1 mg/L), Nickel (maximum of 0.12 mg/L) and Sodium (maximum of 740 mg/L) that exceeded of the NYSDEC guidance values.

j) PCB results indicated the presence of one (1) PCB compound (PCB-1260) that exceeded GQS with a maximum concentration level of 3.6 µg/l in MW-16.

6. Soil vapor samples collected during the RI were compared to the compounds listed in Vapor Intrusion Matrices in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion, dated October 2006, updated May 2017. Soil vapor samples collected during the RI indicated the detection of several VOC compounds in all five (5) soil vapor samples analyzed as:

   c) The VOC compounds Trichloroethene (TCE) and Tetrachloroethene (PCE) were detected with TCE at a maximum concentration level of 41.9 $\mu g/m^3$ and PCE at a maximum concentration level of1480 $\mu g/m^3$. PCE and TCE concentrations within the monitor/mitigate levels established within the soil vapor guidance matrices and although not a direct comparison standard, TCE and PCE were detected at concentrations exceeding the NYSDOH Air Guideline Value (AGVs) of 2 and 30 $\mu g/m^3$, respectively.

   d) Petroleum based BTEX (benzene, toluene, ethylbenzene, xylenes) compounds were detected in all five (5) soil vapor samples analyzed. The total BTEX concentration levels ranged from 36.2 $\mu g/m^3$ in SV-3 to 271.31 $\mu g/m^3$ in SV-5. The gasoline additive methyl tert-butyl benzene (MTBE) was detected in three (3) of five (5) soil vapor samples collected ranging from 3.36 $\mu g/m^3$ in SV-5 to 41.8 $\mu g/m^3$ in SV-1.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of moderate amounts of contaminated soil will be necessary at this site.

3.2 Remedial Action Objectives

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

3.2.1 Soil

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

3.2.2 Groundwater

- Monitor groundwater improvement in response to contaminant source removal and/or treatment.
- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

3.2.3 Soil Vapor

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

3.3 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.

3.3.1 Alternatives

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

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would require the removal of soil from ground surface to approximately eight (8) to ten (10) feet bgs across the entire Site, and possibly into the groundwater (approximately 12 feet bg). If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 1 Unrestricted Use SCOs. This additional excavation would require dewatering, and the groundwater removed would require treatment.

- No Engineering or Institutional Controls are required for a Track 1 cleanup. As part of development, a vapor barrier would be installed to prevent potential exposures from soil vapor from off-site sources or residual groundwater contamination.
- As part of the development, a composite cover would be placed over the entire Site.

Alternative 2:

1. Selection of NYSDEC 6 NYCRR 375-6 Restricted Commercial Soil Cleanup Objectives (RCSCOs)
2. A major portion of the RA will be the excavation and removal of soil/fill exceeding RCSCOs in the southern portion of the Site including the sidewalk along Hamilton Avenue. The soils on-site shall initially be excavated to a depth of six (6) feet bgs across the entire Site, subject to any observance of safety consideration of utility lines, with a goal of removing a substantial amount of source materials. Then, a trapezoidal area approximate 90 feet long and 16 feet wide will be subsequently excavated to a maximum depth of 15 feet below surface grade (bsg) which is approximately three (3) feet into groundwater. A retaining wall, sheet piles or shoring, would be constructed along Hamilton Avenue, and its permeability reduced by grouting or with the use of plastic sheeting. This deep excavation will be sloped northward rising from 15 feet to six (6) feet bsg where it will intersect with a shallow excavation to expand the area on the interior of the Site that had been previously spot excavated, and to meet the excavation requirements for foundations and other aspects of the proposed redevelopment. During the excavation activity it is estimated that approximately 2,500 tons of soil will be removed.

- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor;
- Installation of an active Sub Slab Depressurization System (SSDS);
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval;
- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended. The SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP; and
- 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.

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

Alternative 2 would achieve comparable protections of human health and the environment by excavation and removal soil/fill exceeding Restricted Commercial SCOs and implementing EC/ICs including a vapor barrier, active SSDS, composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing Institutional Controls including a Site Management Plan and a deed notice on the property would ensure that the vapor barrier, active SSDS, and composite cover systems remains intact and protective of public health.

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

Compliance with Applicable Standards, Criteria and Guidance

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

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCO's and Protection of Groundwater SCO's. Compliance with SCGs for soil vapor would also be achieved by installing a vapor barrier system below the new building's slab and continuing the vapor barrier outside of subgrade foundation walls, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of soil to meet Restricted Commercial SCOs. Compliance with SCG's for soil vapor would also be achieved by installing a vapor barrier system below the new building's slab and continuing the vapor barrier outside of any subgrade foundation walls. A Site Management Plan would ensure that these controls remained protective for the long term

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

Short-Term Effectiveness and Impacts

This evaluation criterion assess 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. Approximately 50 30-ton capacity truck trips would be necessary to transport fill and soil excavated during Site development and remediation. 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 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 contamination and attaining Restricted Commercial SCOs; installing a composite cover and vapor barrier system across the Site; installing and operating an active SSDS; maintaining use restrictions; and establishing an SMP to ensure long-term management of ICs and ECs. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy continue to provide the required level of protection.

Reduction of toxicity, mobility, or volume of contaminated material

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

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all soil in excess of Track 1 Unrestricted Use SCO's.

Alternative 2 would remove most of the contaminated fill at the Site, and all remaining on-Site soil/fill beneath the new building will meet Restricted Commercial SCOs and subject to Engineering and Institutional Controls.

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.

Costs associated with Alternative 1 will be substantially higher than Alternative 2 due to the depth of excavation and the installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. Additionally, active soil vapor management is not allowed under a Track 1, Unrestricted Use remedy. 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 1. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

Land use

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

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. The proposed future use of the Site includes a one-story restaurant and bar with a small mezzanine above the kitchen and bathroom area. The building will be approximately 30 feet in height and contain no basement or landscaped areas. Following remediation, the Site will meet either Track 1 Unrestricted Use or Restricted Commercial SCOs, both of which are protective of public health and the environment for its planned commercial use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns. The area surrounding consists of predominantly mixed residential and commercial buildings in zoning districts designated for manufacturing uses. The development would remediate an automobile repair facility

which contains a single-story concrete building with three (3) service bays and provide a one-story restaurant and bar with a small mezzanine above the kitchen and bathroom area. The proposed development would clean up the property and make it safer, create new employment opportunities and associated societal benefits to the community, and other economic benefits from land revitalization.

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

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

Sustainability of the Remedial Action

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

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.

Selection of the Preferred Remedy

The preferred remedy for the site is Alternative 2. Data generated during the site investigation support the conclusion that Unrestricted Use SCOs for soil cannot be achieved with the proposed excavations at this site. In addition, active vapor mitigation is required in the form of an active Sub Slab Depressurization System (SSDS), which is not allowed under Unrestricted Use remedies.

The Alternative 2 remedy will remove all soil/fill exceeding Restricted Commercial SCOs throughout the Site, which will be confirmed with post-excavation sampling. If soil/fill containing analytes at concentrations above Restricted Commercial SCOs is still present at the base of excavation after removal of all soil required for construction of the new building's slab, additional excavation would be performed to the extent practicable to ensure removal of soil/ fill that does not meet Restricted Commercial SCOs.

.

Engineering Controls are required for a Track 2 Restricted Commercial Cleanup. A concrete slab covering the entire site and vapor barrier membrane would be installed. Additional soil vapor management as operation of an active SSDS would be required to address soil vapor intrusion. Use restrictions will be imposed on the site including prohibitions on any use higher than Restricted Commercial; 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, NYSDEC and NYSDOH approval. Institutional Controls in the form of deed restrictions will be placed on the property to inform future owners regarding contamination remaining and on-going site management requirements.

3.4 Summary of Preferred Remedial Action

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds during ground intrusive work;
3. Selection of NYSDEC 6 NYCRR Part 375-6 Restricted Commercial Soil Cleanup Objectives (RCSCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking, staking excavation areas & off-site permits;
5. Completion of a Waste Characterization Study prior to excavation activities will aid the management of excavated materials. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s);
6. Construction of a retaining wall, sheet piles or shoring, along Hamilton Street, with reduced permeability by grouting or with the use of plastic sheeting;
7. Excavation and removal of soil/fill exceeding 6 NYCRR 375-6 Restricted Commercial Soil Cleanup Objectives (RCSCOs). The soils on-site shall initially be excavated to a depth of six (6) feet bgs across the entire Site, subject to any observance of safety consideration of utility lines, with a goal of removing a substantial amount of source materials. Then, a trapezoidal area approximate 90 feet long and 16 feet wide will be subsequently excavated to a maximum depth of 15 feet below surface grade (bsg) which is approximately three (3) feet into groundwater. A retaining wall, sheet piles or shoring, would be constructed along Hamilton Avenue, and its permeability reduced by grouting or with the use of plastic sheeting. This deep excavation will be sloped northward rising from 15 feet to six (6) feet bsg where it will intersect with a shallow excavation to expand the area on the interior of the Site that had been previously spot excavated, and to meet the excavation requirements for foundations and other aspects of the proposed redevelopment. During the excavation activity it is estimated that approximately 2,500 tons of soil will be removed.
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of non-contaminated material and non-contaminated materials;

9. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities;
10. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
11. Collection and analysis of four (4) end-point samples to evaluate the performance of the remedy with respect to attainment of commercial SCOs.
12. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
14. As the excavation will extend three (3) feet into groundwater along Hamilton Avenue, dewatering is required. Dewatering will be performed in compliance with city, state, and federal laws and regulations. Effluent from the dewatering will either be containerized for off-site disposal at a licensed facility 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;
15. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, will be in compliance with applicable laws and regulations;
16. Spill closure and any associated groundwater remediation will be managed under NYSDEC authority for Spill 8904339. Spill remediation requirements include:
    a. Removal of one (1) known AST, and if applicable, the removal of any USTs encountered during soil/fill removal actions. Registration of tank(s) and reporting of any petroleum spills associated with UST's, as warranted;
    b. Over excavation of petroleum contaminated soil/fill to remove grossly contaminated soils to the extent feasible;
    c. Collection of post excavation end-point and side-wall soil samples as per NYSDEC DER-10 Guidance which requires one bottom sample/900 sf and one sidewall sample each 30 linear feet. As the excavation will extend three (3) feet into groundwater, only side wall samples are proposed; and
    d. Groundwater Treatment and Monitoring;
        i. Pumping and treatment of groundwater in conjunction with the Hamilton Avenue sidewalk excavation;
        ii. Application of compounds designed to enhance the biodegradation of residual contaminants in the groundwater in conjunction with the Hamilton Avenue sidewalk excavation;
        iii. Decommission all existing onsite monitoring wells in addition to wells located in or near the Hamilton Avenue sidewalk excavation followed by installation of replacement monitoring wells (Figure 3); and
        i. Groundwater monitoring in accordance with the SMP. A new monitoring well network will be comprised of two (2) existing wells, one (1) upgradient and the

other side-gradient; three (3) newly installed downgradient wells; and one (1) existing downgradient well.

17. This RAWP does not alter or interfere with the remedial action for the petroleum spill. A separate Spill closure report may be prepared and submitted to NYSDEC, if warranted based on the results of the investigation;
18. Placement of clean fill in all excavated areas (to the extent needed for the development backfill) and a composite cover system over the entire Site to prevent exposure to remaining soil/fill. The engineered composite cover would consist of an eight (8) inch thick concrete building slab, directly underlain by a 12-inch clean granular sub-base beneath all building areas and four (4) inches of poured concrete on a six (6) inch sub-base comprising the sidewalk along Hamilton Avenue;
19. Installation of a vapor barrier system beneath the building slab and along foundation side walls to prevent potential exposures from soil vapor. The Vapor Barrier will consist of a "2-product system" comprised of 4EVERCRETE and IMPENECRETE, a spray on product, both manufactured by ECI Environmental Coatings, Inc.;
20. Installation and operation of a active Sub Slab Depressurization System (SSDS). The SSDS will consist of a network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The gas permeable layer will consistent of a 12-inch thick layer of 6-inch crushed stone and 6-inch pea gravel. The perforated pipes will consist of schedule 40 4-inch PVC pipe connected through a solid header and 4-inch steel riser pipe to a hardwired RadonAway XP201 blower on the roof of the building. A pressure gauge and alarm will be located in an accessible area in the first floor. The active SSDS is an Engineering Control for the remedial action. The remedial engineer will certify in the RAR that the active SSDS was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building. The testing and monitoring of the SSDS will be done by ExxonMobil consultants and will report the findings to the NYSDEC and NYSDOH as part of their remediation program;
21. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended;
22. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and describes all Engineering and Institutional Controls to be implemented at the Site; and
23. 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, NYSDEC, and NYSDOH-approval. The deed restriction will also document the installation, and continued operation, of the active SSDS. The deed restriction for the active SSDS can be removed if OER, NYSDEC and NYSDOH determines that the active SSDS has achieved its goals and is no longer warranted.

