

**89 GRAND STREET
BROOKLYN, NEW YORK**

Remedial Action Work Plan

**NYC VCP Number: 14CVCP198K
E-Designation Site Number: 12EH-N299K**

Prepared for:

PTSE Property Holdings, LLC
34 North 7th Street, PH1C
Brooklyn, NY 11249

Prepared by:

Joseph Horowitz, P.E.
76-06 137 Street
Flushing, NY 11367
718-544-5105

JANUARY 13, 2014

REMEDIAL ACTION WORK PLAN

TABLE OF CONTENTS

TABLE OF CONTENTS.....	ii
LIST OF ACRONYMS	iv
CERTIFICATION	vi
EXECUTIVE SUMMARY	1
REMEDIAL ACTION WORK PLAN	10
1.0 SITE BACKGROUND.....	10
2.0 REMEDIAL ACTION OBJECTIVES	14
3.0 REMEDIAL ACTION ALTERNATIVES ANALYSIS	15
4.0 REMEDIAL ACTION.....	25
5.0 REMEDIAL ACTION MANAGEMENT	38
6.0 REMEDIAL ACTION REPORT	48
7.0 SCHEDULE.....	50

FIGURES

Figure 1: Site Location Map

Figure 2: Site Plan

Figure 3: Sample Exceedence Map

APPENDICES

1. Citizen Participation Plan
2. Sustainability Statement
3. Soil/Materials Management Plan
4. Construction Health and Safety Plan
5. Proposed Development Plans

6. Vapor Barrier: Manufacturer's Data
7. Vapor Barrier: Manufacturer's Compatibility Letter

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/Demolition
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
VCA	Voluntary Cleanup Agreement
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
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

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
SVOC	Semi-Volatile Organic Compound
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

CERTIFICATION

I, Joseph Horowitz, am a professional engineer licensed in the State of New York. I have primary direct responsibility for overseeing implementation of the remedial action for the 89 Grand Street, Brooklyn site, 12EH-N 299K.

I certify that 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 (if any required) 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.

This RAWP deals with hazardous materials (HazMat); a separate RAWP will be submitted to comply with E-Designation requirements for noise.

Joseph Horowitz

Name

35166

NYS Professional Engineer Number



Signature



January 13, 2014

Date

EXECUTIVE SUMMARY

PTSE Property Holdings, LLC has applied for enrollment in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 4,810-square foot site located at 89 Grand Street in the Williamsburg section of Brooklyn, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Current Usage

The project includes two adjoining properties, former 87 and 89 Grand Street (formerly Lots 42 and 40, respectively). Grand Street is a major thoroughfare in Greenpoint-Williamsburg and the area is characterized by mixed commercial and residential development. The combined site is irregular, but roughly L-shaped. The Site occupies 4,810-sq.ft. and is bounded by Lots 8 and 9 to the northeast, both of which front on North 1st Street. Lot 8 contains a one-story brick building. Lot 9 contains a large, 1-story shed-like commercial building, used for theater scenery (set) construction. To the southeast, the site is bordered by Lot 39, which fronts on Grand Street. Lot 39 contains a 4-story brick residential structure, which occupies the front portion of the lot; the rear portion is open space. To the southwest, the site fronts on Grand Street. Across Grand Street are a playground and public school. To the northwest is Lot 43, which is vacant.

Currently, the easterly portion of the Site (former Lot 40) contains a three-story masonry and wood frame building, which is unoccupied. The building was originally used as a factory and most recently as an art studio. The westerly portion of the site (former Lot 42) is vacant.

Figure 1 is a Site Location Plan and **Figure 2** is a Site Plan.

Summary of Proposed Redevelopment Plan

The two lots will be combined into a single lot 40. The existing building will be demolished and replaced with a new two- and five-story building, with mixed commercial, residential and community facility use. The new building will occupy the full lot area and scope will include a

new cellar occupying most of the building footprint. Community Use space will take the form of double-height rooms, suitable for a place of worship or non-profit art gallery. Construction will include a heavily reinforced concrete slab (mat slab) with steel columns and beams supporting poured concrete floors on steel decking; interior partitions and ceilings will be dry-wall.

Excavation on current 89 Grand Street will include deepening the existing cellar by 4 to 5 feet and excavating an additional 6 ft. for construction of a new elevator pit. Excavation to a depth of about 13'-6" below grade for a new partial cellar and to 1 ft below grade for the slab-on-grade area is proposed on former 87 Grand Street. Existing cellar walls will be retained and underpinning of existing adjoining foundation walls will be avoided through the use of stepped concrete support arrangements.

Summary of the Remedy

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. A Community Air Monitoring Program for particulates and volatile organic carbon (VOC) compounds.
3. Establishment of Track 4 Site Specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs. For new development, excavation will include deepening the existing cellar on former 89 Grand Street by 4 to 5 feet to a

depth of about 13'-6" below grade; excavation to approximately 13'-6" below grade for a new partial cellar in the former 87 Grand Street property; and to approximately 1 ft below grade in the proposed slab on grade area on former 87 Grand Street.

6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. Removal of underground storage tanks (if any are found) and closure of petroleum spills (if any are found) in compliance with applicable local, State and Federal laws and regulations;
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this Plan. Characterization sampling and analysis of excavated media shall be as required by the disposal facilities;
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCO's;
10. Need for imported soil is not anticipated. However, should imported soil be required, for any reason, it will be restricted to certified clean material and in accordance with this plan and applicable laws and regulations.
11. As part of development, installation of a 20-mil thick vapor barrier beneath the building slab and on foundation sidewalls up to grade;
12. Capping of the entire Site with concrete building slab to prevent exposure to remaining on-Site soil/ fill;
13. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;

15. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
16. Submission of a RAR that describes the remedial activities completed, 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.
17. Continued registration with an E-Designation by the NYC Buildings Department; establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

Community Protection Statement

The Office of Environmental Remediation created the New York City Voluntary Cleanup Program (NYC VCP) to provide governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies that show the location of 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. This cleanup plan 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.

Remedial Investigation and Cleanup Plan. Under the NYC VCP, a thorough cleanup 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 identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

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

Qualitative Human Health Exposure Assessment. An important part of the cleanup planning for the Site is the performance of 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. See Section 4.6 of this Plan for the Qualitative Human Health Exposure Assessment

Health and Safety Plan. This cleanup plan includes a Health and Safety Plan that is designed to protect community residents and on-Site workers. The elements of this plan are in compliance with safety requirements of the United States Occupational Safety and Health Administration. This plan includes many protective elements including those discussed below. See **Appendix 4** of this Plan for the Health and Safety Plan.

Site Safety Coordinator. This project will have a designated Site Safety Coordinator to implement the Health and Safety Plan. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site Safety Coordinator is Joseph Horowitz and can be reached at 718-544-5105.

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

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

Odor, Dust and Noise Control. This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and include steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the **Site Superintendent, Mr. Shawn Sidebottom at 917-601-9900** or

NYC Office of Environmental Remediation Project Manager, Mr. Horace Zhang, at 212-788-8484.

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.

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

Hours of Operation. The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the normal hours of operation are 7:00 a.m. to 5:30 p.m. Monday through Friday.

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, provides project contact names and numbers, and locations where project documents can be viewed.

Complaint Management. The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the **Site Superintendent, Mr. Shawn Sidebottom at 917-601-9900**, the NYC Office of Environmental Remediation Project Manager, Mr. Horace Zhang at 212-788-8484, or call 311 and mention that the Site is in the NYC Voluntary Cleanup Program.

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

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

Soil Chemical Testing and Screening. All excavations will be supervised by a trained and properly qualified environmental professional. Excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and workmen and community protection.

Stockpile Management. In general, soil shall be loaded directly into trucks and not stockpiled. However, when soil stockpiles cannot be avoided, stockpiles will be kept covered with tarps to prevent dust, odors and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be also be protected with silt fences. Hay bales will be used, as needed to protect storm water catch basins and other discharge points.

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

Imported Material. No use of imported fill is anticipated on this project. However, should imported fill be required, all fill materials proposed to be brought onto the Site shall comply with rules outlined in this cleanup plan. Imported fill shall be certified as “clean” by the supplier and approved by the Engineer and will be inspected and approved by the Engineer’s field representative located on-Site. Waste materials shall not be brought onto the Site. Trucks entering the Site

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

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

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

Final Report. The results of all cleanup work will be fully documented in a final report (called a Remedial Action Report) that will be available for review in the public document repository located at the Brooklyn Public Library, Greenpoint Branch, 107 Norman Avenue (at Leonard Street), Brooklyn, NY.

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

REMEDIAL ACTION WORK PLAN

1.0 SITE BACKGROUND

PTSE Property Holdings, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 89 Grand Street, in the Greenpoint-Williamsburg section of Brooklyn, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Current Usage

The project includes two adjoining properties, 87 and 89 Grand Street (formerly Lots 42 and 40, respectively). The combined site is irregular, but roughly L-shaped. Figure 1 shows the Site location. The Site occupies 4,810-sq.ft. and is bounded by Lots 8 and 9 to the northeast, both of which front on North 1st Street. Lot 8 contains a one-story brick building. Lot 9 contains a large, 1-story shed-like commercial building, used for theater scenery (set) construction. To the southeast, the site is bordered by Lot 39, which fronts on Grand Street. Lot 39 contains a 4-story brick residential structure, which occupies the front portion of the lot; the rear portion is open space. To the southwest, the site fronts on Grand Street, a major neighborhood thoroughfare. Across Grand Street are a playground and public school. To the northwest is Lot 43, which is vacant.

Currently, the easterly portion of the Site (former Lot 40) contains a three-story masonry and wood frame building, which is unoccupied. The westerly portion of the site (former Lot 42) is vacant.

1.2 Proposed Redevelopment Plan

The two lots will be combined into a single lot 40. The existing building will be demolished and replaced with a new two- and five-story building, with mixed commercial, residential and community facility use. The new building will occupy the full lot area and scope will include a new cellar occupying most of the building footprint. Community Use space will take the form of double-height rooms, suitable for a place of worship or non-profit art gallery. Construction will include a heavily reinforced concrete slab (mat slab) with steel columns and beams supporting poured concrete floors on steel decking; interior partitions and ceilings will be dry-wall.

Excavation on current 89 Grand Street will include deepening the existing cellar by 4 to 5 feet and excavating an additional 6 ft for construction of a new elevator pit. Excavation to a depth of about 13' -6" below grade for a new partial cellar and to 1 ft. feet below grade for the slab-on-grade area is proposed on former 87 Grand Street. Existing cellar walls will be retained and underpinning of existing adjoining foundation walls will be avoided through the use of stepped concrete support arrangements.

1.3 Description of Surrounding Property

The Greenpoint-Williamsburg area, in which this project is located, is characterized by a mix of residential, commercial and light industrial occupancies.

Figure 1 shows the Site location. The Site occupies 4,810-sq.ft. and is bounded by Lots 8 and 9 to the northeast, both of which front on North 1st Street. Lot 8 contains a one-story brick building. Lot 9 contains a large, 1-story shed-like commercial building, used for theater scenery (set) construction. To the southeast, the site is bordered by Lot 39, which fronts on Grand Street. Lot 39 contains a 4-story brick residential structure, which occupies the front portion of the lot; the rear portion is open space. To the southwest, the site fronts on Grand Street, a major neighborhood thoroughfare. Across Grand Street are a playground and public school. To the northwest is Lot 43, which is vacant.

Currently, the easterly portion of the Site (former Lot 40) contains a three-story masonry and wood frame building, which is unoccupied. The westerly portion of the site (former Lot 42) is vacant.

1.4 Remedial Investigation

In January, 2012, Environmental Building Solutions, LLC, New York, NY (EBS) conducted a Phase I Environmental Site Assessment (ESA), for the 87 Grand St. property, which was subsequently submitted to OER. The study did not identify any “recognized environmental conditions” on this site. EBS subsequently undertook a limited Phase II ESA (March, 2013)¹, which included soil, groundwater and soil vapor sampling and testing. Findings included the following:

1. Elevation of the property ranges from 25 ft. to 38 ft. above sea level;
2. Depth to groundwater is approximately 22 ft. below ground surface;
3. Groundwater flow is generally from east to west;
4. Depth to bedrock exceeds 25 ft. below ground surface.
5. The stratigraphy of the Site, from the surface down, consists of approximately 12 feet of historic urban fill material underlain by grey, brown coarse to fine sand with sediments.

Laboratory test results, which were furnished informally to OER prior to publication of the report, showed that the 89 Grand St. was essentially clean but that the 87 Grand St. site had low levels of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), in excess of regulatory limits. These were associated with historic fill on adjoining properties.