3.5 Soil Cleanup Objectives and Soil/ Fill Management

Track 2 Restricted Commercial SCOs are proposed for this project and SCOs are defined in 6 NYCRR Part 375, Table 6.8 Track 2 Restricted Commercial Use. If these Track 2 SCOs are not achieved, the following Site-Specific SCO's will be utilized:

Contaminant	Site-Specific SCO's
Total SVOCs	200 ppm
Lead	1500 ppm
Mercury	2 ppm
Barium	800 ppm
VOCs	1 ppm total

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 4. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

3.6 Soil/Fill Excavation and Removal and Groundwater Treatment

The location of planned excavations is shown in Figure 4. The excavation is limited by the existing foundations that are to be preserved and utility lines including gas lines.

The soils on-site shall initially be excavated to a depth of six (6) feet bgs across the entire Site, subject to any observance of safety consideration of utility lines, with a goal of removing a substantial amount of source materials. A sheet pile or other shoring such as a left in place slide rail system with plastic (or similar) barrier will be designed by a structural engineer to allow the excavation to extend to 15 feet, approximately three (3) feet into groundwater, over the area shown on Figure 4. Outside this area and to the north of the shoring the excavation will be sloped as specified by a structural engineer. To the side of the excavation (east and west) the excavation will be sloped or shored as specified by the structural engineer to protect utilities and municipal structures. The plan shown envisions a 1:1 slope, but this will be modified if required by the Structural Engineer. An existing foundation for a large sign and former walls and their foundations will be preserved as indicated on Figure 4. The total quantity of soil/fill expected to be excavated and disposed off-Site is 2,500 tons.

To enable the excavation to extend three (3) feet into groundwater and to provide groundwater treatment, the excavation will be dewatered. Effluent from the dewatering will be transferred to a tanker truck and disposed of at a licensed facility or will be treated on-Site and discharged into the city sewer system. All required permits will be obtained from NYCDEP prior to any discharge of groundwater into the sewer system. The shoring will be grouted to reduce permeability. The grouting will be compatible with the shoring specified by the structural engineer and may include inter-seam grouting of the sheet piles, grouting in conjunction with plastic sheeting, or similar for other shoring approaches.

3.6.1 Disposal Facilities

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.

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
Clean Earth (Carteret) Soil Safe, Inc (Logan)	Petroleum contaminated soil	800 tons
Clean Earth of NJ Environ Soil Management of NY	Non-petroleum impacted historic fill	1,700 tons

3.6.2 End-point Sampling

As the excavation will extend three (3) feet into groundwater, no sidewall samples are proposed due to shoring.See Figure 4 End-point Sampling Locations. Additionally, the type of shoring constructed will restrict end point sampling along the retaining wall. Samples will be obtained approximately every 30 feet along the sidewall. Two additional samples will be obtained along the retaining wall if practicable. Four post-excavation confirmation soil samples will be obtained in areas excavated to 6 feet below grade

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

- Volatile organic compounds by EPA Method 8260;
- SVOCs by USEPA Method 8270D; and,
- Target analyte list (TAL) metals by USEPA Methods 6010C and 7471B.

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.

3.6.3 Quality Assurance/Quality Control

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

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

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

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

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides. One blind duplicate sample will be prepared and submitted for analysis every 20 samples.

All samples collected will be appropriately identified; the following information will be entered into the chain-of-custody form:

- Site name and address;
- Sampler(s)' name(s) and signature(s);
- Names and signatures of persons involved in the chain of possession of samples;
- Sample number;
- Number of containers;
- Sample location;
- Date and time of collection;
- Type of sample, sample matrix and analyses requested;

The sampler collector will sign and date the "Relinquished" section of the chain of custody and remove one copy of the custody form before sealing the remaining copies of the form in a Ziploc plastic bag and place inside the sample cooler. The sample cooler will be sealed with tape prior to laboratory pick-up. The samples will be picked up and analyzed by an ELAP-certified laboratory.

3.6.4 Groundwater Treatment

In addition to the excavation of contaminated soil three (3) feet into the groundwater, and the pumping of contaminated groundwater during the excavation, additional groundwater treatment will be done. One of the following reactants or biodegradation enhancers will be added to the excavation prior to back fill:

- ORC
- RegenOx
- EcoSpersa

Material loading will be calculated at the time once an idea of the success of the excavation is evaluated.

3.6.5 Proposed Post Redevelopment Monitoring Well Networking.

The groundwater monitoring network will be affected by the excavation. Therefore, unused wells will be closed, wells preserved or replaced, and new wells installed to establish a monitoring network consistent with the remediation proposed. See Figure 3 – Proposed Monitoring Well Network

The following wells will be closed in accordance with NYSDEC protocols: IP-1, IP-2, IP-3, IP-4, IP-5, IP-6, IP-7 and IP-8, MW-3, MW-7A, MW-9 (located off-site), MW-12, MW-19 and MW-20. In addition, the following wells will be removed via excavation: MW-7, IP-12, MW-1, MW-11, IP-11, IP-10, MW-2, MW-13 and IP-9.

New wells will be installed comprised of 2" schedule 40 PVC screened from ~15'-5' below grade, with a 4.5' solid riser (standard well construction details). Three (3) monitoring wells will be installed along the north side of Hamilton Street (MW-21 through MW-23); MW-16 will be replaced if damaged and beyond reasonable repair.

The resulting monitoring network will be comprised of:

- MW-5, and existing up-gradient well
- MW-18, an existing side-gradient well
- MW-16, an existing down-gradient well, or its replacement, and
- MW-21 to 23, new down-gradient wells on the north side of Hamilton
- MW-8A, MW-10, and MW-15, existing wells across Hamilton Ave

Once post-remedial/construction data demonstrates declining and/or stable trends, an NFA request will be made.

3.7 Import of Soils

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

- Residential Use SCOs, and
- Groundwater Protection Standards in Part 375-6.8.

Most imported materials will be comprised of construction materials including gravel, RCA, and concrete. The estimated quantity of common soil fill to be imported into the Site for backfill is 2,500 tons. A map of soil backfill placement locations is shown as Figure 8.

3.8 Reuse of Onsite Soils

Soil reuse is not planned on this project.

3.9 Engineering Controls

Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site has three (3) Engineering Control Systems. These are:

(1) Composite Cover System

(2) Soil Vapor Barrier System

(3) Active Sub-Slab Depressurization System

3.9.1 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 eight (8) inch thick concrete building slab with a 12-inch clean granular sub-base beneath the entire building area, and four (4) inches of poured concrete on a six (6) inch sub-base comprising the sidewalk along Hamilton Avenue.

Figure 5 shows the location of each cover type built at the Site.

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

3.9.2 Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab, water vapor barrier and contaminant vapor barrier. The contaminant vapor barrier, hereafter called the “vapor barrier”, will consist of a “2-product system” comprised of 4EVERCRETE and IMPENECRETE, both manufactured by ECI Environmental Coatings, Inc. IMPENECRETE is used in conjunction with 4EVERCRETE to form a total waterproof and vapor-proof barrier.

4EVERCRETE is a one-time permanent application specially engineered with a proprietary formula to waterproof and greatly reduce vapor transmission through concrete. The product is applied by airless sprayer at high pressure to allow the product to atomize so that the silicate chains can be broken apart to best penetrate the slab. These silicates have been altered on a molecular level (from pencil-shaped to spherical) to allow for maximum penetration and filling capability. As the product works its way down through the capillary system of the concrete, it fills all voids and forms a colloidal gel. 4EVERCRETE has been shown to penetrate up to 7 ¾ inches.

IMPENECRETE is specially formulated to readily penetrate, seal and protect the surface of concrete by providing a protective opaque flexible polymer film coating which durably and tenaciously adheres to the surface after drying. IMPENECRETE is used in conjunction with 4EVERCRETE to form a water and vapor barrier. An initial application of 4EVERCRETE will be followed by one coat of IMPENECRETE.

The vapor barrier will extend throughout the area occupied by the footprint of the new building and on the foundation sidewalls. A plan view showing the location of the proposed vapor barrier system is provided in Figure 5.

Product and installation specifications are provided in Appendix 5. The manufacturer's letter of compatibility is also provided in Appendix 5.The Vapor barrier will be installed by the manufacturer who will warrant its installation. The warrantee language to be used is provided in Appendix 5. The vapor barrier installation will also be observed by a professional engineer who will certifying its installation in accordance with this RAWP.

The Remedial Action Report will include as-built drawings and diagrams, manufacturer documentation, photographs and the professional engineer's certification of installation in accordance with the RAWP.

The vapor barrier will be applied on an eight (8) inch thick concrete building slab. Cold joints at the junction of slab and vertical walls will be sealed in accordance with the Manufacturer's specifications in Appendix 5. All protrusions through the concrete slab will also be sealed in accordance with the Manufacturer's specifications in Appendix 5.

The vapor barrier will be applied on foundation sidewalls to enhance the performance of the SDS system.

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

3.9.3 Active Sub-Slab Depressurization System

Migration of soil vapor into the building will be mitigated with the construction of an active Sub-Slab Depressurization System (SSDS). The SSDS will consist of network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The perforated

pipes will be connected through a solid header and riser pipe to a blower on the roof of the building. The layout of the SSDS piping network is shown in Figure 6. Figure 7 provides additional details for the SSDS system.

The horizontal piping will consist of perforated schedule 40, four (4) inch PVC pipe laid approximately 20 feet apart or less, and within 10 feet of foundation walls or less. The perforated pipe will be laid in 6-inches of pea gravel and covered by ¾ inch crushed stone extending a minimum of six (6) inches from the perforated pipe in all directions. The stone will be wrapped in a geotextile filter fabric creating an assembly of pipe, rock and filter fabric that is a minimum of 16 inches by 16 inches. The assembly will be installed in a gas permeable layer consisting of 12-inches of pea gravel and ¾ inch crushed stone or other compatible dimension as specified by the building engineer.

The perforated PVC pipe will be connected to a four (4) inch, solid header pipe to pass through the grade beams and better extend the negative pressures (suction) to the farthest points from the riser pipe. The four (4) inch header will penetrate the slab and transition to a four (4) inch, Steel riser pipe. The SSDS will have three (3) flush mounted testing ports installed in areas not open to the public.

The active SSDS will be hardwired and will include a Radon Away XP201 blower, or similar blower after final design is completed. The blower will be installed on the riser pipe above the roof line in accordance with NYC DOB code. The blower will be instrumented with remote pressure and temperature gauges, and a remote motor failure alarm located in an accessible area.

The SSDS 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.

In order to request turning the active system to passive, a Soil Vapor Intrusion study proposal will be submitted to OER, NYSDEC and NYSDOH prior to any testing or temporary shut-off of the system. Testing will be completed in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Based on the results of the study, OER, NYSDEC, and NYSDOH will determine the necessity of an active system.

3.10 Institutional Controls

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

- Recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the SMP, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded

DCR will be submitted in the Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;

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

4 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the Site Management Plan are implemented, and performed by the property owner's consultant.

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.

5 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.