1. Soil/fill samples collected during RI showed no detectable concentrations of VOCs or PCBs. Six semi volatile organic compounds (SVOCs) were detected at concentrations above Track 2 Restricted Residential SCO's and included benzo(a)anthracene (max. 2.75 ppm), benzo(a)pyrene (max. 2.64 ppm), benzo(b)fluoranthene (max. 2.11 ppm), benzo(k)fluoranthene (max. 2.19 ppm), chrysene (max. 2.7 ppm), indeno(1,2,3-cd)pyrene (max. 1.3 ppm). Two pesticides 4,4-DDE (max. 28.3 ppb) and 4,4-DDT (max. 296 ppb) were detected above Track 1 Unrestricted Use SCOs and well below Restricted Residential SCOs. Six metals were identified exceeding Track 1 Unrestricted Use SCOs including arsenic (max. 14.3 ppm), cadmium (max. 3.36 ppm), chromium (max. 37.7 ppm), lead (max. 163 ppm), mercury (max. 2.0 ppm), and zinc (max. 164 ppm). Of these

¹ The Remedial Investigation was conducted in March, 2012 but report (RIR) was published in March 2013.

metals, mercury also exceeded Track 2 Restricted Residential Use SCOs in one deep sample.

2. Groundwater samples showed VOCs naphthalene and methylene chloride detected below NYSDEC 6 NYCRR Part 703.5 Groundwater Quality Standards (GQS). SVOCs, pesticides, and PCBs were not detected in groundwater. Two metals iron (max. 1,240 ug/L) and sodium (max. 51,600 ug/L) were identified exceeding GQS.
3. Results of soil vapor samples indicated low concentrations of petroleum related compounds. Benzene, ethylbenzene, toluene, and xylenes were detected at concentrations from non-detect to 70 $\mu\text{g}/\text{m}^3$. Most compounds were detected below 50 $\mu\text{g}/\text{m}^3$ except for acetone (max. of 1300 $\mu\text{g}/\text{m}^3$) and ethanol (max. of 170 $\mu\text{g}/\text{m}^3$). The chlorinated VOC PCE (max 240 $\mu\text{g}/\text{m}^3$) was detected within its monitoring range established by DOH guidance matrix. 1,1,1-Trichloroethane (max 2.7 $\mu\text{g}/\text{m}^3$) was also detected, but below its monitoring range.

Figure 3 is a map of the site, showing the location of samples with test results exceeding regulatory limits. For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal of significant amounts of hazardous waste is not anticipated at this site.

2.0 REMEDIAL ACTION OBJECTIVES

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

2.1 Groundwater

- Prevent direct exposure to contaminated groundwater.

2.2 Soil

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

2.3 Soil Vapor

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

3.0 REMEDIAL ALTERNATIVES ANALYSIS

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

1. Protection of human health and the environment;
2. Compliance with SCGs;
3. Short-term effectiveness and impacts;
4. Long-term effectiveness and permanence;
5. Reduction of toxicity, mobility, or volume of contaminated material;
6. Implementability;
7. Cost effectiveness;
8. Community Acceptance;
9. Land use; and,
10. Sustainability.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. As required, a minimum of two remedial alternatives (including a Track 1 scenario) are evaluated, as follows:

Alternative 1 involves:

- Establishment of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs);
- Removal of all soil/fill exceeding 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 excavation to a depth of 12 feet below grade across the entire property to remove all historic fill at the Site. If soil/fill containing analytes at concentrations above Track 1 Unrestricted Use SCOs is still present at the

base of the excavation after removal of soil is complete, additional excavation would be performed to ensure complete removal of soil that does not meet Track 1 Unrestricted Use SCOs;

- No engineering or institutional controls are required for a Track 1 cleanup, but a vapor barrier/waterproofing system would be installed beneath the basement foundation and behind foundation sidewalls of the new building as a part of development to prevent any potential future exposures from off-Site soil vapor; and
- Placement of a final cover over the entire Site as part of construction.

Alternative 2 involves:

- Establishment of Track 4 Site-Specific SCOs;
- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 has been achieved with post-excavation endpoint sampling. Excavation for development purposes would take place to a depth of approximately 13'-6" across the cellar area and to approximately 1 foot below grade for the slab-on-grade area. If soil/fill containing SVOCs or metals at concentrations exceeding Track 4 Site-Specific SCOs are still present at the base of the excavation after removal of all soil required for construction is complete, additional excavation would be performed to ensure complete removal of soil that does not meet Track 4 Site-Specific SCOs;
- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil/fill;
- Placement of a soil vapor barrier/waterproofing system beneath the building slab and along foundation side walls to prevent any potential future exposures from off-Site soil vapor;
- Establishment of use restrictions including: prohibitions on the use of groundwater from the Site; prohibitions of sensitive 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 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; and,

- Continued registration as an E-designated property to memorialize the remedial action and the Engineering and Institutional Controls required by this RAWP.

3.1 THRESHOLD CRITERIA

Protection of Public Health and the Environment

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

Alternative 1 would be protective of human health and the environment by removing contaminated soil/fill exceeding Track 1 Unrestricted Use SCOs and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contamination leaching into groundwater. Potential future migration of soil vapors from off Site into the new building would be prevented by installation of vapor barrier system.

Alternative 2 would achieve comparable protections of human health and the environment by excavating the historic fill at the Site and by ensuring that remaining on-Site soil/fill meets Track 4 Site-Specific SCOs and by placement of Institutional and Engineering controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing institutional controls including a Site Management Plan would ensure that the composite cover system remains intact and protective. Establishment of Track 4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater. Potential future migration of off-Site soil vapors into the new building would be prevented by installation of a vapor barrier system.

For both Alternatives, potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a CHASP, an approved Soil/Materials Management Plan (SMMP), and a Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the new building would be

prevented by the ventilated parking garage and by installing a vapor barrier below the new building's basement slab and continuing the vapor barrier around foundation walls.

3.2 BALANCING CRITERIA

Compliance with Standards, Criteria and Guidance (SCG)

This evaluation criterion assesses the ability of the alternatives 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 to Track 1 Unrestricted Use SCOs and Groundwater Protection Standards. Compliance with SCGs for soil vapor would also be achieved by installing a vapor barrier/waterproofing system below the new building's basement slab and continuing the vapor barrier around foundation walls.

Alternative 2 would achieve compliance with the remedial goals, chemical specific SCGs and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCOs. Compliance with SCGs for soil vapor would also be achieved by installation of a vapor barrier. 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) that comply with the applicable SCGs shall be implemented during Site redevelopment under this RAWP. For both Alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-Term Effectiveness and Impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their effects on public health and the environment during implementation of the remedial action, including protection of the community, environmental impacts, time until remedial response objectives are achieved, and protection of workers during

remedial actions.

Both alternatives have similar-short term effectiveness during their respective implementations, 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 would be higher for Alternative 1 based on greater amounts of historical fill material to be excavated. However, focused attention to means and methods during the remedial action during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities and any differences between these alternatives.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. It is estimated that about 80 truckloads of soil will be removed. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flaggers will be used to protect pedestrians at Site entrances and exits. Alternative 1 would require additional truck trips to transport fill and soil.

Both alternatives would employ appropriate measures to prevent short term impacts, including a CHASP, a CAMP, and a SMMP, during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a CHASP will be protected from on-Site contaminants; personal protective equipment (PPE) 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 SCOs, and enabling unrestricted usage of the property.

Alternative 2 would provide long-term effectiveness by: removing most on-Site contamination and attaining Track 4 Site-Specific SCOs; establishing Engineering Controls, including a composite cover system across the Site; and, establishing Institutional Controls to ensure long-term management, including use restrictions, a SMP, and continued registration as an E-designated property to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy will provide continued high level of protection in perpetuity.

Both alternatives would result in removal of soil contamination exceeding the SCOs providing a high level, effective and permanent remedy over the long-term with respect to a remedy for contaminated soil, which will eliminate any migration to groundwater. Potential sources of soil vapor and groundwater contamination will also be eliminated as part of the remedy.

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 the total volume of contaminated media.

Alternative 1 would permanently eliminate the toxicity, mobility, and volume of

contaminants from on-Site soil by removing all soil in excess of unrestricted use SCOs.

Alternative 2 would remove most of the impacted soil present on the Site and any remaining soil beneath the new building would meet Track 4 - Site-Specific SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site. Placement of a composite cover system and vapor barrier will lower toxicity by eliminating potential exposures to remaining soil, groundwater, and soil vapor. Groundwater use restrictions will reduce toxicity by ensuring that there is no use of on-Site groundwater for potable purposes.

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 Alternatives 1 and 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. They use standard materials and services that are well established technology. 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, disposal costs, and engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Since the new building requires excavation of the majority of the Site to a depth of 13.5ft, the costs associated with both Alternative 1 and Alternative 2 will likely be comparable. However, Alternative 1 would require additional soil excavation.

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. In both cases, appropriate public health and environmental protections are achieved.

The remedial plan creates an approach that combines the remedial action with the redevelopment of the Site, including the construction of the building foundation and subgrade structures. The remedial plan is also cost effective in that it will take into consideration the selection of the closest and most appropriate disposal facilities to reduce transportation and disposal costs during the excavation of historic fill and other soils during the 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.

Based on the overall goals of the remedial program, the intended Site use and initial permitting associated with the proposed site development, no adverse community opposition is anticipated for either alternative. This RAWP will be subject to public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedial action. 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.

Land Use

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

might emanate from the Site; proximity to flood plains, geography and geology; and, current ICs applicable to the Site.

Both alternatives for remedial action at the Site are comparable with respect to the proposed use and to land uses in the vicinity of the Site. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 4 Site-Specific SCOs, both of which are appropriate for its planned community facility and residential use. The proposed redevelopment of the Site is consistent with the existing zoning designation for the property and is consistent with recent development patterns. The Site is surrounded by commercial and residential properties and both alternatives provide comprehensive protection of public health and the environment for these uses. Improvements in the current environmental condition of the property achieved by both alternatives are also consistent with the City's goals for cleanup of contaminated land and bringing such properties into productive reuse.

Sustainability of the Remedial Action

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

The remedial plan 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. To the extent practicable, energy efficient building materials, appliances, and equipment will be utilized to complete the 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. A complete list of green remedial activities

considered as part of the NYC VCP is included in the Sustainability Statement, included as Appendix 2.

4.0 REMEDIAL ACTION

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is Alternative 2, the Track 4 Alternative, which achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action alternative 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 standard 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. A Community Air Community Monitoring Program for particulates and volatile organic carbon (VOC) compounds.
3. Establishment of Track 4 Site Specific Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs. For new development, excavation will include deepening the existing cellar on former 89 Grand Street by 4 to 5 feet to a depth of about 13'-6" below grade; excavation to approximately 13'-6" below grade for a new partial cellar in the former 87 Grand Street property; and to approximately 1 ft. below grade in the proposed slab-on-grade area on former 87 Grand Street.
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
7. Removal of underground storage tanks (if any are found) and closure of petroleum spills (if any are found) in compliance with applicable local, State and Federal laws and regulations;

8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this Plan. Characterization sampling and analysis of excavated media shall be as required by the disposal facilities;
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCO's;
10. Need for imported soil is not anticipated. However, should imported soil be required, for any reason, it will be restricted to certified clean material and in accordance with this plan and applicable laws and regulations.
11. As part of development, installation of a 20-mil thick vapor barrier beneath the building slab and on foundation sidewalls up to grade;
12. Capping of the entire Site with concrete building slab to prevent exposure to remaining on-Site soil/ fill;
13. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
15. Submission of an approved Site Management Plan (SMP) in the Remedial Action Report (RAR) for long-term management of residual contamination, including plans for inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
16. Submission of a RAR that describes the remedial activities completed, 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.
17. Continued registration with an E-Designation by the NYC Buildings Department; establishment of Engineering Controls and Institutional Controls in this RAWP and a

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

4.2 Soil Cleanup Objectives and Soil/Fill management

The following Track 4 Site-Specific SCOs will be used:

<u>Contaminant</u>	<u>Track 4 SCOs</u>
Total SVOCs	250 ppm
Lead	800 ppm
Mercury	2.5 ppm

In accordance with OER direction, soil removal will be limited to that required for construction of the new cellar and elevator pit unless hotspots are identified during the remedial action. 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 3. The location of planned excavation is shown in the project drawings (Appendix 5).

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

4.2.1 Estimated Soil/Fill Removal Quantities

Excavation on current 89 Grand Street will include deepening the existing cellar by 4 to 5 feet and excavating an additional 5' for construction of a new elevator pit. Excavation to a depth of about 13'-6" below grade for a new partial cellar and to 1 ft. below grade for the slab-on-grade area is proposed on former 87 Grand Street. The total quantity of soil expected to be excavated and disposed off-Site is 1,237 cy.

Disposal facilities will be submitted to OER when they have been identified and prior to the start of the remedial action.

4.2.2 End-Point Sampling

Removal actions under this plan will be performed in conjunction with remedial end-point

sampling. Post-excavation confirmation end-point sampling and testing will be performed promptly following materials removal and completed prior to Site development activities. Endpoint sampling locations will be developed by OER. To assess attainment of Track 4 Site-Specific SCOs, samples will be collected and analyzed for trigger analytes listed in the Track 4 SCOs table above according to analytical methods described below. To evaluate attainment of Track 1 Unrestricted Use SCOs, if pursued, samples will be collected and analyzed for SVOCs, TAL Metals, and Pesticides according to analytical methods described below.

Hot-spot removal actions, if any should be identified during the remedial program, will be performed in conjunction with post remedial end-point samples to ensure that hot-spots are fully removed. Analytes for end-point sampling will be those parameters that are driving the hot-spot removal action and will be approved by OER. Frequency for hot-spot end-point sample collection is as follows:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
 - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
 - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

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

New York State ELAP certified labs will be used for all confirmation and end-point sample analyses. Labs performing confirmation and end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all confirmation and end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be Confirmation samples will be analyzed for compounds and elements as described above utilizing the following methodology:

Soil analytical methods will include:

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

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

4.2.3 Quality Assurance/Quality Control

Should hot spots be identified during the work, an appropriate QA/QC protocol for end point sampling will be developed. This will include at least one duplicate sample for each of 20 samples collected and sufficient field and lab blank samples to assess sampling and lab artifacts.

4.2.4 Import and Reuse of Soils

Neither import of soils onto the property nor reuse of soils already onsite is anticipated at this site. However, if required, these activities will be performed in conformance with the Soil/Materials Management Plan in Appendix 3. The estimated quantity of soil to be imported

into the Site for backfill and cover soil is zero (0) tons. The estimated quantity of onsite soil/fill expected to be reused/relocated on Site is zero (0) tons.

4.3 Engineering Controls

The excavation required for the proposed Site development will achieve Track 4 SCOs. Engineering Controls will be employed in the remedial action to address residual contamination remaining at the site. The Site will have two Engineering Controls: a composite cover system and a soil vapor barrier under the cellar slab and on the exterior of new foundation walls, up to grade.

4.3.1 Cover System

Exposure to residual soil/fill will be prevented by an engineered permanent cover system. This cover system will be comprised of a 2 ft. thick mat slab under the cellar and 5-inch poured concrete building slab over 6-in. of crushed stone, in the NW portion of the former 87 site, where no cellar is planned.

The composite cover system is a permanent engineering control for the Site. The system will be inspected and reported on at specified intervals as required by this RAWP and the SMP. A Soil/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 RAR.

4.3.2 Soil Vapor Barrier

Migration of soil vapor will be mitigated by a vapor barrier under the cellar slab, which will occupy the entire site and extend up on the exterior of foundation walls to grade. Vapor barrier installation details are shown on Sheet A-750.00 of the Architectural Drawings (**Appendix 5**). Vapor barrier will utilize the following products, all manufactured by W. R. Grace & Co.: See **Appendix 6** for manufacturer's cut sheets on each of these products and **Appendix 7** for manufacturer's compatibility letter.

a. Grace Florprufe 120

Grace Florprufe 120, a vapor barrier product, will be used below the 2-ft thick concrete mat slab and the 5-in. concrete floor slab. This product will cover the entire property, except for the elevator pit², and will be used for horizontal applications only. The product is laid directly on the subgrade, with the adhesive layer uppermost. Concrete is then placed directly on the product, with which it bonds, creating a permanent seal.

b. Grace Preprufe 160 R

Grace Preprufe 160R is a product that acts as both a vapor barrier and a waterproofing membrane and is suitable for both horizontal and vertical applications. It will be applied to the exterior of new foundation walls, except at the elevator pit.³ The material will be mounted on the inside face of the forms, with the adhesive surface exposed. Concrete is then poured directly against the film, with which it bonds, creating a permanent seal.

c. Grace Procor 20

This is a troweled-on waterproofing and vapor barrier, which will be applied to the inside face of existing foundation walls which are to remain in place.

Vapor barrier shall be installed in accordance with the manufacturer's instructions. Particular attention shall be paid to penetrations or areas where the vapor barrier must be installed in sections. The report describing installation of the vapor barrier will be included in the Remedial Action Report (RAR). The project's Professional Engineer licensed by the State of New York will have primary direct responsibility for overseeing the implementation of the vapor barrier. The Remedial Action Report will include photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturer's certificate of warranty. In addition, an inspector retained by the Owner shall observe and photograph installation of the vapor barrier prior to concrete placement. The

² Elevator pit construction, including vapor barrier/waterproofing, was described in letter from J. Horowitz, P.E. to Mr. Horace Zhang of OER, dated Oct. 31 2013.

³ See previous footnote.

inspector shall furnish a written report confirming that the material was installed in accordance with manufacturer's instructions.

4.4 Institutional Controls

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

4.5 Site Management Plan

Post-construction 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 DCR and the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) inspection and certification of EC's; and (3) reporting.

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

4.6 Qualitative Human Health Exposure Assessment

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

Investigations reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA). 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 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.

4.6.1 Known and Potential Sources

Soil

1. SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene exceeded Track 2 Restricted Residential SCO's.
2. Mercury exceeded Track 2 Restricted Residential Use SCOs in one deep sample.

Groundwater

1. Two metals, iron and sodium, were identified exceeding GQS.

Soil vapor

1. Chlorinated VOC tetrachloroethene was detected above its NYS DOH monitoring threshold; and
2. Petroleum VOCs detected at low concentrations included benzene, toluene, ethylbenzene and xylenes.

4.6.2 Nature, Extent, Fate and Transport of Contaminants

SVOCs and metals are present in the historic fill materials throughout the Site. Dissolved metals including iron, and sodium were detected above GQS. The chlorinated VOCs found in soil vapor were not found in any of the on-Site soil or groundwater samples collected.

4.6.3 Potential Routes of Exposure

The five elements of an exposure pathway are: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population. An exposure pathway is considered complete when all five elements of an exposure

pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill, or soil;
- Inhalation of vapors and particulates; and
- Dermal contact with water, fill, soil, or building materials

4.6.4 Points of Exposure

Current Conditions: The potential for exposure to surficial historic fill exists on 87 Grand Street, but is limited by the building capping 89 Grand Street. Groundwater is not exposed at the Site, and because the Site is served by the public water supply and groundwater use for potable supply is prohibited, groundwater is not used at the Site and there is no potential for exposure. As there is currently a vacant structure onsite, accumulation of soil vapor is possible.

Construction/ Remediation Activities: Once redevelopment activities begin, construction 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 soil and fill. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, the Site will be fully capped, limiting potential direct exposure to soil and groundwater remaining. A vapor barrier system will prevent soil vapors from intruding into the building. The Site is served by a public water supply, and groundwater is not used at the Site for potable supply. There are no plausible off-Site pathways for ingestion, inhalation, or dermal exposure to contaminants derived from the Site under future conditions.

4.6.5 Receptor Populations

On-Site Receptors – The Site is currently vacant. Access to Site is restricted. Onsite receptors are limited to trespassers and site representatives and visitors granted access to the property. During redevelopment of the Site, the on-Site potential receptors will include construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child building residents, workers and visitors.

Off-Site Receptors - Potential off-Site receptors within a 0.25-mile radius of the Site include: adult and child residents, and commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

1. Commercial Businesses (up to 0.25 mile) – existing and future
2. Residential Buildings (up to 0.25 mile) – existing and future
3. Building Construction/Renovation (up to 0.25 mile) – existing and future
4. Pedestrians, Trespassers, Cyclists (up to .25 mile) – existing and future
5. Schools (up to .25 mile) – existing and future

4.6.6 Overall Human Health Exposure Assessment

Based upon this analysis, complete on-Site exposure pathways appear to be present only during the current unremediated phase and the remedial action phase. Under current conditions, on-site exposure is limited by preventing access to the Site and limiting Site activity. 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.

There is no complete exposure pathway under future conditions after the site is developed. The waterproofing/vapor barrier will prevent the potential for vapor intrusion. The composite cover system and use restrictions will prevent contact with residual soil or groundwater and continued protection after the remedial action will be achieved by the implementation of site management including periodic inspection and certification of the performance of remedial controls. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure,

site-wide impervious surface cover cap, and a subsurface vapor barrier system for the building. Potential post-construction use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

The Professional Engineer (PE) and Qualified Environmental Professional (QEP) for this project is Joseph Horowitz, P.E.

5.2 Site Security

Site access will be controlled by a DOB-approved construction fence. For work areas of limited size, barrier tape will be sufficient to delineate and restrict access.

5.3 Work Hours

The hours for operation of remedial construction will be from 7:30 a.m. to 5:30 p.m. These hours conform to the New York City Department of Buildings construction code requirements.

5.4 Construction Health and Safety Plan

The Construction Health and Safety Plan (CHASP) is included in Appendix 4. The Health and Safety Officer will be Joseph Horowitz. 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 CHASP and applicable laws and regulations. The CHASP 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, including 40-hour hazardous waste operator training and annual 8-hour refresher training. The Health and Safety Officer will be responsible for maintaining workers' training records.

Personnel entering any exclusion zone will be trained in the provisions of the CHASP and be required to sign a CHASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed. Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency

procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

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

5.5 Community Air Monitoring Plan

5.5.1 General

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 baling/purging, and taking a reading prior to leaving a sample location. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence. Exceedances of action levels observed during performance of the Community Air Monitoring Plan (CAMP) will be reported to the OER Project Manager and included in the Daily Log.

5.5.2 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 shut down.

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. See Appendix 4 (Construction Health and Safety Plan) for additional information.

5.5.3 Particulate Monitoring, Response Levels, and Actions

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust

is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for OER personnel to review. See Appendix 4 (Construction Health and Safety Plan) for additional information.

5.6 Agency Approvals

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

5.7 Site Preparation

5.7.1 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.

5.7.2 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.

5.7.3 Utility Markout Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated by the Contractor, prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an

electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout 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.

5.7.4 Dewatering

No dewatering is anticipated for this project.

5.7.5 Equipment and Material Staging

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

5.7.6 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 roads 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.

5.7.7 Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the NYC VCP 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 potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

5.7.8 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, PTSE Property Holdings, LLC will undertake the following steps for site preparedness prior to the event and response after the event.

- **Storm Preparedness**

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

- **Storm Response**

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will

be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Storm-water 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. If the source of the spill is ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

- **Storm Response Reporting**

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

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

5.8 Traffic Control

Drivers of trucks leaving the NYC VCP 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 will be developed by the selected Contractor and reported to the Owner's Representative and OER prior to start of work.

5.9 Demobilization

Demobilization will include:

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

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

5.10 Reporting and Record Keeping

5.10.1 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 day by the Engineer.

Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of 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 excursions, if any;
- 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.

5.10.2 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). Photos of installation of the vapor barrier shall be taken by the inspector retained by the Owner.

5.11 Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations from the Remedial Action Work Plan

All changes to the RAWP will be reported to 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 that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 REMEDIAL ACTION REPORT

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

- Information required by this RAWP;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan;
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action, if any;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account 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, if any;
- Continued registration of the property with an E-Designation by the NYC Department of Buildings.
- Reports and supporting material will be submitted in digital form.

Remedial Action Report Certification

The following certification will appear in front of the Executive Summary of the Remedial Action Report. The certification will include the following statements:

I, _____, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Site name Site Site number.

I, _____, am a qualified Environmental Professional. I had primary direct responsibility for implementation remedial program for the Site name Site Site number. (Optional)

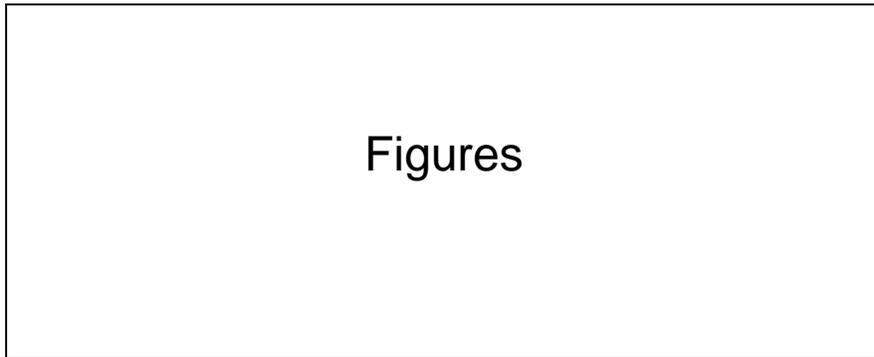
I certify that the OER-approved Remedial Action Work Plan dated month day year and Stipulations in a letter dated month day, year; if any were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

7.0 SCHEDULE

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 19-week remediation period⁴ is anticipated.

Schedule Milestone	Weeks from Remedial Action (Start Date)	Duration (weeks)	Remarks
OER Approval of RAWP	0	-	
Fact Sheet 2 announcing start of remedy	0	-	
Demolition	2	9	
Elevator pit construction		5	Requires hand-digging; OER approval will be requested for an early start.
Excavation, installation of soil vapor barrier, foundations and slab (Phase A)	10	9	
Other building construction (Phase B)	19	60	
Submit Remedial Action Report	20	3	

⁴ Applies to work required to satisfy E-Designation for HazMat only.