5.1 Known and Potential Contaminant Sources

The stratigraphy of the site, from the surface down, consists of approximately three feet of fill material underlain by layers of varying thickness of black, gray, light to medium brown sand mixed with gravel and other fragments to a depth of 10 feet bgs. Based on the results of the RIR, the contaminants of concern are:

Soil:

- Seven SVOC compounds were detect above regulatory SCOs. Benzo(a)pyrene exceeded the Restricted Industrial SCOs. Benzo(b)fluoranthene and chrysene exceeded the Residential SCOs. Benzo(a) anthracene, benzo(k)fluoranthene, Dibenzo-a,h-anthracene, and indeno(1,2,3-cd) pyrene exceeded the Restricted Residential SCOs.
- One pesticide, 4,4'-DDE, exceeded the Unrestricted Use SCOs
- Two PCB compounds, Aroclor1260 and Aroclor1254, exceeded the Unrestricted Use SCOs
- Four TAL Metals were detected above the regulatory SCOs. Zinc exceeded the Unrestricted SCOs. Lead exceeded the Unrestricted SCOs, the Restricted Residential SCOs and the Restricted Commercial SCOs. Barium exceeded the Residential SCOs and the Restricted Commercial SCOs. Lastly, Mercury exceeded the Unrestricted SCOs and the Restricted Residential SCOs.

Groundwater:

- Several VOC compounds exceeded their respective GQS
- One SVOC compound, Naphthalene, exceeded its GQS
- Nine TAL Metals, Arsenic, Cadmium, Chromium, Iron, Lead, Manganese, Magnesium, Nickel and Sodium, exceeded their respective GQS
- One PCB compound, PCB-1260, exceeded its GQS

Soil Vapor:

- Petroleum VOCs including benzene, toluene, ethyl-benzene, xylenes and MTBE were detected
- PCE was above NYS DOH Guidance Standards
- TCE was above NYS DOH Guidance Standards

5.2 Nature, Extent, Fate and Transport of Contaminants

Although gasoline and other materials used at the gasoline service station were remediated on Site to levels acceptable to the NYSDEC, off-site contamination extended toward Hamilton Avenue and the Hugh L. Carey Tunnel retaining wall 75 feet to the northwest. The direction of groundwater flow was evaluated to be to the northwest from the former facilities of the gasoline service station.
This direction of flow was later confirmed by a construction dewatering evaluation, along with the rate of flow and volume required to be pumped. The dewatering plan has been approved by the Triborough Bridges and Tunnels Authority (TBTA) who maintain the Hugh L. Carey Tunnel.

MW-11 represented the highest concentrations (see above) and is located adjacent to Hamilton Avenue directly downgradient of the former gasoline service station facilities. Temporary wells in Hamilton Avenue and permanent wells across the Avenue (MW-8A, MW-10 and MW-15 demonstrated that the extent of contamination was limited to the northeastern half of Hamilton Avenue.

The concentrations in MW-11 were associated with contaminated soil under the Hamilton Avenue sidewalk. Therefore, excavation under the sidewalk in conjunction with the Site redevelopment, and associated groundwater remediation have been proposed in this RAWP.

5.3 Receptor Populations

On-Site Receptors: The site is currently used for an automobile repair facility and contains a single-story concrete building with three (3) service bays and can only be accessed from the south side of the site along Hamilton Avenue. The Site is restricted by an 8-foot-high, chained and locked, perimeter fence. Onsite receptors are limited to employees, staff, site representatives, customers and visitors. During construction, potential on-site receptors include construction workers, site representatives, and visitors. Under proposed future conditions, potential on-site receptors include restaurant employees and adult/child customers.

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

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future

3. Building Construction/ Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – existing and future

5.4 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.

5.5 Potential Exposure Points

Current Conditions: The site is currently capped with asphalt or a building slab there are no 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. As the site has structures (a single-story concrete building with three (3) service bays), accumulation of soil vapor can pose an exposure threat.

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 off-site only (excavation of the sidewalk). 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 Restricted Commercial SCOs will be removed. The site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and engineering controls (vapor barrier/active 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.

5.6 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 commercial structure, site-wide surface cover, a subsurface vapor barrier for the building and a SSDS.

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. After construction is completed, the property will be capped with composite cover and there would be no direct contact with soils. Additionally, an active SSDS will address any soil vapor condition and improve soil vapor quality over time. A deed restrictions placed on the property will inform future property occupant regarding soils underneath the property and on-going requirements for Site Management.

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 near the Site that could be impacted or threatened.

6 Remedial Action Management

6.1 Project Organization and Oversight

The Professional Engineer responsible for preparation of this RAP and oversight of its implementation is John A. Rhodes, P.E, CEUS Engineering, P.C. Site work related to remediation will managed by Richard Levato, Advanced Site Restoration, LLC. This constitutes the team responsible for the remediation aspects of this development construction.

Please note that this remediation will be conducted in the context of a major construction project and all remediation activities must be coordinated with the construction operation.

6.2 Site Security

Site access will be controlled by the Site Development Constructor and development Construction Manager in accordance with New York City regulations. In addition, the Site will be fenced off with one entrance and exit gate located on the south side of the property along Hamilton Avenue.

6.3 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.

6.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix 5. The Site Safety Coordinator will be John Paul Murano. 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.

6.5 Community Air Monitoring Plan

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

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

6.5.1 VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

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

6.5.2 Particulate Monitoring, Response Levels, and Actions

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

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

6.6 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.

6.7 Site Preparation

6.7.1 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.

6.7.2 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.

6.7.3 Utility Marker Layouts, Easement Layouts

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

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

6.7.4 Dewatering

Dewatering is anticipated during the off-site excavation of the sidewalk along Hamilton Avenue. Dewatering is not anticipated during the remediation and construction of the Site.

Dewatering will be performed in order to excavate soil and fill material below the water table (expected to be fifteen feet below grade and three (3) feet into the groundwater). Dewatering for this site will utilize a pumping system initially from wells before they are removed by the excavation, and/or from pits in the excavation. Water will be pumped to a tanker truck for off-site treatment and disposal or will be treated on-Site and discharged into the city sewer system. All required permits will be obtained from NYCDEP prior to any discharge of groundwater into the sewer system.

6.8 Equipment and Material Staging

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

6.8.1 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.

6.8.2 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.

6.9 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.

6.9.1 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.

6.9.2 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.

6.9.3 Storm Response Reporting

A site inspection report will be submitted to OER at the completion of site inspection. An inspection report established by OER is available on OER's website (www.nyc.gov/oer) and will be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the OER project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

6.10 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 9.

6.11 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.

6.12 Reporting and Record Keeping

6.12.1 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.

6.12.2 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).

6.12.3 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.

6.13 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.

7 Remedial Action Report

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

- Information required by this RAWP;
- Text description with thorough detail of all engineering and institutional controls (if Track 1 remedial action is not achieved)
- As-built drawings for all constructed remedial elements;
- Manifests for al soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 remedial action is not achieved);
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results (including all soil test results from the remedial investigation for soil that will remain on site) and all soil/fill waste characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;

- Full accounting of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Recorded Declaration of Covenants and Restrictions (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.

7.1 Remedial Action Report Certification

I, [name], certify the following:

- I am currently a registered professional engineer licensed by the State of New York.
- I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for 113 Hamilton Avenue, Brooklyn, NY, NYC VCP site number 19CVCP079K.
- 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 of P.E.

PE License Number:

PE Stamp

_____

Signature

_____

Date

I, *Name of QEP*, certify the following:

- I am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for 113 Hamilton Avenue, Brooklyn, NY, site number 18TMP0589K.
- 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.

Name of QEP

_____
Signature

_____
Date

8 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, three-week remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Cumulative Duration (weeks)
OER Approval of RAWP	4	3
Fact Sheet 2 announcing start of remedy	1	4
Mobilization*	1	5
Remedial Excavation*	3	8
Demobilization*	1	9
Submit Remedial Action Report	10	19

* Mobilization, Remedial Excavation and Demobilization start, and duration times may vary from the above as they must be coordinated with building construction.

APPENDIX 1 CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and 113 Hamilton Avenue, 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, 113 Hamilton Avenue, 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 other questions, comments or concerns that arise during the remedial process at (212) 788-8841.

Project Contact List: OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at brownfields@cityhall.nyc.gov.

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

Reanimation Library

289 Van Brunt St, Brooklyn, NY 11231, USA

+1 718-710-0276

Wednesdays through Sundays 12pm to 6pm. Closed on Mondays and Tuesdays.

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

Issues of Public Concern: The major issues of concern to the public will be potential impacts of nuisance odors and dust during the disturbance of historic fill soils at the Site. This work will be performed in accordance with procedures which will be specified under a detailed Remedial Program which considers and takes preventive measures for exposures to future residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a Construction Health and Safety Plan and a Community Air Monitoring Plan are required components of the remedial program. Implementation of these plans will be under the direct oversight of the New York City Department of Environmental Remediation (NYCOER).

These plans will specify the following worker and community health and safety activities during remedial activity at the Site:

- On-Site air monitoring for worker protection,
- Perimeter air monitoring for community protection.

The Health and Safety Plan and the Community Air Monitoring Plan prepared as part of the Remedial Action Work Plan will be available for public review at the document repository.

Public Notice and Public Comment: Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be reviewed and approved by OER prior to distribution and mailed by the Enrollee. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

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

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

a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

APPENDIX 2 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.

This project intends to use recycled concrete aggregate wherever possible in grading and backfilling the Site. 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.

Recycled concrete materials and other backfill materials will be locally sourced reducing the energy consumption associated with transporting these materials to the Site. 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. Electrical energy will be minimized for the SSDS blower units. Natural gas will be utilized for fuel in the new building.

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.

Storm Water Retention: As the building will cover the entire site, stormwater retention is impracticable.

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.

Paperless Voluntary Cleanup Program: 113 Hamilton Avenue, 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: 113 Hamilton Avenue, 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.

The redevelopment plan does not include any landscaping, trees or vegetation.

APPENDIX 3 SOIL/MATERIALS MANAGEMENT PLAN

4. SOIL/MATERIALS MANAGEMENT PLAN

4.1. 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.

4.2. Stockpile Methods

Excavated soils will have a threshold of 50 ppm reading on the PID. The 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.

4.3. 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. No soils will be reused on-Site.

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.

The vehicle loading zone will be located on site to minimize impact to adjacent streets. The loading zone will 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.

4.4. 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.

4.5. 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.

4.6. Materials Reuse On-Site

No material will be reused on-Site.

4.7. Demarcation

Cover will be comprised of concrete and aggregate sub-base. An additional demarcation layer is not needed.

4.8. Import of Backfill 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 in accordance with OER requirements 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;
- Crushed virgin rock and screened sand from virgin sand pits.

All materials received for import to the Site will be approved by a PE/QEP and ExxonMobil 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 material to be imported from non-virgin sources 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.

The PE/QEP will 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.

4.9. 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.

4.10. 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.

4.11. 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.

4.12. 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.

4.13. 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 4 CONSTRUCTION HEALTH AND SAFETY PLAN

APPENDIX 5 MANUFACTURER SPECIFICATIONS and WARRANTEE FOR VAPOR BARRIER

Overview

4EVERCRETE is a one-time permanent application specially engineered with a proprietary formula to waterproof and greatly reduce vapor transmission through concrete. The product is applied by airless sprayer at high pressure to allow the product to atomize so that the silicate chains can be broken apart to best penetrate the slab. These silicates have been altered on a molecular level (from pencil-shaped to spherical) to allow for maximum penetration and filling capability. As the product works its way down through the capillary system of the concrete, it fills all voids and forms a colloidal gel - purging all contaminants to the surface in the process. Contaminant levels can vary from project to project. Usually, after 24-48 hours the contaminants can be cleaned off the surface and the slab is permanently sealed. In cases with high levels of contaminants or salts, the purging process can take 72 hours or longer to complete. Once the purging process has stopped and the surface is clean, any coatings or coverings can be applied.

IMPENECRETE is specially formulated to readily penetrate, seal and protect the surface of concrete by providing a protective opaque flexible polymer film coating which durably and tenaciously adheres to the surface after drying. IMPENECRETE is used in conjunction with 4EVERCRETE to form a total waterproof and vapor-proof barrier.