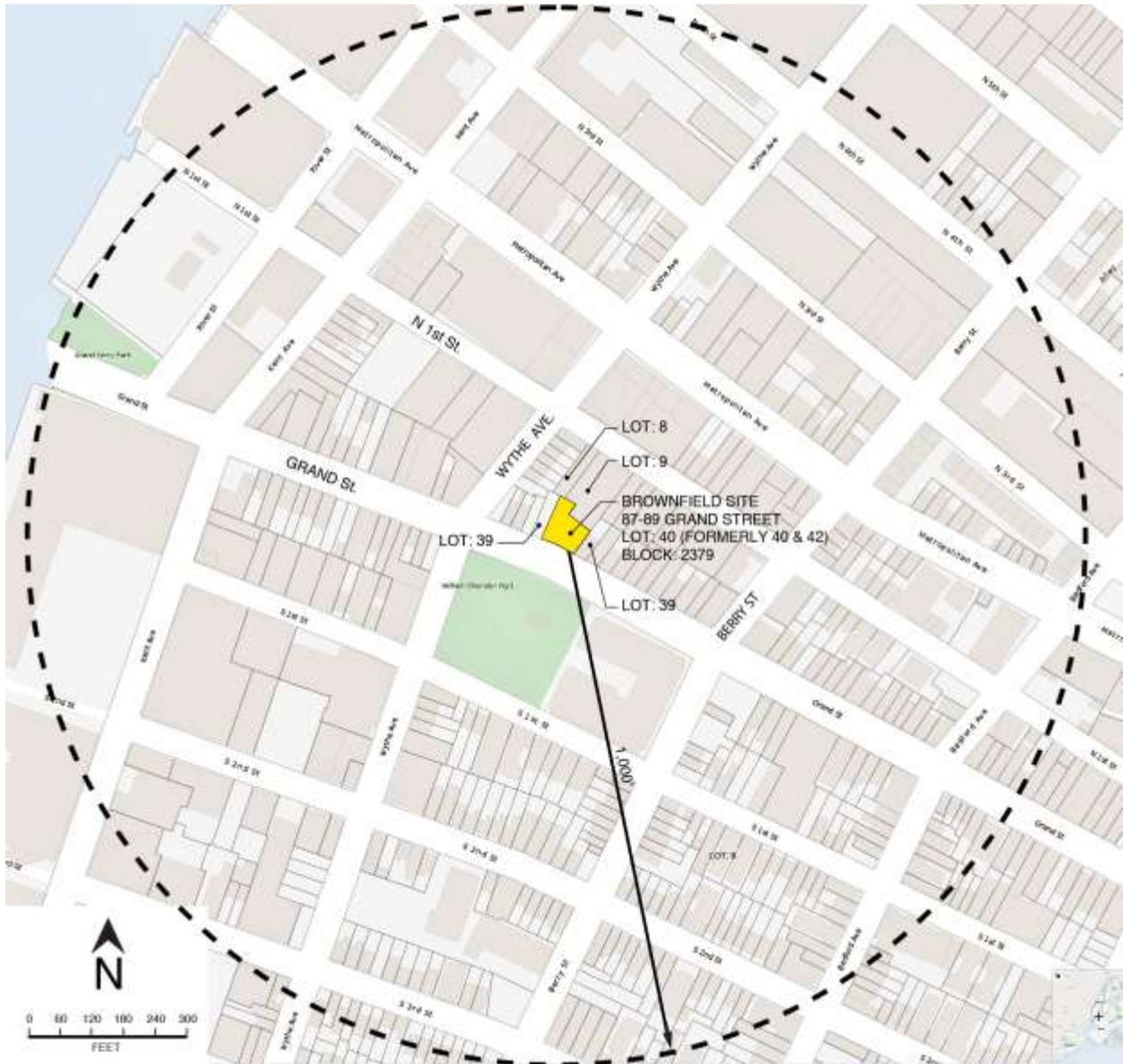


Figure 1: Site Location Map

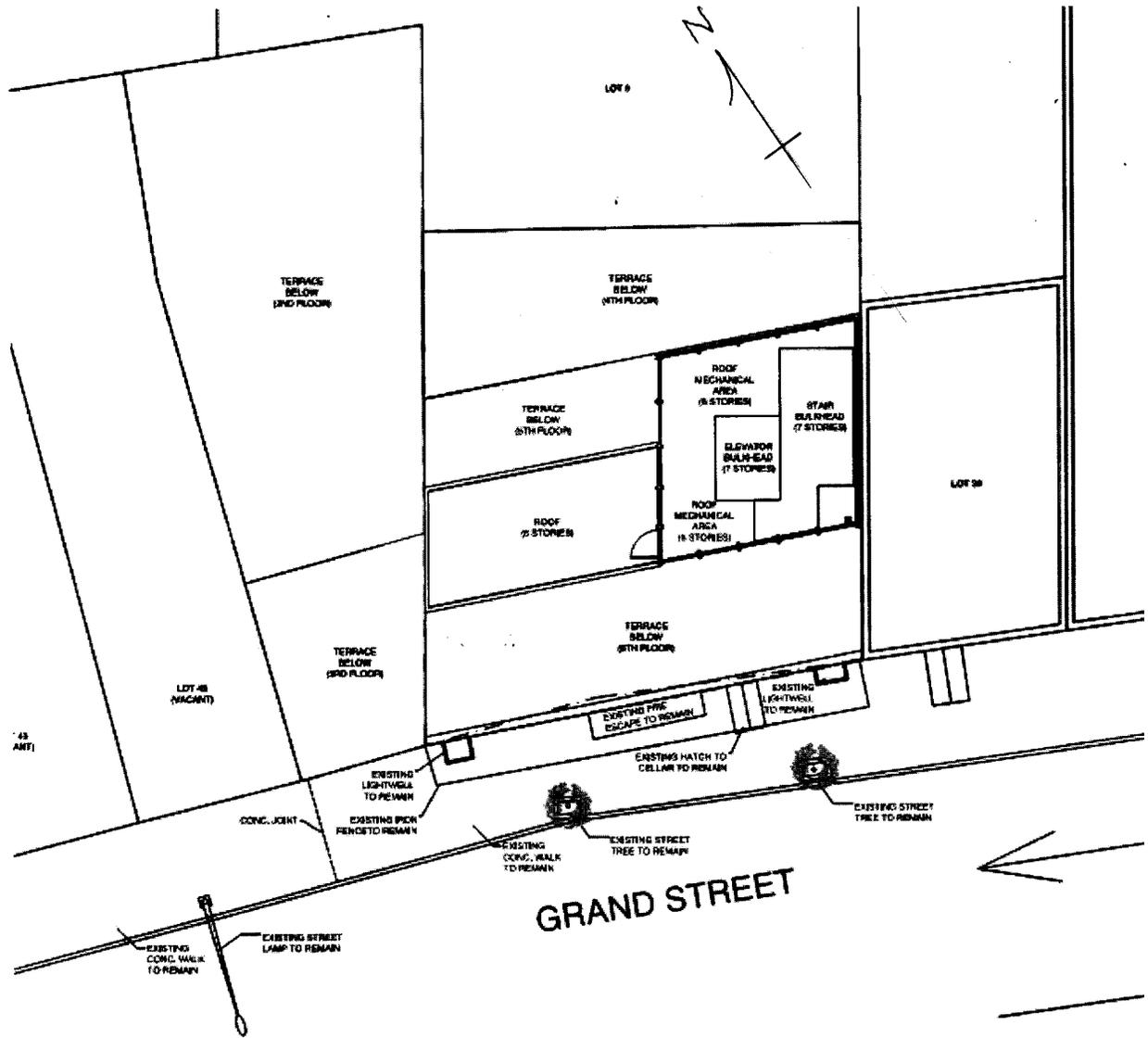


Figure 2: Site Plan

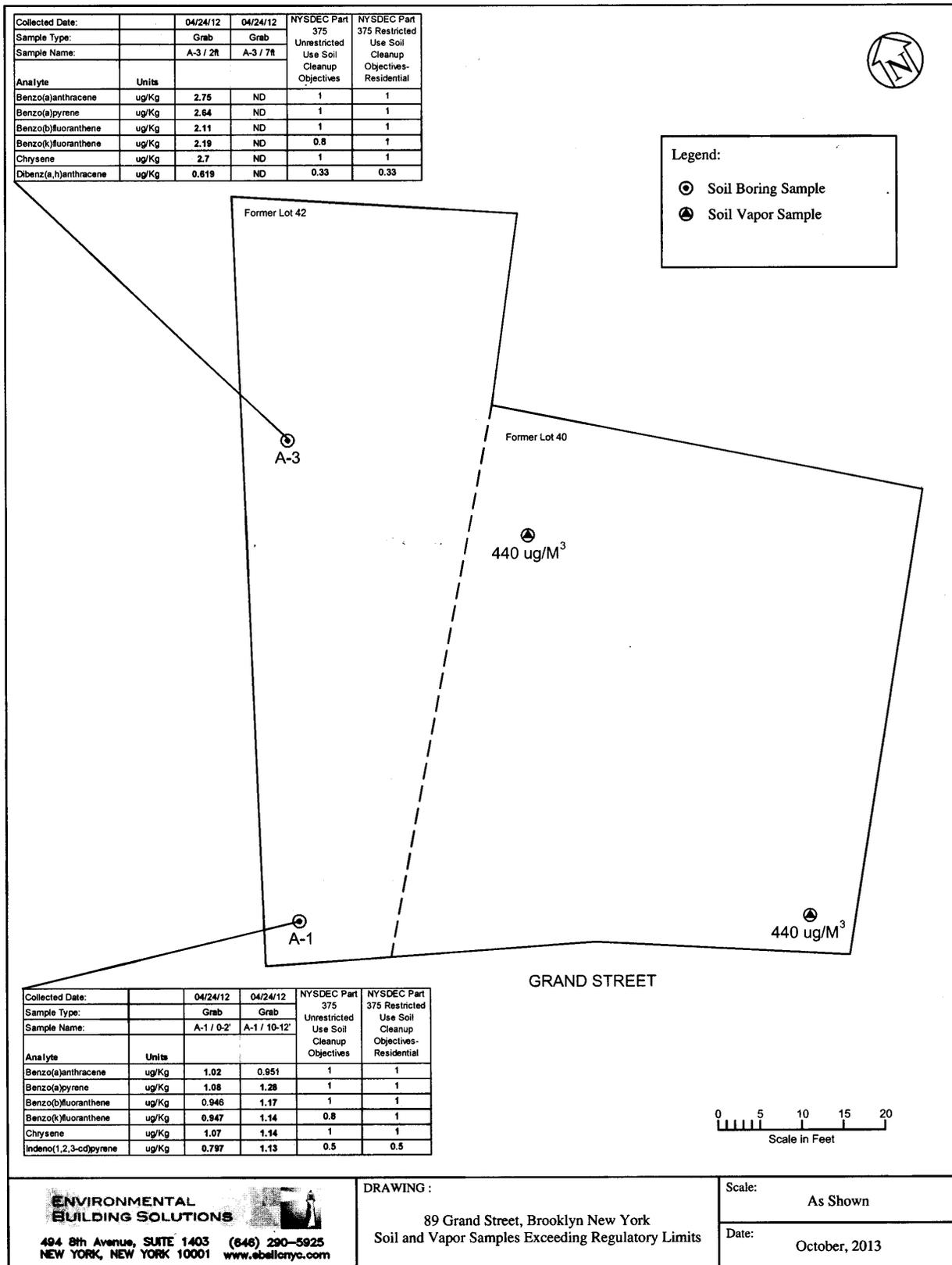
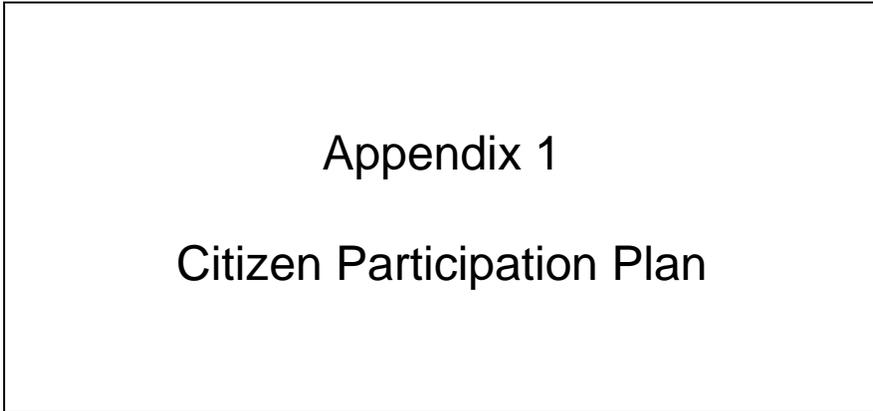


Figure 3: Sample Exceedance Map



Appendix 1
Citizen Participation Plan

Appendix 1

Citizen Participation Plan

Introduction. The NYC Office of Environmental Remediation and PTSE Property Holdings, 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, PTSE Property Holdings, 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 Mr. Horace Zhang, OER's project manager assigned to this Site, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8484.

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. The current Site Contact List will be found at the end of this Appendix 1.

Repository. A document repository is maintained in the nearest public library that maintains evening and weekend hours. 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. PTSE Property Holdings, LLC will inspect the repository to ensure that it is fully populated with project information. The repository for this project is:

Brooklyn Public Library, Greenpoint Branch
107 Norman Avenue (at Leonard Street)
Brooklyn, NY 11222
718-349-8504

Repository Hours of Operation:

M, T, F: 10:00a.m. – 6:00 p.m.; W: 10:00 a.m.- 8:00 p.m.; Th: 1:00 p.m.-8:00 p.m.; Sat: 10:00 a.m. – 5:00 p.m.; Sun: Closed.

Digital Documentation. NYC OER strongly encourages the use of digital documents in repositories as a means of minimizing paper use while also increasing convenience in access and ease of use.

Identify Issues of Public Concern. PTSE Property Holdings, LLC is required to identify whether there are specific issues of concern to stakeholders proximate to the project site. Such issues include but are not limited to interests of Environmental Justice communities. No specific issues of public concern have been identified for this site.

Public Notice and Public Comment. Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be prepared by PTSE Property Holdings, LLC, reviewed and approved by OER prior to distribution and mailed

by PTSE Property Holdings, LLC. 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. See flow chart on the following page, which identifies when during the NYC VCP public notices are issued: 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 the Site and Engineering Controls implemented for the Site and announcing the issuance of the Notice of Completion.

Appendix 2
Sustainability Statement

Appendix 2

Sustainability Statement

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

1. Noise Control. The E-Designation for this site requires the use of special, acoustically rated windows that must provide a minimum outdoor-indoor attenuation of 30 dBA in order to maintain an interior noise level of 45 dBA. In addition to insuring quiet conditions inside the building, this requirement will also protect nearby properties and public areas from excessive noise generated within the building.

2. 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.

The special, acoustically-rated windows described above will also provide improved thermal insulation, resulting in significant energy conservation and reduced fuel use. Windows in residential spaces will be operable, so that residents can use natural ventilation when outside conditions permit.

3. Use of Natural Gas for Building Heating. The new building will use non-polluting natural gas for heating.

4. 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. :

Remediation will include a vapor barrier over the entire building area. Since the building will occupy the full area of the site, the full site area will also be protected.

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

As a new building, storm-water retention will comply with NYC DOB and NYC Dept. of Environmental Protection (DEP) regulations.

6. Hydronic Floor Heating. Floors 3, 4, and 5, which will have residential occupancies, will utilize hydronic floor heating (hot water circulating in tubes within the floorslab). This technology contributes to significant energy savings.

7. Paperless Voluntary Cleanup Program. PTSE Property Holdings, 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.

8. Low-Energy Project Management Program. PTSE Property Holdings, 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.

9. 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.

Existing street trees will be marked and carefully protected during demolition and new construction, in accordance with NYC DOB requirements. Planned terraces provide space for new outdoor plantings.

Appendix 3
Soil/Materials Management Plan

Appendix 3

Soil/Materials Management Plan

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 RAR. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion.

2. Stockpile Methods

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

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

3. Characterization Testing of Materials Scheduled for Removal

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. Owner shall retain a qualified environmental consultant to perform characterization sampling and testing of existing soil to be removed. The proposed disposal site or sites shall be submitted for OER approval before any soil removal. Submission shall include the following:

1. Copy of characterization test results;

2. Letter from disposal site confirming their acceptance of proposed material;
3. Copy of disposal site's permit confirming their authorization to accept the type of material involved.

No excavation (except for characterization testing sampling) shall be done until a disposal site has been submitted and approved by Engineer and OER.

4. Materials Excavation, Load-Out and Departure

The PE overseeing the remedial action will:

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

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

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

5. Off-Site Materials Transport

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

Outbound truck transport routes will be developed by the Contractor, subject to approval by the Engineer and will be submitted to OER prior to the start of the remedial action. 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.

6. Materials Disposal Off-Site

The following documentation will be established and reported by the Engineer 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 Contractor 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 Brooklyn, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the Engineer or PTSE Property Holdings, LLC. 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 RAR.

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 RAR.

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 RAR. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the RAR. 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.

7. Materials Reuse On-Site

No on-site re-use of soil or fill derived from the property is planned for this site. If project plans change, soil and fill that is derived from the property that meets the 6 NYCRR Part 375 Soil Cleanup Objectives (SCOs) established in this plan may be reused on-site. The SCOs for on-site reuse are listed in the RAWP. "Reuse on-site" means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed.

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

8. Demarcation

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

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

9. Import of Backfill Soil from Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. No imported fill is anticipated for this project. However, should conditions change such that imported fill is required it shall meet OER-approved backfill and/or cover soil quality objectives for this Site.

Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

All materials received for import to the Site will be approved by the Engineer and will be in compliance with provisions in this RAWP. The RAR 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.

9.1 Source Screening and 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 P.E. is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

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

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

10. Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York

City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

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

11. Storm-water Pollution Prevention

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (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.

12. Contingency Plan

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 in coordination with the OER.

13. Odor, Dust and Nuisance Control

13.1 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 deodorants 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 Engineer certifying the Remedial Action Report.

13.2 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 Engineer's responsible for certifying the Remedial Action Report.

13.3 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

Prepared by

Environmental Building Solutions, LLC

231 West 29th Street

New York, NY 10001

Note: This Health and Safety Plan is intended to apply only to remedial work covered by this RAWP, including excavation of soil, some of which may be contaminated. It is not intended to cover other phases of construction.



**Environmental Building
Solutions, LLC**

**Health and Safety Plan
for
87/89 Grand Street
Brooklyn, New York 11211**

Prepared For:

**PTSE Property Holdings, LLC
34 North 7th Street, PH1C
Brooklyn, NY 11249**

Project ID: 12-149

Date: October 8, 2013

PROJECT SUMMARY

The purpose of this Health and Safety Plan (HASP) is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during soil remedial activities at 87/89 Grand Street, in Brooklyn, NY (the site). The HASP is intended to minimize health and safety risks resulting from the known and potential presence of hazardous materials on the site. Applicability extends to all employees, contractors, subcontractors, and visitors. This HASP is limited to health and safety risks specifically associated with potentially contaminated soil and/or groundwater; it is not intended to cover all construction-related risks.

All personnel on-site, contractors and subcontractors included, shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation.

This plan must be reviewed, and an agreement to comply with the requirements must be signed, by all personnel prior to entering the exclusion zone or contamination reduction zone.

During development of this plan consideration was given to current safety standards as defined by the USEPA, OSHA, and NIOSH. Listed procedures were designed to account for the potential for exposure to known and unknown substances. Specifically, the following reference sources have been consulted:

- OSHA 29 CFR 1910.120 and EPA 40 CFR 311
- U.S. EPA, OERR ERT Standard Operating Safety Guides
- NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines
- ACGIH Threshold Limit Values

Potential Chemical Hazards: Petroleum Compounds and Heavy Metals

All on-site activities, with the exception of confined space entry (if required), will be conducted using Level D personal protective equipment. Personnel will upgrade to Level C if the “Ambient Air Contaminant Threshold” (AACT) is exceeded or other site conditions warrant additional protection. The AACT Upgrade Threshold Levels are as follows:

- Level C upgrade threshold: 50 ppm (PID)
- Level B upgrade threshold: 250 ppm (PID)

These levels are based on photo ionization detector (PID) readings within the immediate area of work and relate to worker exposure.

EMERGENCY CONTACTS

The following list provides names and telephone numbers for emergency contact personnel. In the event of a medical emergency, personnel will take direction from the Health and Safety Officer (HSO) and notify the appropriate emergency organization. In the event of a fire or spill, the Site Supervisor will notify the appropriate local, state, and federal agencies.

Organization	Contact	Telephone
Ambulance		911
Police Department		911
Fire Department		911
National Response Center		(800) 424-8802
Poison Control Center		(800) 682-9211
NYC OER Project Manager	Mr. Horace Zhang	(212) 788-8484
Call Before You Dig		(800) 272-4480
Contractor's Health & Safety Officer	TBD	
Environmental Engineer	Joseph Horowitz, P.E.	718-544-5105
Environmental Consultant	Michael Borello Env. Building Solutions, LLC	917-217-7334
Site Representative	TBD	

MAP TO THE NEAREST HOSPITAL

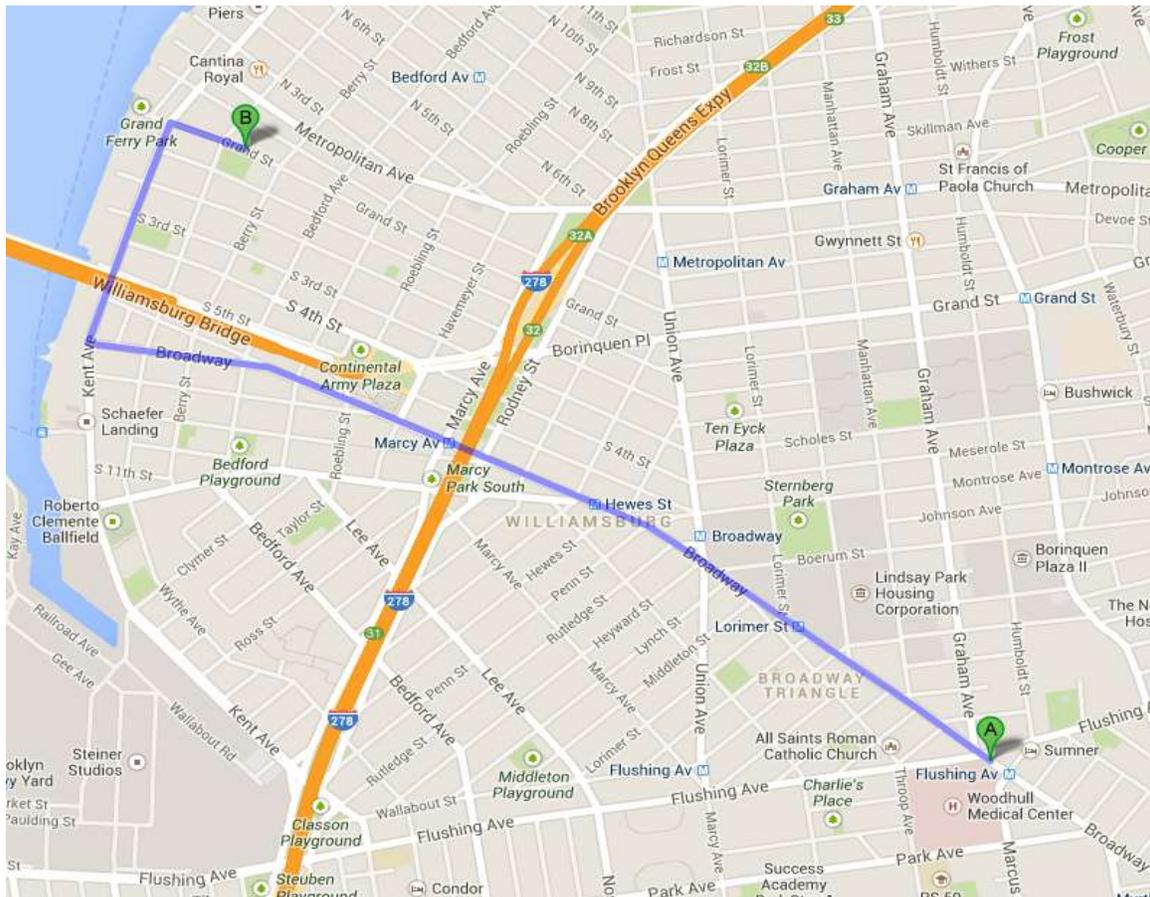
A map to the nearest hospital is provided below:

Woodhull Medical Center

760 Broadway

Brooklyn, NY 11206, US

(718) 963-8000



DIRECTIONS TO WOODHULL MEDICAL CENTER

1. Head west on Grand Street toward Kent Avenue – 0.1 miles
2. Turn left onto Kent Avenue
3. Head south on Kent Avenue toward Broadway – 0.4 miles
4. Turn left onto Broadway
5. Head southwest on Broadway to 760 Broadway – 1.6 miles

TABLE OF CONTENTS

PROJECT SUMMARY	3
EMERGENCY CONTACTS.....	4
MAP TO THE NEAREST HOSPITAL	5
SCOPE AND APPLICABILITY OF HASP	8
OPERATIONAL SAFETY AND HEALTH ANALYSIS	9
SCOPE OF WORK.....	10
HASP Scope and Objectives	10
Task-Specific Health and Safety Analysis	10
TRAINING REQUIREMENTS	14
All Personnel	14
Health and Safety Officer	14
Briefing Topics	15
Confined Space Entry	15
Visitors	15
PERSONNEL PROTECTIVE EQUIPMENT	16
PPE Levels	16
<u>Level A</u>	16
<u>Level B</u>	16
<u>Level C</u>	16
<u>Level D</u>	16
Reassessment of PPE Program	17
Selected PPE	17
<u>Level D</u>	17
<u>Level C</u>	18
AIR MONITORING AND SAMPLING.....	21
Direct-Reading Monitoring Instruments	21
Site-Specific Monitoring	22
PARTICULATE MONITORING	21

SITE CONTROL MEASURES	24
Buddy System	24
Site Communications Plan	24
Work Zone Definition	24
Safe Work Practices	25
Decontamination Plan	26
Equipment Decontamination	26
Disposal of Decontamination Wastes	26
EMERGENCY RESPONSE/CONTINGENCY PLANS	27
Pre-Emergency Planning	27
Personnel Roles and Lines of Authority	27
Emergency Recognition/Prevention	27
Emergency Contact/Notification System	27
Emergency Medical Treatment Procedures	28
Fire or Explosion Procedures	28
Spill and Leak Procedures	28
RECORD KEEPING	29

SCOPE AND APPLICABILITY OF HASP

The purpose of this Health and Safety Plan (HASP) is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide for contingencies that may arise during sub-surface soil remedial activities at 87/89 Grand Street, in Brooklyn, NY (the site). The HASP is intended to minimize health and safety risks resulting from the known and potential presence of hazardous materials on the site. Applicability extends to all employees, contractors, subcontractors, and visitors.