An initial application of 4EVERCRETE will be followed by one coat of IMPENECRETE. This 2-product system will be applied according to the specifications that follow and will form a water and vapor barrier, preventing the migration of contaminants through the slab.

4EVERCRETE & IMPENECRETE Specification

PART 1- GENERAL

1.01 SUMMARY

A. Furnish all labor, materials, equipment and incidentals required to provide proper installation of 4EVERCRETE.
B. The owner shall provide temporary electric service and potable water at no cost to Contractor/Applicator when available at the site.

1.02 REFERENCE STANDARDS

A. 4EVERCRETE meets or exceeds the following standards:

- ASTM C-67-7: Water Absorption
- ASTM C-67-9: Suction
- ASTM C-67-10: Efflorescence
- ASTM C-67-13
- ASTM C-67-25
- ASTM C-67-29
- ASTM C-67-65: ORF Method, Dusting Resistance
- ASTM C-23-69: Artificial Weathering
- ASTM C-114: Water Soluble Chloride Ion
- ASTM C-140: Water Repellency Rating
- ASTM C-156: Water Retention
- ASTM C-309: Class A Curing Compound
- ASTM C-514: Permeability
- ASTM C-518: Thermal Conductivity-Thermal Resistance
- ASTM C-672-760: Scaling Resistance to Deicers
- ASTM C-666: Freeze Thaw Resistance
- ASTM C-856: Petrographic Analysis
- ASTM C-1664: Non-Volatility
- ASTM D-327: Sulfate Durability
- ASTM D-2047: Slip Resistance
- ASTM D-4541: Adhesion "Bond" Test
- ASTM D-5084: Hydraulic Conductivity (Permeability Test)
- ASTM E-96: Moisture Vapor Transmission
- ASSHTO T259-80: Chloride Ion Penetration
- ASSHTO T260: Chloride Ion Content
- DIN-1048: Water Penetration
- CRD C48-73: Hydrostatic Pressure Resistance
- CRD C52-54: Abrasion Resistance
- NCHRP 244: Reduction of Chloride Penetration
- NCHRP 244-Series IV: Moisture Vapor Transmission
- USDA Approved For Use In Food Processing Areas
- EPA Compliant

1.03 SUBMITTALS

A. Product data: Within 30 calendar days after the Contractor or Applicator (if separate contract) has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's current specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.

B. Any test data or reports required under this Section.

1.04 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
B. If ECI is not installing the product, use a Certified Applicator currently approved in writing by the product Manufacturer.
C. Cooperate as required in performance of the specified testing and inspecting.
D. Application of product shall conform to Manufacturers written specifications.
E. The Engineer may select an area for testing product application and observing applicator procedures for conformance with this section and the Manufacturers specifications.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in the original manufacture's sealed containers to location on site approved by Owner.
B. Store materials in such a way as to prevent damage to containers or product and protect from freezing temperatures.
C. Containers shall be kept tightly sealed until product is applied.

1.06 WARRANTY REQUIREMENTS

A. Environmental Coatings, Inc. (Manufacturer) warrants that if any goods supplied prove defective in workmanship or material, that Manufacturer shall replace them or refund their purchase price. The terms of this paragraph may not be orally modified. There are no warranties express or implied extended beyond the face herewith.

PART 2 - PRODUCTS

2.01 4EVERCRETE

A. Where indicated on the Drawings, and/or where specified herein for concrete waterproofing & vapor barrier, provide the following product manufactured by **Environmental Coatings, Inc.**, Montclair, New Jersey. **(No Substitutions)**

1. 4EVERCRETE is a milky white (cures clear), water borne, environmentally neutral solution that provides superior concrete waterproofing, vapor restriction and sealing.

2. Water shall be potable water only.

2.02 IMPENECRETE

A. Where indicated on the Drawings, and/or where specified herein for concrete sealing and for complete vapor barrier system, provide the following product manufactured by **Environmental Coatings, Inc.**, Montclair, New Jersey. **(No Substitutions)**

1. IMPENECRETE is a milky white (cures clear), water borne, environmentally neutral solution that provides superior concrete water vapor restriction and sealing.

2.03 Crack Repair & Joint Sealant

A. Where indicated on the Drawings, and/or where specified herein for concrete crack and joint sealing, provide the following product manufactured by **Dow Corning Corporation**, Auburn, Michigan or EQUAL/SUPERIOR product.

1. Dow Corning® 790 Silicone Building Sealant is an ultra-low-modulus sealant for new and remedial construction joint sealing applications

2.04 OTHER MATERIALS

A. Provide other materials, not specifically described in this Section, but required for completing the work, where specified by the Engineer.

PART 3 – EXECUTION

3.01 SURFA.CE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Surface, air and material shall not be lower than 40°F during application. Do not apply when temperature is expected to fall below 40°F within 6 hours. Or if the temperature exceeds 90ºF the surface needs to be dampened prior to application.

C. Weather should be clear, with moderate breeze. There shall be no precipitation during application or expected for 4 at least hours following.

D. The Contractor or Applicator shall provide protection for any glass or aluminum to avoid over spray. In event of over spraying occurs, remove the over spray promptly with water to guard against potential etching of glass and/or dulling of aluminum.

E. The Contractor or Applicator shall examine the areas and conditions under which work of this section will be performed for conformance with Manufacturer Specifications. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

F. CRACKS/JOINTS: Cracks and joints of significant width (>$^1/_8$") on the slab shall be routed to a width of at least $^1/_4$" and a depth to be three (3) times the width. **Note: Depth of cut should be no greater than 25% of the slab thickness (e.g., no deeper than 1" in a 4" slab).** After cracks are routed, install 4EVERCRETE & IMPENECRETE as indicated in the installation instructions below. Once installation of 4EVERCRETE/IMPENECRETE system is complete, install backer rod (size at least 25% larger than width of crack/joint) into crack/joint and caulk over with Dow

Corning 790. **For cracks or vertical joints on walls, please consult Environmental Coatings, Inc. directly for further recommendations.**

G. **COLD JOINTS**: For horizontal cold joints (between walls and floor), the following steps should be taken **after the application of 4EVERCRETE/IMPENECRETE system is completed**:

1. Tape off to $^1/_4$" of either side of cold joint to prepare clean lines for the expected $^1/_2$" joint.
2. Apply a layer of bond breaker at the center of the cold joint. This should be approximately $^1/_8$" wide. ECI recommends using a grease pencil (e.g., "Sharpie PEEL-OFF China Marker") as a bond breaker.
3. Following the application of the bond breaker, apply the Dow Corning 790 silicone caulk over the cold joint. Allow enough caulk for the $^1/_2$" joint.
4. Tool the caulking to an even finish and immediately remove tape after tooling is completed.

3.02 INSTALLATION

A. On new and existing concrete floors or other approved vertical masonry surfaces, no additional surface preparation is required. Any existing coatings must be removed from concrete or block prior to installation. Any grinding or power-washing prep work must be done prior to installation.

1. Exterior walls -Cover landscaping in adjacent areas during application.
2. Mask off all adjacent glass and metal surfaces.
3. Where the concrete slab is being sprayed, make sure to mask wall finishes with plastic.

B. Installation of 4EVERCRETE requires using a high pressure (approximately 1700-2000 psi) atomizing paint sprayer equipped with fan spray tip size .517. 4EVERCRETE is applied to the point of saturation (the point where runoff is about to occur), but at a rate not to exceed 150 square feet per U.S. gallon.

Hold spray tip approximately 6" from concrete surface – an extension wand may be used for a more ergonomic installation. Make application starting from East to West in a 300 square foot section at a rate of 300 square feet per gallon. Then, in the same section, make application from North to South also at a rate of 300 square feet per gallon. This will give you a virtual coverage rate of 150 square feet per gallon and maximize the penetration that the product will get into the capillary system of the concrete. Repeat in 300 square foot sections as necessary until entire desired surface area is covered. Entire area being treated must be saturated with the atomized spray and with no holidays. Make sure that any areas showing signs of ponding of the 4EVERCRETE are blown, push-broomed or squeegeed to other areas until the 4EVERCRETE is absorbed into the concrete. **DO NOT LEAVE PUDDLES ON THE SURFACE.**

For vertical surfaces the process is the same as above, except you start from the **Bottom** of the wall and work your way **Up**. This is to avoid putting unnecessary strain on the product with gravity and to ensure the wall is properly sealed. Do not exceed 150 square feet per gallon in coverage.

C. Allow a minimum of twenty-four to forty-eight (24-48) hours for the contaminants and salts (at low levels) to be purged from the concrete slab or block interior. If necessary, the concrete slab or block should be re-cleaned using an auto scrubber before any surface sealer is applied. If water vapor drive is an issue, seal the surface with IMPENECRETE.

NOTE: In the case of extremely high levels of contamination and salts the **minimum** time to

allow for purging of salts & contaminants is forty-eight to seventy-two (48-72) hours; however, it may take longer for contaminants to purge and this process of purging must be monitored on a

daily basis to determine when the slab is ready for additional coatings. After cleaning the surface to remove the initial purged contaminants, a minimum of twenty-four (24) hours must be allowed to ensure no more contaminants have been purged to the surface and the concrete is completely dry. If more salts are present on the surface, then the slab should be re-cleaned using an auto scrubber, and an additional twenty-four (24) hours must be allowed to ensure no more contaminants have been purged and the concrete is completely dry. Repeat this process as necessary. **Make sure the slab is dry and no salts/contaminants remain on the surface prior to applying the IMPENECRETE seal coat or any epoxy or urethane floor coating.**

D. Any holidays observed after initial application of product shall be sprayed immediately with overlap.

E. Apply IMPENECRETE with a $^{3}/_{8}$" roller at a rate not to exceed 200 square feet per gallon using an overlapping motion to ensure maximum penetration and complete coverage. Roll until product is absorbed into concrete. **DO NOT LEAVE PUDDLES ON THE SURFACE.**

F. Clean equipment with potable water and mild soap.

G. Topical materials shall be installed in conformance with specific manufacturer's requirements.

H. Upon completion of work, remove containers, trash, and debris caused by work under this section.

Sample Warrantee

Evironmental Coatings, Inc.

LIMITED WARRANTY

Environmental Coatings, Inc., ["ECI"] hereby grants a Limited Warranty for the following material(s):

[**4EVERCRETE/IMPENECRETE**]

which have been properly applied/installed to the following project:

Job Reference: Address:

Project Owner and Address (if different from above): N/A

Total Surface Area (Square Feet, or Linear Feet): _____ Square Feet
Substrate or Structure Type:
Notes: Foundation Application
Attending Technician:

ECI does warrant (subject to the terms, covenants, and conditions herein stated) that the above listed products as applied/installed to the referenced project, to be and to remain completely free of all inherent material defects, for a continuous period of **ten (10)** years from the completion date of application/installation. **The system shall provide a protective membrane that renders the area waterproof, vapor-proof, and prevents water from migrating to the surface of the concrete in the area of application.**

UPON FAILURE OF THE PRODUCT(S) [DUE TO INHERENT MATERIAL DEFECT] LISTED HEREIN, AND SUBJECT TO THE TERMS, COVENANTS AND CONDITIONS CONTAINED HEREIN, ECI SHALL:

1) REFUND THE COST OF SAID PRODUCT(S) OR FURNISH REPLACEMENT MATERIALS.

This limited warranty is in lieu of all warranties, whether expressed or implied, including, but not limited to, any warranty of merchantability or fitness for a particular purpose.

Claims for punitive, incidental or consequential damages resulting from a breach of this limited warranty are specifically excluded and disclaimed. Damage to building contents or personal injury damage is also specifically excluded.