All personnel on-site, contractors and subcontractors included, shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation.

This plan must be reviewed, and an agreement to comply with the requirements must be signed, by all personnel prior to entering the exclusion zone or contamination reduction zone.

During development of this plan consideration was given to current safety standards as defined by the USEPA, OSHA, and NIOSH. Listed procedures were designed to account for the potential for exposure to known and unknown substances. Specifically, the following reference sources have been consulted:

- OSHA 29 CFR 1910.120 and EPA 40 CFR 311
- U.S. EPA, OERR ERT Standard Operating Safety Guides
- NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines
- ACGIH Threshold Limit Values

OPERATIONAL SAFETY AND HEALTH ANALYSIS

This HASP addresses site-specific hazards identified through previous site work or background information. For additional historic information concerning the Site see the following documents:

- Environmental Building Solutions, LLC – Sub-Surface Soil/Groundwater Investigation for 87 Grand Street, dated March 2012
- Environmental Building Solutions, LLC – Limited Sub-Surface Soil/Groundwater Investigation for 89 Grand Street, dated June 2012

The project includes two adjoining properties, 87 and 89 Grand Street (formerly Lots 42 and 40, respectively). Grand Street is a major thoroughfare in Greenpoint-Williamsburg and the area is characterized by mixed commercial and residential development. The combined site is irregular, but roughly L-shaped. The 87 site is vacant. The 89 site contains a vacant three-story masonry and wood frame building, built about 1918, which occupies the entire lot. The building was originally used as a factory and most recently as an art studio.

Applicability of HASP

This HASP is limited to the first phase of work (“Phase A”) for construction of a two- and five-story mixed occupancy building. This phase includes temporary shoring and bracing, foundations, earthwork, the new basement slab and vapor barrier and includes excavation and disposal of about 1,237 cu. yds. of soil, some of which may be contaminated.

The HASP also includes a program of dust monitoring.

SCOPE OF WORK

HASP Scope and Objectives

Several of the tasks described above involve potential contact with soil and or exposure to soil vapors, either of which may be contaminated as defined in the March and June 2012 soil investigation reports. Potential contact paths include direct (dermal) contact, inhalation, and ingestion.. In addition, this HASP will include a program for dust monitoring, to protect workers and the general public.

Task-Specific Health and Safety Analysis

The following subsections describe each task in terms of the specific hazards associated with it. In addition, the protective measures to be implemented during completion of each task are identified. In this section task related health and safety issues for site preparation, excavation and removal of contaminated soil are regarded as task specific safety issues.

Task #1: Reduce vegetation in work area and carry out grading and removal of obstacles to field equipment.

This will be done using hand held “weed-whackers.”

Hazards and Hazard Prevention

Potential hazards associated with the use of heavy equipment together with accidents commonly associated with use of weeding and grubbing equipment include slips, trips and falls; lacerations from contact with the equipment during operation; eye injury from flying vegetation/earth/miscellaneous debris. The site may also contain unknown material dumped on the site and hidden by the tall grass.

PHYSICAL HAZARD - An exclusion zone will be established around the perimeter of the work area. Only authorized personnel will be allowed to enter the exclusion zone during work activities. Site workers will wear appropriate foot wear with rubber-grip soles, avoid slippery surfaces, and generally use caution and good judgment.

CHEMICAL HAZARDS - Based on prior investigations, the primary contaminants anticipated are petroleum hydrocarbons.

Task #2: Soil excavation throughout the entire work area.

Hazards and Hazard Prevention

This task is intrusive. The primary safety concerns during soil remediation will be physical hazards (slips, trips, and falls), utility line rupture, and exposure (through inhalation or dermal contact) to contaminated soils.

PHYSICAL HAZARDS - An exclusion zone will be established around the work area. Only authorized personnel will be allowed to enter the exclusion zone during removal activities. Site workers will wear appropriate foot wear with rubber-grip soles, avoid slippery surfaces, and generally use caution and good judgment. The exclusion area will extend to any area clear of the drilling rig and its range. Earplugs will be worn during all drilling.

UTILITIES - Utility mark outs will be performed prior to any work on-site.

CHEMICAL HAZARDS - Based on prior investigations, the primary contaminants anticipated are petroleum hydrocarbons.

First aid equipment will be available during all field activities.

Chemical Hazards of Concern

The remedial soil generated and the surrounding work area will be continuously monitored using a photo ionization detector (PID) during site activities. The PID is an appropriate direct-reading monitoring instrument, given the confirmed presence of VOC contamination in the drill cuttings.

Benzene will be used as a surrogate for all volatile organic compounds (VOCs) on site. If PID readings for benzene should exceed 50 ppm above background, PPE will be upgraded to Level C, including half-face respirators, for all persons in the immediate work area

If PID readings in the areas above and surrounding the work area should exceed 250 ppm above background levels, all on-site activities will be suspended. The personal protective equipment selected will then depend on the nature and concentrations of the contaminants encountered. A complete listing of PPE levels can be found in Appendix D, and a listing of the specific PPE selected for on-site activities can be found in Section IV. First aid equipment will be available based on MSDS requirements.

First aid equipment will be available during all field activities.

Chemical Hazards of Concern

Petroleum Hydrocarbons

Chemical Formula: Varies

Normal Physical State: Liquid, at times near solid

Color/Appearance: Black/Brown

Solubility: \approx 5 mg/L

Specific Gravity:	Less than 1.0
Vapor Pressure:	Varies
Classification:	May be flammable; explosive in enclosed spaces. Non-reactive, non-corrosive
Explosive Limits:	0.7%-5% (#2 fuel oil)
Incompatibilities:	Chlorinated solvents, strong acids
Exposure Limits:	
	Petroleum distillates: 400 ppm (OSHA TWA)
	85 ppm (NIOSH TWA)
	10,000 ppm (NIOSH IDLH)

SOURCES OF INFORMATION:

USDHHS, NIOSH Pocket Guide to Chemical Hazards. June 1997. (NIOSH Internet site - "http.www.cdc.gov/niosh").

Riser-Roberts, Eve. Bioremediation of Petroleum Contaminated Sites. 1992.

Merck & Co. The Merck Index. 1996.

OSHA Internet site.

Peakall, David and Lincer, Jeffrey. Polychlorinated Biphenyls: Another Long-Life Widespread Chemical in the Environment. BioScience Vol 20, No. 17, September 1, 1970.

Routes of Exposure**Petroleum**

Naphthalene and semi-volatile organics are all proven or experimental poisons through inhalation and ingestion and are mildly to strongly toxic through dermal absorption. The most common route of exposure for these compounds is inhalation.

Symptoms**Petroleum**

Naphthalene and semi-volatile organics all induce nausea, vomiting, and an initial sense of euphoria upon exposure. A feeling of depression followed by loss of consciousness and eventually respiratory failure occur upon prolonged exposure.

First Aid

If contaminants come in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working. If contaminants come in contact with the skin, promptly wash the contaminated skin with soap and water. If contaminants penetrate through the clothing, promptly remove the clothing and wash the skin with soap and water. If a person breathes in large amounts of these contaminants, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. If these contaminants are swallowed, get medical attention immediately.

TRAINING REQUIREMENTS

All Personnel

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all site personnel are required to be trained in accordance with 29 CFR 1910.120. At a minimum, all personnel are required to be trained to recognize the hazards on-site, the provisions of this HASP, and the responsible personnel. All training and medical monitoring records for each subcontractor are the responsibility of that subcontractor. In addition, training records for all site personnel will be maintained by the Site Health and Safety Officer.

Prior to on-site arrival, each employer will be responsible for certifying that his/her employees meet the requirements of preassignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). The employer should be able to provide a document certifying that each general site worker has received 40 hours of instruction off the Site, and 24 hours of training for any workers who are on-site only occasionally for a specific task. If an individual employee has work experience and/or training that is equivalent to that provided in the initial training, an employer may waive the 40-hour training so long as that equivalent experience is documented or certified. All personnel must also receive 8 hours of refresher training annually.

Health and Safety Officer

The Health and Safety Officer (HSO) has the responsibility for ensuring that the provisions of this HASP are adequate. Site personnel are responsible for ensuring that these provisions are implemented in the field. Changing field conditions may require decisions to be made concerning whether operating procedures and personal protective equipment are adequate and are to be discussed with the HSO. Therefore, it is vital that any personnel assigned as HSO be experienced, and meet the additional training requirements specified by OSHA in 29 CFR 1910.120.

The following individual is identified as the HSO⁵:

Name:

Title:

Organization:

⁵ The HSO will be an employee of the Contractor, who will be designated after contract award.

Briefing Topics

In order to comply with 29 CFR 1910.1200, Hazard Communication, the following items will be discussed by a qualified individual at the pre-operational briefing(s) or periodic site briefings:

<u>Training</u>	<u>Frequency</u>
Air Monitoring, Sec. 7.0; [29 CFR 1910.120(H)]	Daily
Confined space entry procedure, Sec. 11.0	Periodic
Emergency response plan, Sec. 10.0; [29 CFR 1910.120(1)]	Periodic
Personnel protective equipment, Sec. 5.0	Daily

Confined Space Entry

Entry into confined spaces as defined in OSHA 29 CFR 1910.146(b)(1) is not anticipated as an on-site activity. Should entry into a confined space be required, all operational activities will be suspended until entry can be achieved in accordance with 1910.146.

Visitors

All visitors entering the contamination reduction zone and exclusion zone at the Site will be required to read and verify compliance with the provisions of the HASP. In addition, visitors will be expected to comply with relevant OSHA requirements, such as medical monitoring, training, and respiratory protection (if applicable). Visitors will also be expected to provide their own protective equipment.

In the event that a visitor does not adhere to the provisions of the HASP, he/she will be requested to leave the work area. All non-conformance incidents and accidents will be recorded in the site log.

PERSONNEL PROTECTIVE EQUIPMENT

This section describes the specific levels of protection required for each task on-site. The general requirements of the USEPA and OSHA-designated Levels of Protection (A-D) are described below.

Personnel shall wear PPE when response activities involve known or suspected atmospheric contamination vapors, gases, or particulates may be generated by site activities, or when direct contact with skin-affecting substances may occur. Full face-piece respirators protect the lungs, gastrointestinal tract and eyes against airborne toxicants. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals.

PPE Levels

The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

Level A

Should be worn when the highest level of respiratory, skin and eye protection is needed.

Level B

Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B is the primary level of choice when encountering unknown environments.

Level C

Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is required.

Level D

Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.

Modifications of these levels are permitted, and routinely employed during site work activities to maximize efficiency. For example, Level C respiratory protection and Level D skin protection may be required for a given task. Likewise, the type of chemical protective ensemble (i.e. material, format) will depend upon contaminants and degrees of contact. In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate Level of Protection must be selected based on professional experience and judgment until the hazards can be better identified.

The Level of Protection selected is based upon the following:

- Type and measured concentration of the chemical substance and its toxicity.
- Potential for exposure to substances in air, liquids, or other direct contact with material due to work being done.
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix.

Reassessment of PPE Program

The Level of Protection provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or findings of investigations. When a significant change occurs, the hazards should be reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase, such as the start of drum sampling or work that begins on a different portion of the site.
- If a change in job tasks occurs during a work phase.
- If there is a change of season/weather.
- If temperature extremes or individual medical considerations limit the effectiveness of PPE.
- If contaminants other than those previously identified are encountered.
- If there is a change in ambient levels of contaminants.
- If there is a change in the scope of work, which affects the degree of contact with contaminants.