This limited warranty provides you specific legal rights, which may vary from state to state.

a) ECI shall have the right, at its option during the period of this limited warranty and prior to the execution hereof, to inspect the product application and, in the event of any defect covered by this warranty, to repair and correct the same or to supply additional product to correct the problem. In the event that the owner refuses to allow such inspection or repair, this warranty shall become null and void and have no further force and effect.
b) If the owner is aware of any unwarranted damage or deterioration, the owner shall promptly furnish a written report of it to ECI, setting forth in reasonable detail the nature and extent of said claim. Failure by the owner to promptly report shall make this warranty null and void and have no further force and effect.
c) Any claim hereunder shall be deemed waived unless the owner shall have given ECI written notice thereof within five (5) calendar days following the discovery of circumstances giving rise to a claim. ECI will immediately acknowledge receipt of the owner's claim.
d) All products are to be applied according to ECI's written application instructions and procedures. Failure to follow said instructions and procedures shall make this limited warranty null and void and of no further force and effect. ECI does not warrant or guarantee the quality of labor used to prepare the surface and to apply or install the products covered by this limited warranty.

Evironmental Coatings, Inc.

LIMITED WARRANTY

e) If payment in full is not made on a timely basis to ECI, this limited warranty shall be without consideration and this limited warranty shall be null and void and of no further force and effect.

f) This limited warranty will not cover damage or failure of the product(s) if such failure or damage is:

1) caused by natural events, including, but not limited to, fires, subsidence, floods, lightning, hurricanes, hail, wind, earthquakes, tornadoes, cyclones and other Acts of God,
2) caused by physical penetration, vandalism, damage or attack by third parties, foreign objects or agents including animal and plant life,
3) caused by lack of positive drainage or moisture entering the building through walls, copings, or any part of the building structure not encased with ECI 4EVERCRETE or other ECI waterproofing materials,
4) caused by the owner by making or permitting, without prior written consent of ECI, repairs alterations, or additions to the structure which affect the product or change the use, function or purpose of the structure. ECI shall respond promptly to any written request for consent to repairs, alterations, or additions,
5) caused by excessive structural movement, failure of the substrate encased, or faulty construction or design.

g) This limited warranty may be transferred to a new owner upon sale of the property provided that ECI receives express written notice of said sale or transfer within thirty (30) days of said transfer or sale and the new owner accepts the product as being in compliance with this warranty at the time of sale or transfer, and further accepts all of the terms and conditions of this limited warranty. Any such transfer shall transfer only the time period remaining under the original limited warranty and shall not be deemed to be a new Limited Product Warranty.

h) Any lawsuit to enforce any rights under the limited warranty must be commenced within one (1) year after the written notice of claim is sent to ECI and, if not commenced within said one (1) year period, shall be forever barred.

This limited warranty comprises the entire warranty granted for the product(s) listed above and no prior, contemporary or subsequent oral or written representations made by any ECI representative or employees shall be binding on ECI unless specifically set forth on the face hereof.

1. The Applicator/Installer (Contractor) is responsible for proper application/installation procedures and must have applied the materials to the surface in accordance with same.
2. The limited warranty applications must be signed by the ECI or any other Installer responsible for performing the installation of the products being warranted on this project.
3. No warranty is valid unless approved by an authorized ECI officer.

SAMPLE

Environmental Coatings, Inc. Warranty Authorization

By: _____ Title: _____ Date: _____
Environmental Coatings, Inc.

By: _____ Title: _____ Date: _____
Contractor

By: _____ Title: _____ Date: _____
Building Owner Representative

Warranty Number: _____ Project Completion Date: _____

ECI, 36 Eagle Rock Way, Montclair, NJ 07042 (973) 509-9456

ECI
Environmental Coatings, Inc.
Cost-Effective Environmentally Advanced Solutions

36 Eagle Rock Way
Montclair, NJ 07042
Phone: 973-509-9456
Fax: 973-509-9460

Rich Levato
Advanced Site Restoration
62 William St.
New York, NY 10005

March 2018

Re: 113 Hamilton Avenue, Brooklyn, NY

Dear Rich:

Based on the testing results you forwarded to us for review, our recommended system for this project would be an initial application of 4EVERCRETE followed by one coat of IMPENECRETE. This 2-product system (when applied according to the specifications attached with this letter) will form a complete water and vapor barrier, preventing the migration of contaminants through the slab. For your convenience, the latest specifications document for this system is available on our website: www.eciproducts.com. This system can be warrantied based on proper installation and three-part inspection by a member of ECI.

If you have any questions, please contact me directly at (973) 509-9456.

Sincerely,

Nick Cusenza

Nick Cusenza
Vice President
Environmental Coatings, Inc.

APPENDIX 6 SPECIFICATIONS FOR SUB-SLAB DEPRESSURIZATION SYSTEM

Migration of soil vapor into the building will be mitigated with the construction of a Sub-Slab Depressurization System (SSDS). The SSDS will consist of network of horizontal pipe set in the middle of a gas permeable layer immediately beneath the building slab and vapor barrier system. The perforated pipes will be connected through a solid header and riser pipe to a blower on the roof of the building. The layout of the SSDS piping network is shown in Figure 6. Figure 7 provides additional details for the SSDS system.

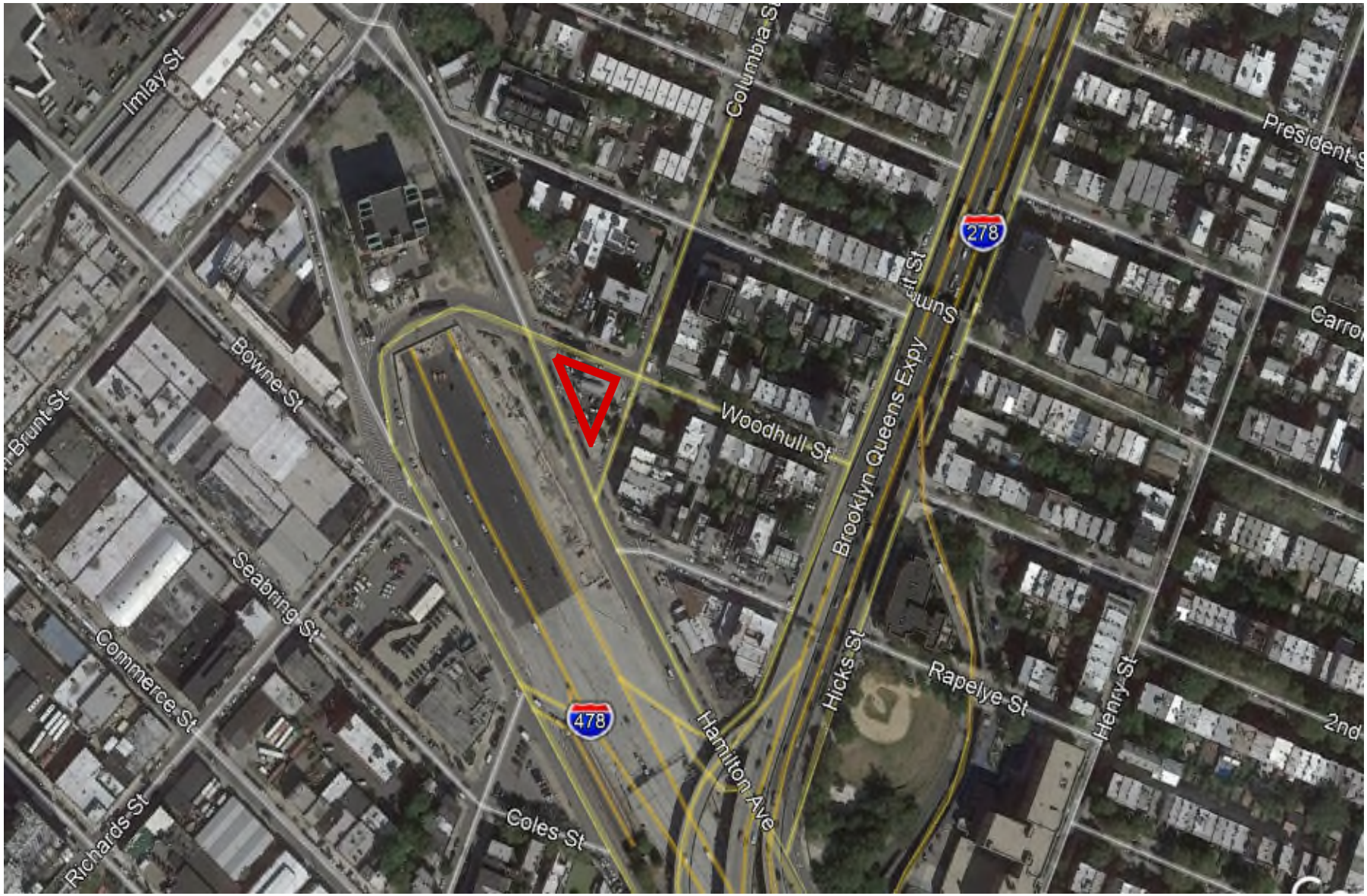
1. Excavation and Preparation
   - 1.1. Following remediation excavation to six (6) feet bgs, backfill to one foot or more below the bottom of the slab in accordance with other specifications.
   - 1.2. Place granular fill (pea gravel) on geotextile fabric, graded as required for SSDS piping layout and sloping.
   - 1.3. The perforated pipe shall be laid in and covered by ¾ inch crushed stone extending a minimum of six (6) inches above and to the sides of the perforated pipe. The stone shall be wrapped in a geotextile filter fabric creating an assembly of pipe, rock and filter fabric that is a minimum of 16 inches by 16 inches. The assembly shall be installed in a gas permeable layer consisting of a 12-inch-thick layer of pea gravel and ¾ inch stone or other compatible dimension as specified by the building engineer.

2. SSDS Piping
   - 2.1. The horizontal piping shall consist of perforated schedule 40, four (4) inch PVC pipe.
   - 2.2. The horizontal perforated PVC pipe shall be connected to a four (4) inch, solid header pipe to pass through the grade beams, to extend to perforated piping for performance reasons, and to connect the piping network to the riser pipe, as shown on Figures 6.
   - 2.3. The horizontal perforated PVC pipe will be laid approximately 20 feet apart or less, and within 10 feet of foundation walls or less, as shown on Figure 6.
   - 2.4. The four (4) inch solid header will penetrate the slab and transition to a four (4) inch, Schedule 40, PVC riser pipe that will travel through the building to the roof.

3. Roof Fan
   - 3.1. A Radon Away XP201 blower, or similar blower after final design is completed, shall be mounted on the four (4) inch riser pipe.
   - 3.2. The blower shall be mounted above the roof line in accordance with NYC DOB code.
   - 3.3. The blower shall be hardwired; and electric feed and disconnect and instrumentation panel shall run along the east wall of the building to the roof to supply power to the fan and connect instrumentation.

3.4. The blower will be instrumented with remote pressure and temperature gauges, and a remote motor failure alarm located in an accessible area.

4. Vapor Monitoring Points- Two vapor monitoring probe points as shown on Figure 3 will be installed.

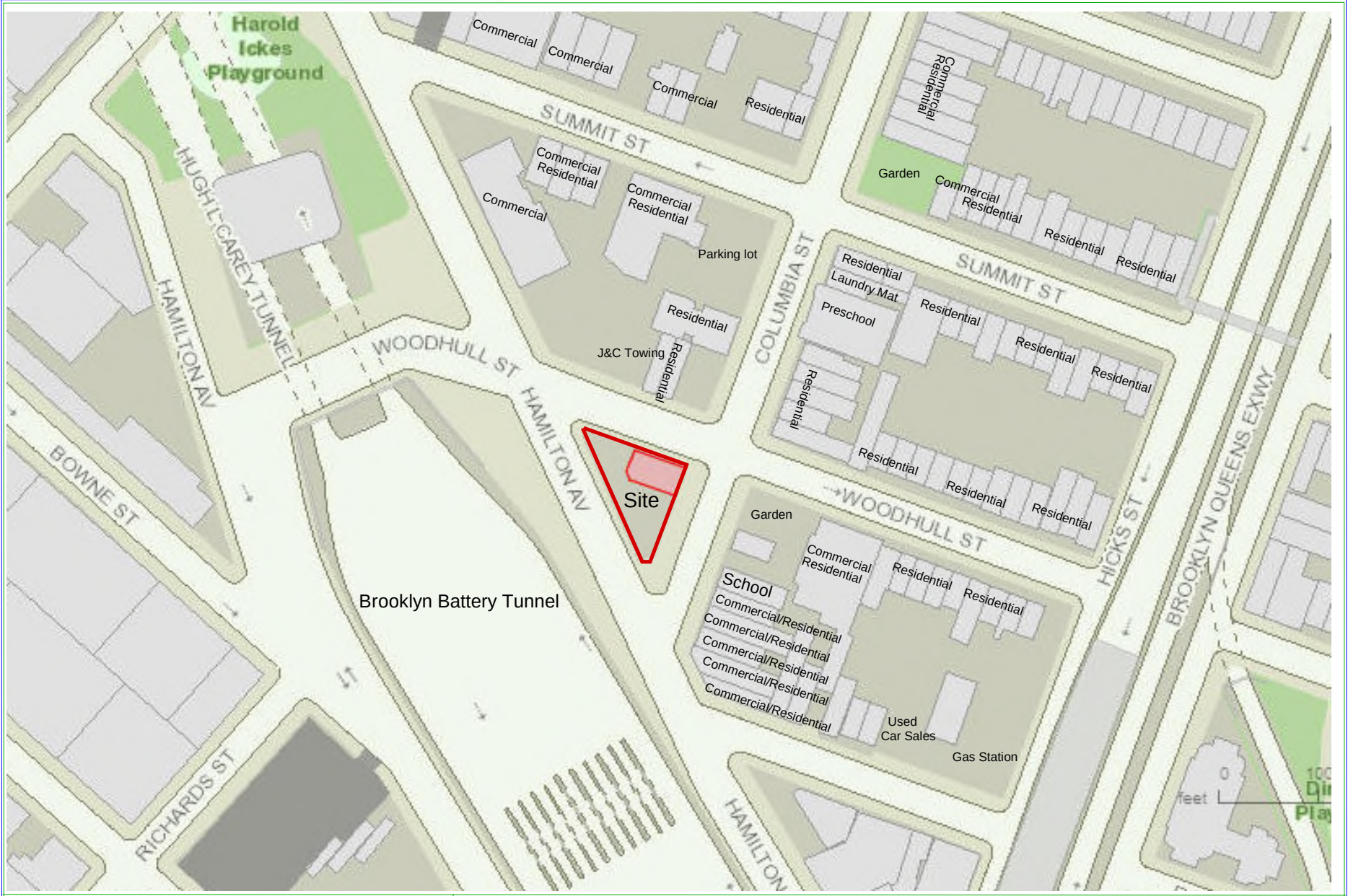


ADVANCED Site Restoration, LLC.
Environmental Services

62 William St., 3rd Floor, New York, NY 10005
Tel: 212-809-1110 Fax: 212-809-1779 info@askasr.com

Figure - 1
Site Map

Renaissance Realty
113 Hamilton Avenue
Brooklyn, New York

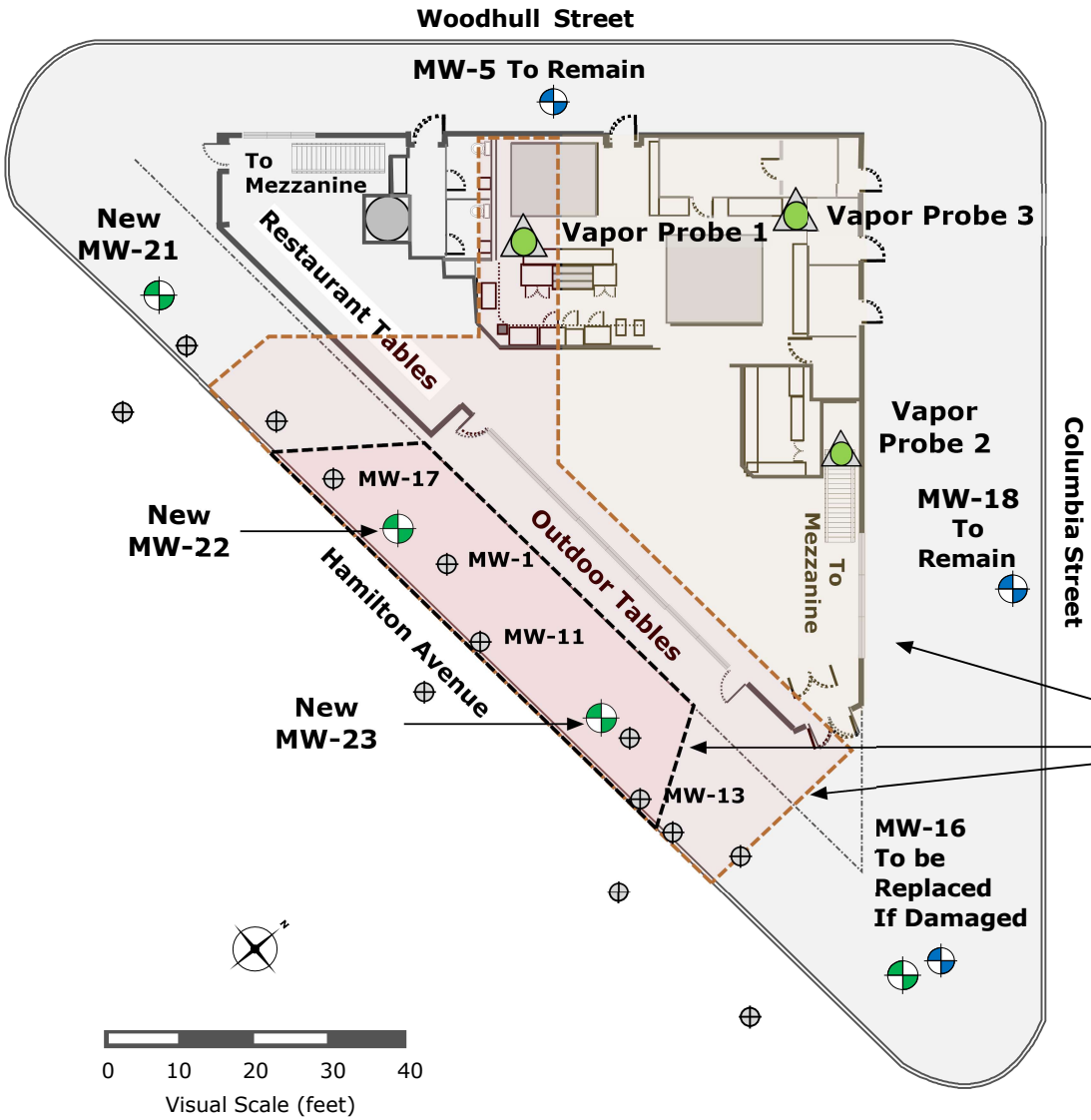


ADVANCED Site Restoration, LLC.
Environmental Services

62 William St., 3rd Floor, New York, NY 10005
Tel: 212-809-1110 Fax: 212-809-1779 info@askasr.com

Figure - 2
Site Location & Surrounding Properties Map

Renaissance Realty
113 Hamilton Avenue
Brooklyn, New York



Monitoring Wells & Vapor Probes
Replacement Wells: 4", Sch. 40 PVC, Screened 5' to 15' below grade

- **Former or Existing Monitoring Well To Be Closed**
- **Monitoring Well To Remain**
- **Replacement Monitoring Well**
- **Vapor Probe**

Extent of Excavations (See Excavation Plan)

Notes

1. Based on Building Plans, Sheet A-100 Floor Plans, SBLM, Architect, 8/10/2017

John A. Rhodes, P.E.

IT IS A VIOLATION OF NEW YORK STATE LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER

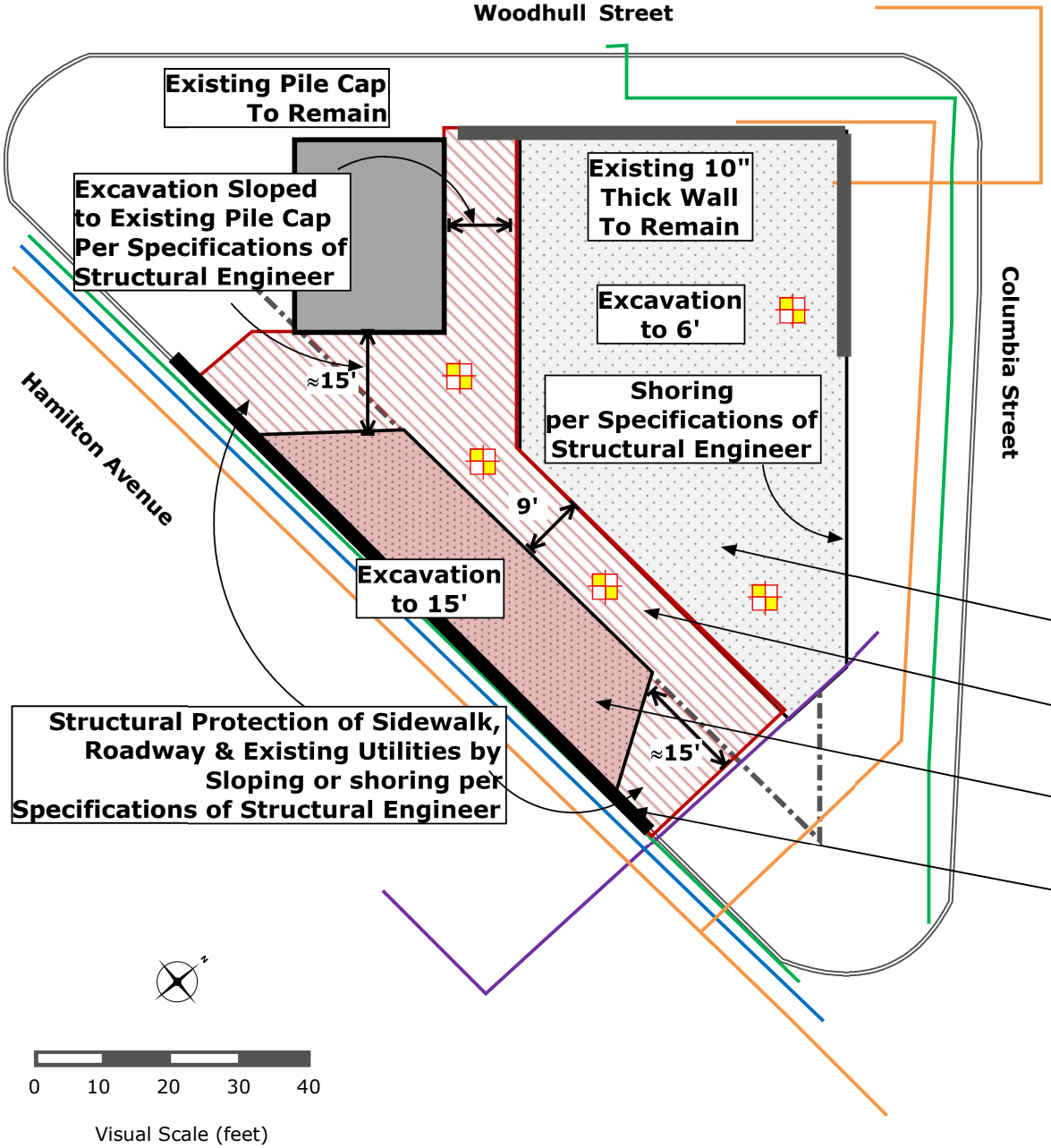
STATE OF NEW YORK · JOHN A. RHODES · 84423 · LICENSED PROFESSIONAL ENGINEER

John A Rhodes, P.E.
NYSPE No. 84423

Monitoring Plan

Renaissance Realty
113 Hamilton Ave
Brooklyn, NY

DRAWN	CHECKED	DATE	DRAWG NO.
John A. Rhodes, P.E.	RL	June 2018	3



Utilities
Approximated: Confirm All Utility Types and Locations Before Proceeding

- Gas
- Water
- Electric
- Telephone

End Point Samples

- Five (5) End Point Samples

Excavation Areas (Depths Below Grade)

- Excavation to 6' or deeper as required for Building Construction
- 1:1 Slope: 15' to 6' & 6' to Grade; or shoring, both as Specified by Structural Engineer
- Excavation To 15'
- Shoring, Sheet Pile or as otherwise Specified by Structural Engineer, Grouted to Reduce Permeability

John A. Rhodes, P.E.