Selected PPE

All on-site activities will be conducted using Level D protective equipment. Personnel will upgrade to Level C if the Ambient Air Contaminant Threshold is exceeded or other site conditions warrant additional protection. It is not anticipated that any of the on-site activities will involve permit-required confined space entry. However, should permit-required confined space entry become necessary together with the actual or suspected presence of hazardous atmosphere, personnel entering the confined space shall wear Level B PPE with supplied air. The determination of whether conditions are such as to constitute permit-required confined space entry shall be made by the on-site Health and Safety Officer.

Should site conditions require PPE above Level C all on-site activities will be suspended until the appropriate level of protection can be arranged. A checklist for PPE and other equipment is included in Table #2. The following specific clothing materials will be used on-site:

Level D

INNER GLOVES:

At least surgical gloves, if sampling

BOOTS/BOOT COVERS:	Steel-toed boots, no boot covers
OUTER GLOVES:	Nitrile if sampling or leather
OUTER GARMENT/COVERALLS:	Standard clothes coveralls or work clothes
RESPIRATORY PROTECTION:	Dust mask
EYE PROTECTION:	Goggles or safety glasses

Level C

INNER GLOVES:	Surgical gloves
BOOTS/BOOT COVERS:	Steel-toed boots, Nitrile-coated covers
OUTER GLOVES:	Nitrile
OUTER GARMENT/COVERALLS:	Tyvek coveralls or similar
RESPIRATORY PROTECTION:	Half face respirator with filter cartridges for with organic vapor/HEPA cartridges or Full-face, negative-pressure air-purifying respirators with organic vapor/HEPA cartridges
EYE PROTECTION:	Goggles

TABLE #1
PPE/EQUIPMENT INSPECTION CHECKLIST

ITEM	PRECHECK
HEALTH & SAFETY-RELATED	
Respirators	Compatible cartridges, clean/operational parts, recent fit test, +/- on-site test
Gloves	Compatibility, fit, rips/tears
Surgical inner gloves	None
Protective suits	Compatibility, fit, rips/tears
Overboots	Compatibility, fit, rips/tears
Hardhat(s)	Fit, suspension
Safety goggles	Fit, comfort, visibility
Caution tape	None
Ear protection	None
First aid kit	
PID	Charged/operational, calibration gas cylinder not empty
NON-H&S-RELATED	
Duct tape	None
Utility knife	None
Plastic bags	None
Lab cooler/Sample jars/COC	None

Decontamination containers/sol'n		None
Camera/Film		None
Logbook		None
Tarp/Plastic		None
Measuring tape		None
Pens/Markers		
Spray paint		
Water level indicator		
Project folder		

AIR MONITORING AND SAMPLING

This section explains the general concepts of an air-monitoring program and specifies the surveillance activities that will take place on-site. Air Monitoring will be performed by a qualified environmental technician reporting to the Environmental Engineer and referred to herein as the **Site Representative**.

The purpose of air monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection needed. Initial screening for identification is often qualitative, i.e., the contaminant, or the class to which it belongs, is demonstrated to be present, but quantification requires subsequent testing. Two principal approaches are available for identifying and/or quantifying airborne contaminants:

- The on-site use of direct-reading instruments.
- Laboratory analysis of air samples obtained by gas sampling-bag collection media (i.e., filter, sorbent), and/or wet-contaminant collection methods.

Direct-Reading Monitoring Instruments

Unlike air sampling devices, which are used to collect samples for subsequent analysis in a laboratory, direct-reading instruments provide information at the time of sampling, allowing rapid decision-making to occur. Data obtained from the real-time monitors are used to assure proper selection of PPE, engineering controls, and work practices. Overall, the instruments give the user the capability to determine if site personnel are being exposed to concentrations which exceed exposure limits or action levels for specific hazardous materials.

Of significant importance, especially during initial entries, is the potential for Immediate Danger to Life or Health (IDLH) conditions or oxygen-deficient atmospheres. Real-time monitors can be useful in identifying any IDLH conditions, toxic levels of airborne contaminants, flammable atmospheres, or radioactive hazards. Periodic monitoring of conditions is critical; especially if exposures may have increased since initial monitoring or if new activities are conducted on-site.

After site mitigation activities have commenced, the selective monitoring of high-risk workers, (those who are closest to the source of contaminant generation) is essential. Personal monitoring samples should be collected in the breathing zone and, if workers are wearing respiratory protective equipment, outside the face piece.

Those employees working closest to the source have the highest likelihood of being exposed to concentrations which exceed established exposure limits. Representative sampling approaches emphasizing worst case conditions (those employees with the greatest risk of exposure) are acceptable. However, the sampling strategy may change if the operation or tasks change on-site or if exposures potentially increase.

Site-Specific Monitoring

Air monitoring will be conducted on a continual basis in the excavation area using a Photo Ionization Detector (PID). Action levels for each contaminant will be set at the TLV for benzene (10 ppm) using half-face or full-face respirators (which provide protection factors of 10x and 50x). PID readings will be recorded in a field notebook at least every 10 minutes. Any variation from background levels experienced during continuous monitoring will also be recorded. Some of the limitations of the PID should be noted:

- Detects total concentration of volatile organic gases and detectable aromatic compounds and a few inorganic gases.
- Moist atmospheric conditions (e.g. rain) and high relative humidity (>90%) "quenches" signal, resulting in low readings.
- Does not detect methane.
- For concentrations >150 ppm, the PID may provide non-linear or erratic responses.
- Lead acid battery in PID loses power quickly in cold weather (may require periodic recharging).
- Readings may be affected by power lines, transformers, or radio wave transmitters.
- Accuracy $\pm 15\%$
- Detection range 0.5-2,000 ppm.

PARTICULATE MONITORING

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. Monitoring will utilize real-time MetOne Particulate monitors, which have a detection limit of 0.001 micrograms of dust per cubic meter of air.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) 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 $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

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

SITE CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program.

Buddy System

During all Level B activities or when on-site conditions present a risk to personnel, the implementation of a buddy system is mandatory. A buddy system requires at least two people to work as a team; each looking out for each other. Level B operations generally require three people.

Site Communications Plan

Successful communications between field teams and contact with personnel in the support zone is essential. The following communications systems will be available during activities at the Site, if required.

<u>Signal</u>	<u>Definition</u>
Hands clutching throat	Out of air/cannot breath
Hands on top of head	Need assistance
Thumbs up	OK/I'm all right/I understand
Thumbs down	No/Negative
Arms waving upright	Send backup support
Grip partner's wrist	Exit area immediately

Work Zone Definition

The three general work zones generally established on-site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone. Given the limited amount of space in each work area and the nature of the subsurface work to be performed on-site, an Exclusion Zone only will be established around each work area. If site conditions warrant, Contamination Reduction and Support Zones will also be established.

The Exclusion Zone is defined as the area where contamination is either known or likely to be present, or because on-site activities will provide a potential to cause harm to personnel. Entry into the Exclusion Zone may require the use of PPE.

The Contamination Reduction Zone is the area where personnel conduct body and equipment decontamination. It is essentially a buffer zone between contaminated areas and clean areas. Activities to be conducted in this zone may require PPE as defined in the Decontamination Zone.

The Support Zone is situated in clean areas where the chance to encounter hazardous conditions is minimal.

Safe Work Practices

Table #2 below provides a list of standing orders for the Exclusion and Contamination Reduction Zones.

TABLE #2

STANDING ORDERS FOR EXCLUSION AND CONTAMINATION REDUCTION ZONES

EXCLUSION ZONE

- No smoking, eating, or drinking.
- No horse play.
- No matches or lighters.
- Check-in upon entering.
- Check-out upon exiting.
- Implement the communications system if conditions warrant it.
- Line of sight must be in position.
- Wear the appropriate level of protection as defined in the HASP.

CONTAMINATION REDUCTION ZONE

- No smoking, eating, or drinking.
- No horse play.
- No matches or lighters.
- Wear the appropriate level of protection.

REMEMBER TO ALWAYS WASH HANDS BEFORE EATING AFTER ANY WORK

Decontamination Plan

Decontamination involves the orderly, controlled removal of contaminants. All site personnel should minimize contact with contaminants in order to minimize the need for extensive decontamination.

Should personnel be required to assist in decontamination procedures, the protection required will be Level D. The HSO is responsible for monitoring decontamination procedures and determining their effectiveness.

Equipment Decontamination

Sampling equipment will be decontaminated in accordance with procedures as defined in the General Sampling Program. The sequence of decontamination steps required for non-sampling equipment and heavy machinery can be found in the Work Plan.

Disposal of Decontamination Wastes

All equipment and solvents used for decontamination shall be decontaminated or disposed of properly. If commercial laundries or cleaning establishments are used to decontaminate protective clothing or equipment, they shall be informed of the chemicals of concern and their potential harmful effects of exposure associated with the project.

EMERGENCY RESPONSE/CONTINGENCY PLANS

This section describes the contingency and emergency planning procedures to be implemented on-site. This plan is compatible with local, state, and federal disaster and emergency management plans as appropriate.

Pre-Emergency Planning

During regular briefings, all employees will be trained in, and reminded of, provisions of the emergency response plan, communication systems, and evacuation routes. The plan will be reviewed and revised, if necessary, on a regular basis by the HSO. This will ensure that the plan is adequate and consistent with prevailing site conditions.

A charged cell phone will be made available at all times to all personnel on-site.

Personnel Roles and Lines of Authority

The Site Supervisor has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area, and evacuation of adjacent residents.

He/she is also responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. The HSO may be called upon to act on behalf of the site supervisor, and will direct responses to any medical emergency. The individual contractor organizations are responsible for assisting the project manager in his/her mission within the parameters of their scope of work.

Emergency Recognition/Prevention

Site personnel will be familiar with techniques of hazard recognition from pre-assignment training and site-specific briefings. The HSO is responsible for ensuring that prevention devices or equipment are available to personnel.

Emergency Contact/Notification System

The list at the beginning of this HASP provides names and telephone numbers for emergency contact personnel. In the event of a medical emergency, personnel will take direction from the HSO and notify the appropriate emergency organization. In the event of a fire or spill, the Site Supervisor will notify the appropriate local, state, and federal agencies.

Emergency Medical Treatment Procedures

Any person who becomes ill or injured in the Exclusion Zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket). First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must be reported to the project manager immediately.

Any person being transported to a clinic or hospital for treatment should take with them information on the chemical(s) they have been exposed to, if applicable. This information is included in this report.

Any vehicle used to transport contaminated personnel will be treated and cleaned as necessary.

Fire or Explosion Procedures

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the project manager or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on-site, if applicable.

If it is safe to do so, site personnel may:

- Use fire fighting equipment available on-site to control or extinguish the fire.
- Remove or isolate flammable or other hazardous materials, if present, which may contribute to the fire.

Spill and Leak Procedures

In the event of a spill or a leak of a hazardous material, site personnel will:

- Inform their supervisor immediately
- Locate the spill source and stop the flow, if it can be done safely
- Begin containment and recovery of the spilled materials

RECORD KEEPING

The Site Representative will perform required air monitoring and will maintain a complete chronologic job log, which includes the following

- Date, times, and weather conditions
 - Names of all site workers
 - Air monitoring activities – Note that levels detected on all monitoring devices are to be recorded every 10 minutes
 - Work activities and progress
 - Sampling conducted
 - Work practices
 - Any violation of established safety procedures
 - Emergency response
 - Worker injuries
-

I have read this health and safety plan and agree to comply with its requirements.

Name: _____ Signature: _____ Date: _____ Company/Organization: _____	Name: _____ Signature: _____ Date: _____ Company/Organization: _____
Name: _____ Signature: _____ Date: _____ Company/Organization: _____	Name: _____ Signature: _____ Date: _____ Company/Organization: _____
Name: _____	Name: _____

Signature: _____ Date: _____ Company/Organization: _____	Signature: _____ Date: _____ Company/Organization: _____
Name: _____ Signature: _____ Date: _____ Company/Organization: _____	Name: _____ Signature: _____ Date: _____ Company/Organization: _____
Name: _____ Signature: _____ Date: _____ Company/Organization: _____	Name: _____ Signature: _____ Date: _____ Company/Organization: _____
Name: _____ Signature: _____ Date: _____ Company/Organization: _____	Name: _____ Signature: _____ Date: _____ Company/Organization: _____
Name: _____ Signature: _____ Date: _____ Company/Organization: _____	Name: _____ Signature: _____ Date: _____ Company/Organization: _____

Appendix 5
Proposed Development Plans

Appendix 5: Proposed Development Plans

Note: Drawings will be submitted electronically.