IT IS A VIOLATION OF NEW YORK STATE LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER

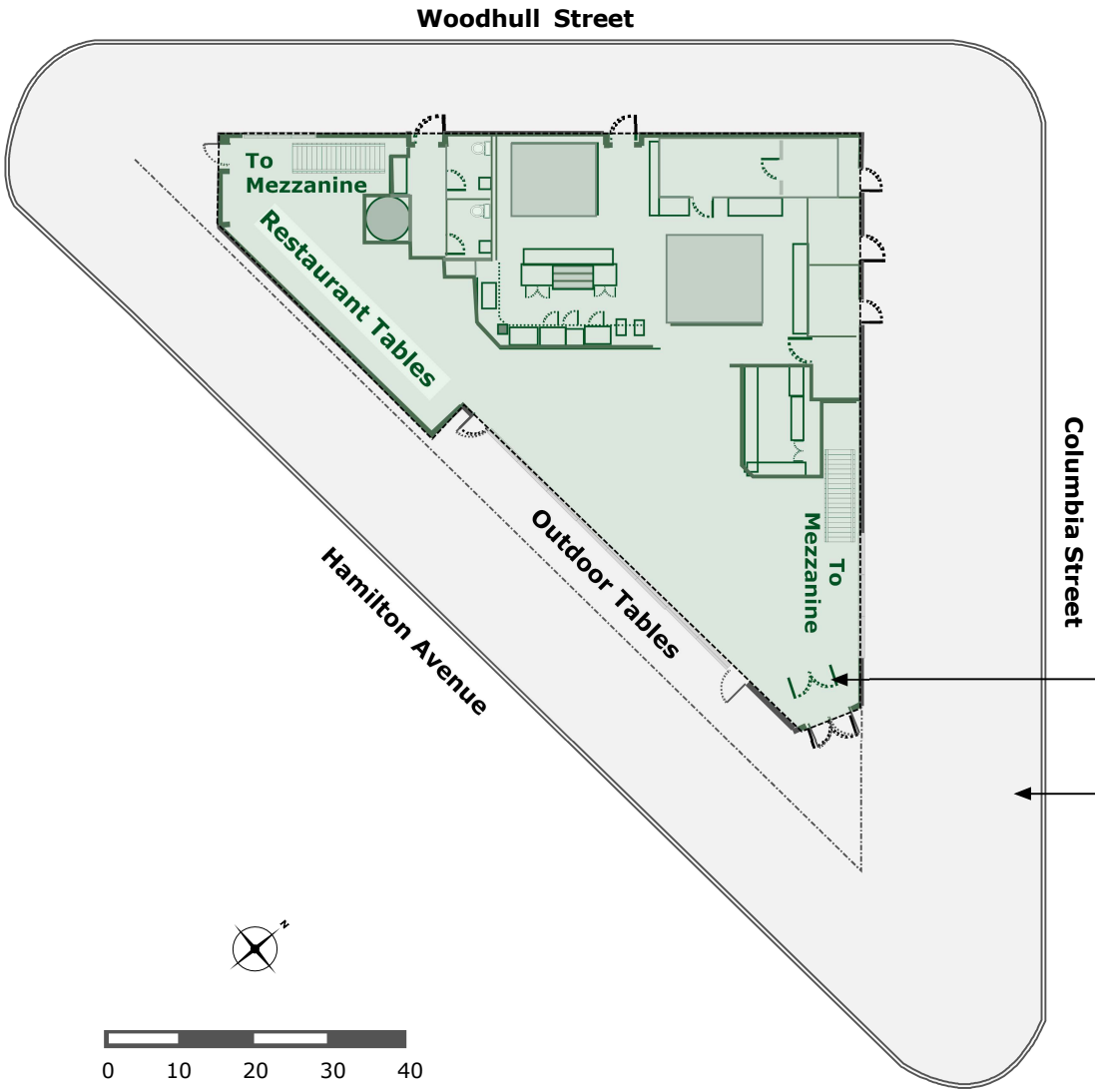
STATE OF NEW YORK · JOHN A. RHODES · 084423 · LICENSED PROFESSIONAL ENGINEER

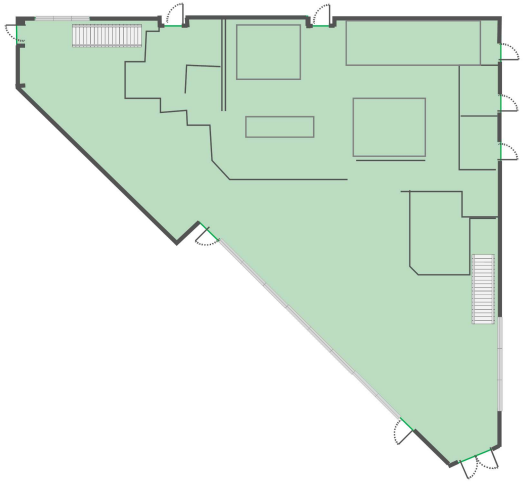
John A Rhodes, P.E.
NYSPE No. 84423

Remedial Excavation Plan

Renaissance Realty
113 Hamilton Ave
Brooklyn, NY

DRAWN	CHECKED	DATE	DRAWG NO.
John A. Rhodes, P.E.	RL	June 2018	4





Vapor Barrier Location Plan
(NTS)

Extent of Building Slab Cover
8" Concrete on 12" sub-base

Extent of Sidewalk Cover
Replaced sidewalk:
4" Concrete on 6" sub-base

Notes

1. Based on Building Plans, Sheet A-100 Floor Plans, SBLM, Architect, 8/10/2017

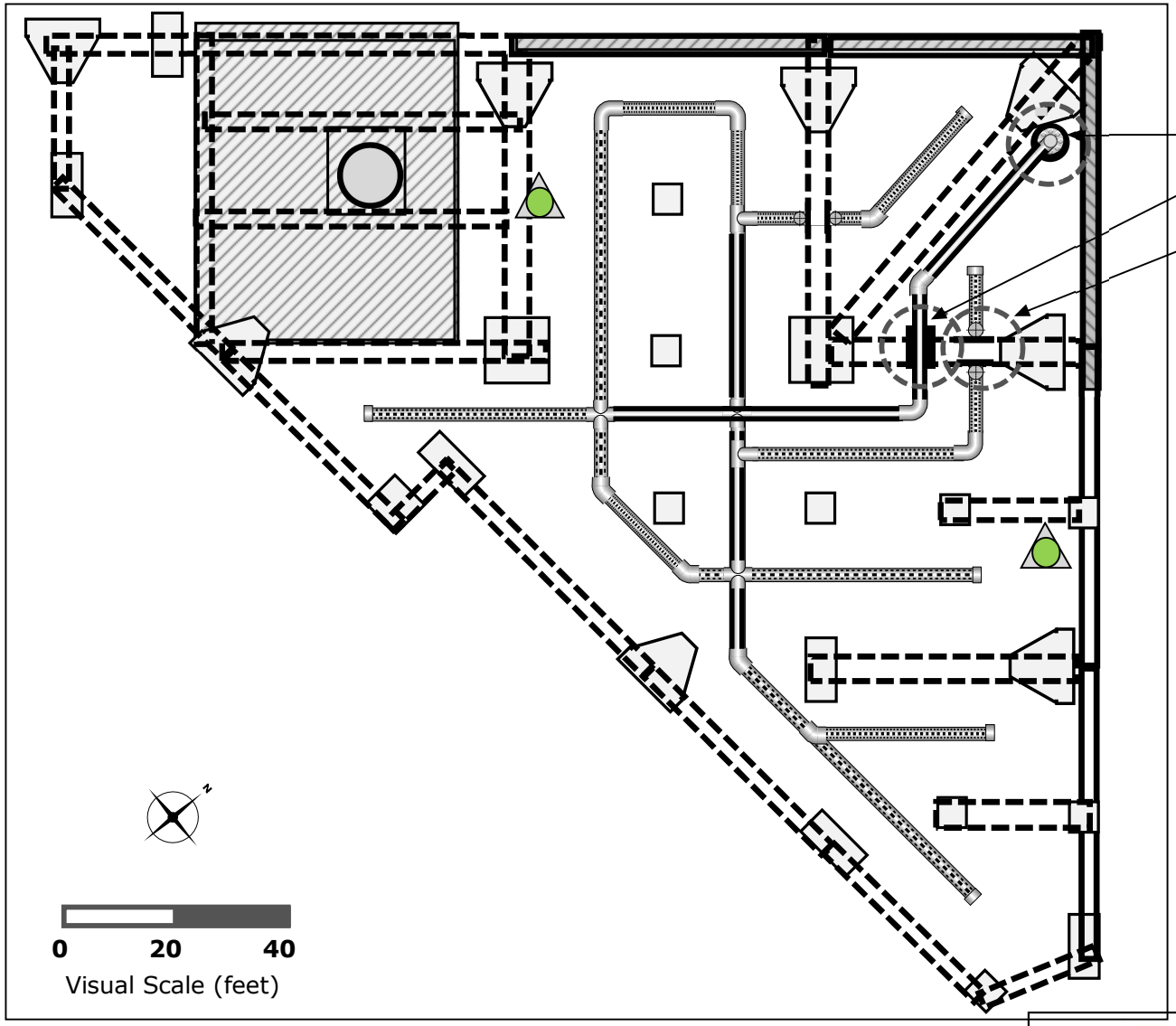
John A. Rhodes, P.E.

IT IS A VIOLATION OF NEW YORK STATE LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER

STATE OF NEW YORK · JOHN A. RHODES · 084423 · LICENSED PROFESSIONAL ENGINEER

John A Rhodes, P.E.
NYSPE No. 84423

Vapor Barrier & Composite Cover			
Renaissance Realty 113 Hamilton Ave Brooklyn, NY			
DRAWN	CHECKED	DATE	DRAWG NO.
John A. Rhodes, P.E.	RL	June 2018	**5**



Key

- 4" Schedule 40 PVC Solid Piping
- 4" Schedule 40 Perforated PVC Piping
- Grade Beam & Footings (Typical)
- Vapor Probe

Notes

1. Based on Building Plans, Sheet FO-100, Foundation Plan, SBLM Architects
2. Modifications to locations, materials and diameters may be made after coordination with architect and building trades

SSDS Piping Layout
Scale as Shown

John A. Rhodes, P.E.

IT IS A VIOLATION OF NEW YORK STATE LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER

STATE OF NEW YORK · JOHN A. RHODES · 84423 · LICENSED PROFESSIONAL ENGINEER

John A Rhodes, P.E.
NYSPE No. 84423

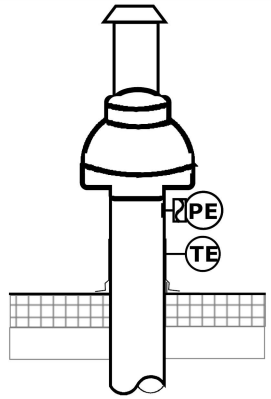
SSDS Piping Layout			
Renaissance Realty 113 Hamilton Ave Brooklyn, NY			
DRAWN	CHECKED	DATE	DRAWG NO.
John A. Rhodes, P.E.	RL	June 2018	6

Rain cap

RadonAway XP201 Blower
Or as Modified By Final Design
Mounted on 4" Riser Pipe

Remote Probes
Motor Off Alarm
Remote Pressure Reading (Vacuum)
Air Temperature

Roof penetration per
A/E Specifications



Roof Detail
NTS

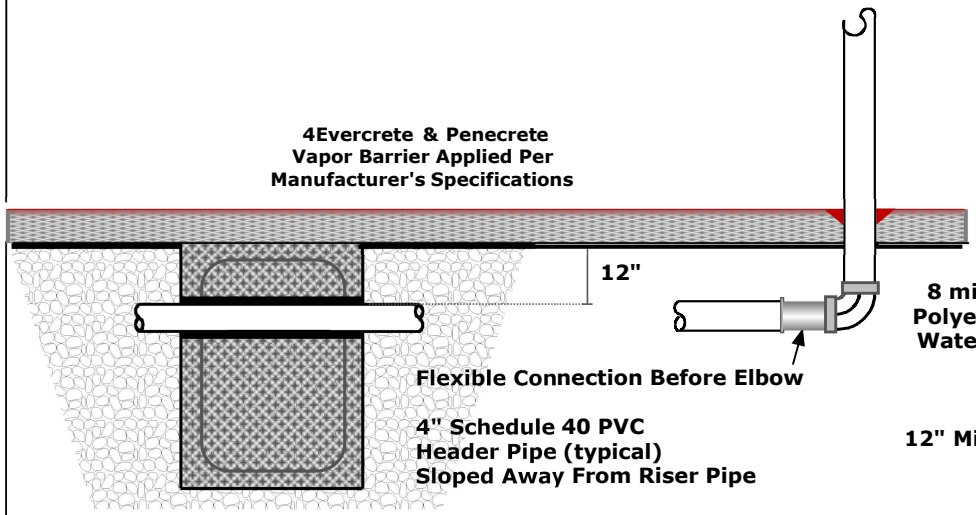
Notes

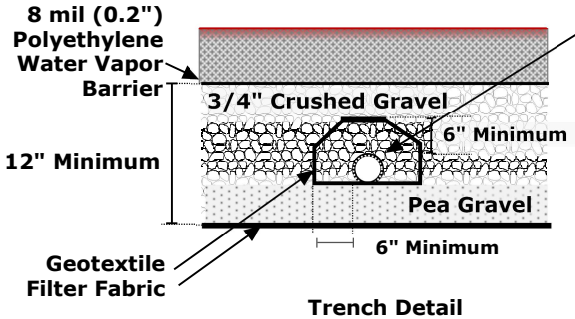
1. All slab penetrations shall be in accordance with A/E and 4Evercrete/Impenecrete specifications

2. Location of riser pipe, roof penetration and blower shall be pre-determined by A/E

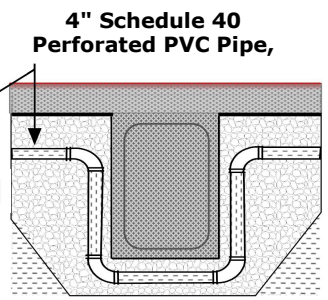
3. All pipe supports per A/E and pipe manufacturer's specifications

4. Sub-slab solid PVC header pipe shall slope away from riser pipe relative to pipe distance from riser





Trench Detail
Perforated PVC Pipe
NTS



Perforated PVC Pipe Detail
Run Under Grade Beam
NTS

Piping Detail
NTS

John A. Rhodes, P.E.

IT IS A VIOLATION OF NEW YORK STATE LAW
FOR ANY PERSON TO ALTER ANY DOCUMENT THAT
BEARS THE SEAL OF A PROFESSIONAL ENGINEER
UNLESS THE PERSON IS ACTING UNDER THE
DIRECTION OF A LICENSED PROFESSIONAL ENGINEER

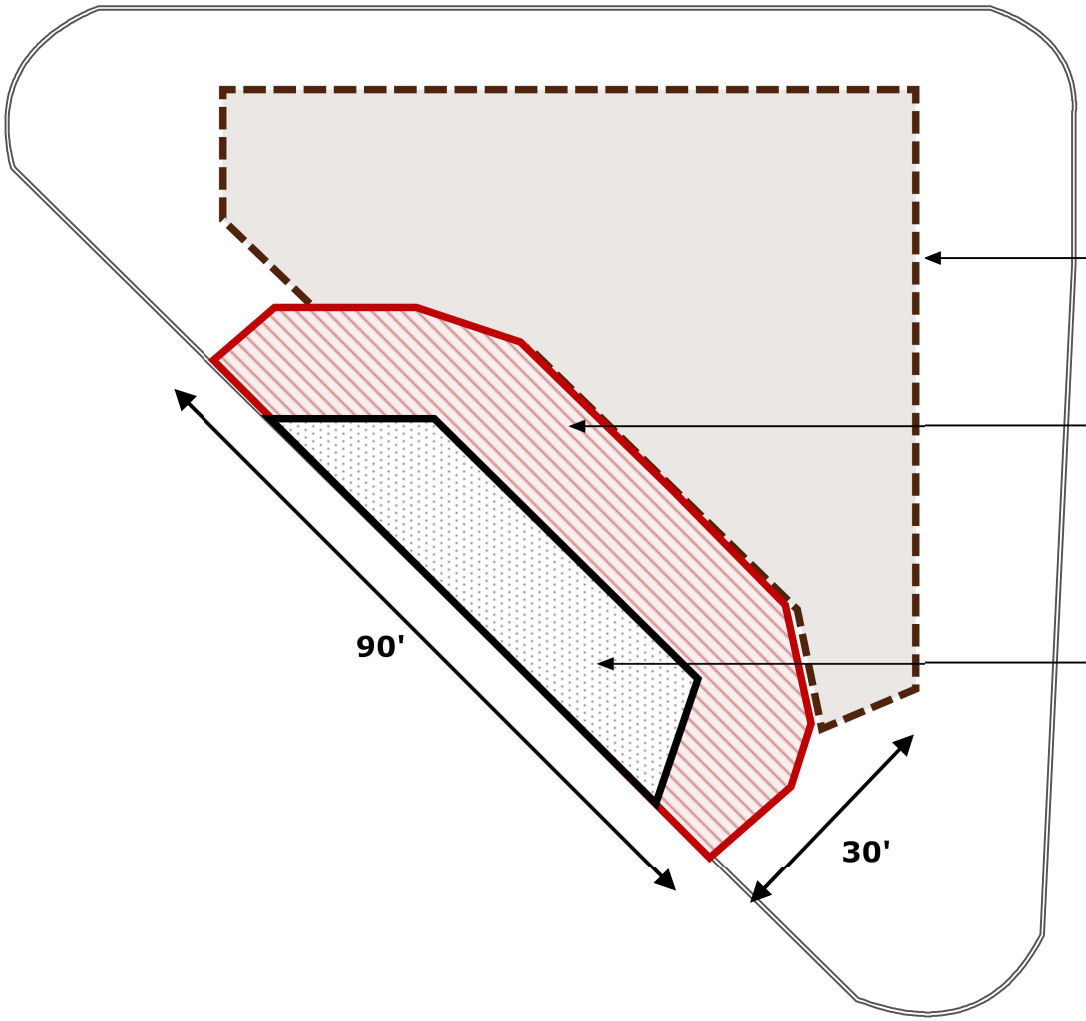
STATE OF NEW YORK
JOHN A. RHODES
84423
LICENSED PROFESSIONAL ENGINEER

John A Rhodes, P.E.
NYSPE No. 84423

SSDS Piping Detail

Renaissance Realty
113 Hamilton Ave
Brooklyn, NY

DRAWN	CHECKED	DATE	DRAWG NO.
John A. Rhodes, P.E.	RL	June 2018	7



Imported Fill

Construction Fills: Gravel, RCA, Clean Sand
Up to 6' bg

Construction Fills: Gravel, RCA, Clean Sand &
Imported Common Fill
On Slope up to 15' bg

Construction Fills: Gravel, RCA, Clean Sand &
Imported Common Fill
15' feet bg

Reused Fill

No material will be reused

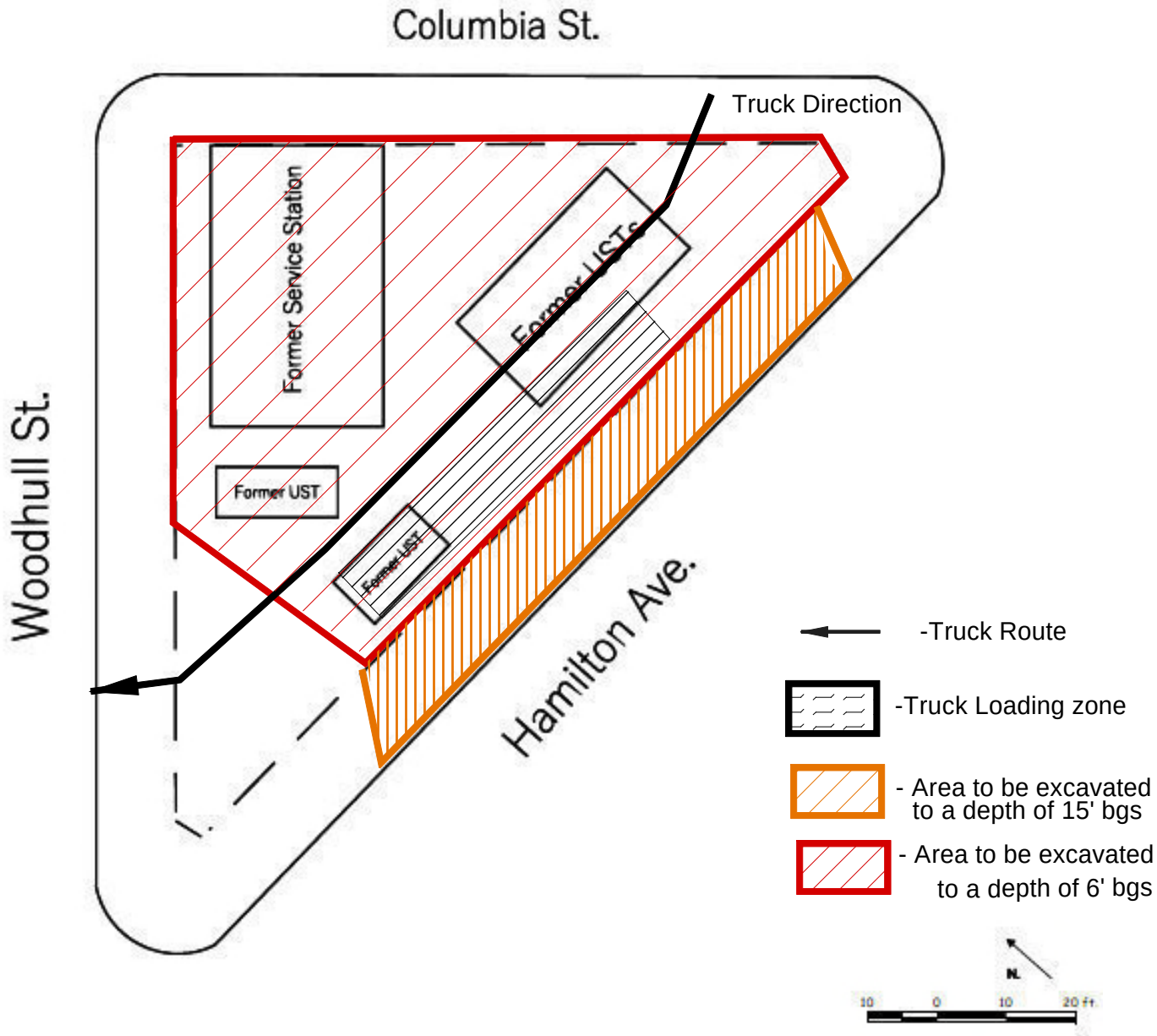
John A. Rhodes, P.E.

IT IS A VIOLATION OF NEW YORK STATE LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER

STATE OF NEW YORK · JOHN A. RHODES · 084423 · LICENSED PROFESSIONAL ENGINEER

John A Rhodes, P.E.
NYSPE No. 84423

Imported Fill			
Renaissance Realty 113 Hamilton Ave Brooklyn, NY			
DRAWN	CHECKED	DATE	DRAWG NO.
John A. Rhodes, P.E.	RL	June 2018	**8**



ADVANCED Site Restoration, LLC.
Environmental Services
62 William St., 3rd Floor, New York, NY 10005
Tel: 212-809-1110 Fax: 212-809-1779 info@askasr.com

Figure - 9

Map showing Truck Route

Renaissance Realty
113 Hamilton Avenue
Brooklyn, New York