Dwg. No.	Title	Date	Remarks
Architectural Drawings: Adjmi & Andreoli			
T-001.00	Title Sheet	10/25/13	
Z-001.00	Zoning Information		
Z-002.00	Zoning Notes		
Z-003.00	Zoning Deductions & Calculations		
A-006.00	Site Survey		
A-007.00	Site Plan		
A-100.00	Cellar Floor Plan		
A-101.00	First Floor Plan		
A-102.00	Second Floor Plan		
A-103.00	Third Floor Plan		
A-104.00	Fourth Floor Plan		
A-105.00	Fifth Floor Plan		
A-106.00	Roof and Bulkhead Plans		
A-400.00	North & South Elevations		
A-401.00	West & East Elevations		
A-300.00	Building Section AA		
A-303.00	Building Section DD		
A-400.00	North & South Elevations		

Dwg. No.	Title	Date	Remarks
A-401.00	West & East Elevations		
A-750.00	Wall Section Details		Includes vapor barrier installation details.

Dwg. No.	Title	Date	Remarks
Structural Drawings Robert Silman Associates			
FO-100.00	Cellar Floor Framing Plan	10/25/13	
S-101	First Floor Framing Plan		
S-102	Second Floor Framing Plan		
S-103	Third Floor Framing Plan		
S-104	Fourth Floor Framing Plan		
S-105	Fifth Floor Framing Plan		
S-106	Roof Framing Plan		
S-107	Bulkhead Framing Plan		
S-108	Column Schedule		
S-200	General Notes		
S-201	Typical Details		
S-202	Typical Details		
S-203	Typical Details		
S-204	Typical Details		
S-205	Typical Details		
S-300	Sections		
S-301	Sections		
S-302	Sections		
S-400	Sections		

Appendix 6

Vapor Barrier:
Manufacturer's Data
W. R. Grace & Co.

Grace Waterproofing Products

GRACE

FLORPRUFE® 120

Integrally bonded vapor protection for slabs on grade

Description

Florprufe® 120 is a high performance vapor barrier with Grace's Advanced Bond Technology™ that forms a unique seal to the underside of concrete floor slabs.

Comprising a highly durable polyolefin sheet and a specially developed, non-tacky adhesive coating, Florprufe 120 seals to liquid concrete to provide integrally bonded vapor protection.

Florprufe exceeds ASTM E1745 Class A rating.

Advantages

- Forms a powerful integral seal to the underside of concrete slabs
- Protects valuable floor finishes such as wood, tiles, carpet and resilient flooring from damage by vapor transmission
- Direct contact with the slab complies with the latest industry recommendations
- Remains sealed to the slab even in cases of ground settlement
- Ultra low vapor permeability
- Durable, chemical resistant polyolefin sheet
- Lightweight, easy to apply, kick out rolls
- Simple lap forming with mechanical fixings or tape

Use

Florprufe 120 is engineered for use below slabs on grade with moisture-impermeable or moisture-sensitive floor finishes that require the highest level of vapor protection.

¹ ACI 302.1R-96

Product Advantages

- Forms a powerful integral seal
- Protects valuable floor finishes
- Ultra low vapor permeability
- Durable, chemical resistant
- Lightweight and easy to apply

Florprufe complies with the latest recommendations of ACI Committees 302 and 360, i.e. for slabs with vapor sensitive coverings, the location of the vapor barrier should always be in direct contact with the slab.

The membrane is loose laid onto the prepared subbase, forming overlaps that can be either mechanically secured or taped. The unique bond of Florprufe to concrete provides continuity of vapor protection at laps. Alternatively, if a taped system is preferred, self-adhered Preprufe® Tape can be used to overband the laps.

Slab reinforcement and concrete can be placed immediately. Once the concrete is poured, an integral bond develops between the concrete and membrane.

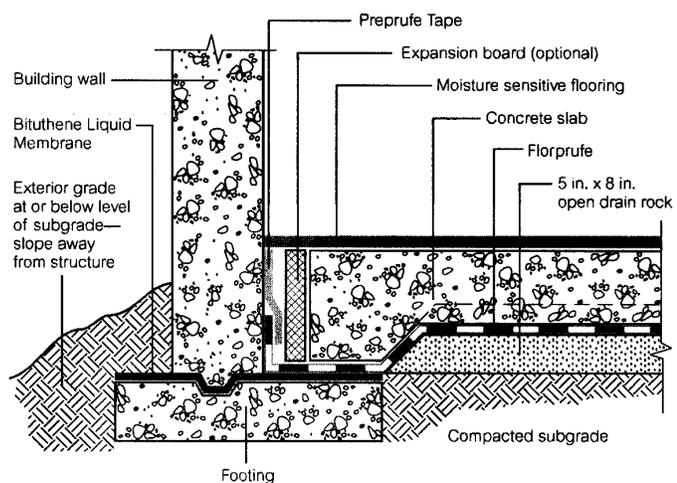
Installation

Health & Safety

Refer to relevant Material Safety Data Sheet.

Complete rolls should be handled by 2 persons.

Florprufe 120 can be applied at temperatures of 25°F (-4°C) or above. Membrane installation is unaffected by wet weather. Installation and detailing of Florprufe 120 are generally in accordance with ASTM E1643-98.



Typical Assembly

Drawings are for illustration purposes only.

Please refer to www.graceconstruction.com for specific application details.

Supply

Florprufe 120	
Supplied in rolls	4 ft x 115 ft (1.2 m x 35 m)
Roll area	460 ft ² (42 m ²)
Roll weight	70 lbs (32 kg) approx.
Ancillary Products	
Preprufe Tape is packaged in cartons containing 4 rolls that are 4 in. x 49 ft (100 mm x 15 m).	
Bituthene Liquid Membrane is supplied in 1.5 gal (5.7 L) pails.	

Physical Properties: Exceeds ASTM E1745 Class A rating

Property	Typical Value	Test Method
Color	White	
Thickness (nominal)	0.021 in. (0.5 mm)	ASTM D3767—method A
Water vapor permeance	0.03 perms	ASTM E96—method B1
Tensile strength	65 lbs/in.	ASTM E1541
Elongation	300%	ASTM D412
Puncture resistance	3300 gms	ASTM D17091
Peel adhesion to concrete	>4 lbs/in.	ASTM D903

1. Test methods that comprise ASTM E1745 standard for vapor retarders

Prepare substrate in accordance with ACI 302.1R Section 4.1. Install Florprufe 120 over the leveled and compacted base. Place the membrane with the smooth side down and the plastic release liner side up facing towards the concrete slab. Remove and discard plastic release liner. End laps should be staggered to avoid a build up of layers. Succeeding sheets should be accurately positioned to overlap the previous sheet 2 in. (50 mm) along the marked lap line.

Laps**1. Mechanical fastening method—**

To prevent the membrane from moving and gaps opening, the laps should be fastened together at 39 in. (1.0 m) maximum centers. Fix through the center of the lap area using 0.5 in. (12 mm) long washer-head, self-tapping, galvanized screws (or similar) and allowing the head of the screw to bed into the adhesive compound to self-seal. It is not necessary to fix the membrane to the substrate, only to itself. Ensure the membrane lays flat and no openings occur. (See Figure 1.) Additional fastening may be required at corners, details, etc. Continuity is achieved once the slab is poured and the bond to concrete develops.

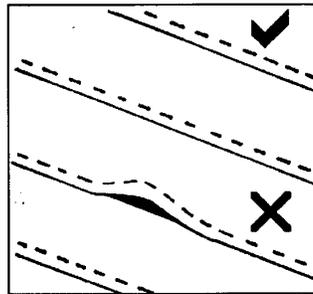


Figure 1

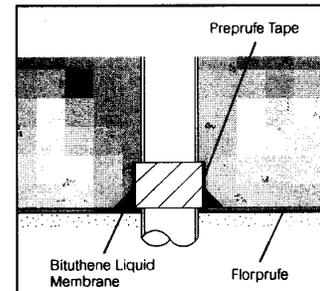


Figure 2

OR

2. Taped lap method—

For additional security use Grace Preprufe Tape to secure and seal the overlaps. Overband the lap with the 4 in. (100 mm) wide Preprufe Tape, using the lap line for alignment. Remove plastic release liner to ensure bond to concrete.

Penetrations

Mix and apply Bituthene Liquid Membrane detailing compound to seal around penetrations such as drainage pipes, etc. (See Figure 2 and refer to the Bituthene Liquid Membrane data sheet, BIT-230.)

Concrete Placement

Place concrete within 30 days. Inspect membrane and repair any damage with patches of Preprufe Tape. Ensure all liner is removed from membrane and tape before concreting.

www.graceconstruction.com

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

Florprufe and Preprufe are registered trademarks of W. R. Grace & Co.—Conn.

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

This product may be covered by patents or patents pending.
PF-001G Printed in U.S.A. 3/07

Copyright 2007. W. R. Grace & Co.—Conn.
FA/LI/1M

GRACE

Grace Below Grade Waterproofing

GRACE

PREPRUFE® 300R & 160R

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

Description

Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.

Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe bond to concrete prevents ingress or migration of water around the structure.

The Preprufe R System includes:

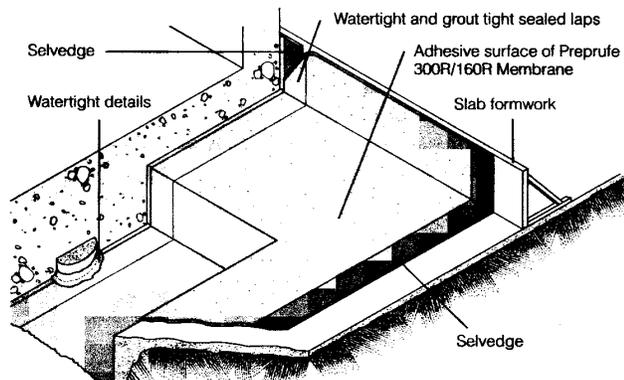
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe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

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

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

Advantages

- **Forms a unique continuous adhesive bond to concrete poured against it**—prevents water migration and makes it unaffected by ground settlement beneath slabs
- **Fully-adhered watertight laps** and detailing
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **BBA Certified** for basement Grades 2, 3, & 4 to BS 8102:1990
- **Zero permeance** to moisture
- **Solar reflective**—reduced temperature gain
- **Simple and quick to install**—requiring no priming or fillets
- **Can be applied to permanent formwork**—allows maximum use of confined sites
- **Self protecting**—can be trafficked immediately after application and ready for immediate placing of reinforcement
- **Unaffected by wet conditions**—cannot activate prematurely
- **Inherently waterproof, non-reactive system:**
 - not reliant on confining pressures or hydration
 - unaffected by freeze/thaw, wet/dry cycling
- **Chemical resistant**—effective in most types of soils and waters, protects structure from salt or sulphate attack



Drawings are for illustration purposes only.
Please refer to graceconstruction.com for specific application details.



Installation

The most current application instructions, detail drawings and technical letters can be viewed at graceconstruction.com. For other technical information contact your local Grace representative.

Preprufe 300R & 160R membranes are supplied in rolls 4 ft (1.2 m) wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe Membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

Substrate Preparation

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

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

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

Membrane Installation

Preprufe can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, Preprufe Low Temperature (LT) is available for low temperature condition applications. Refer to Preprufe LT data sheet for more information.

Horizontal substrates—Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed (see Figure 2).

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

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

Vertical substrates—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to

overlap. Roll firmly to ensure a watertight seal.

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

Details

Refer to Preprufe Field Application Manual, Section V Application Instructions or visit graceconstruction.com. This manual gives comprehensive guidance and standard details.

Membrane Repair

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

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe membrane and tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

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

A minimum concrete compressive strength of 1500 psi (10 N/mm²) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

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

Figure 1



Figure 2

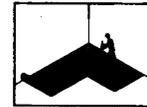
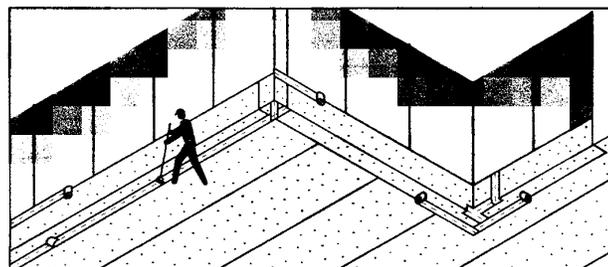
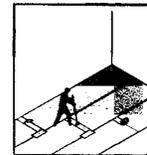


Figure 3

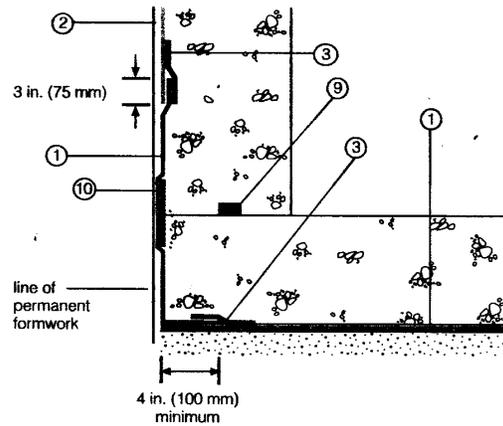


Detail Drawings

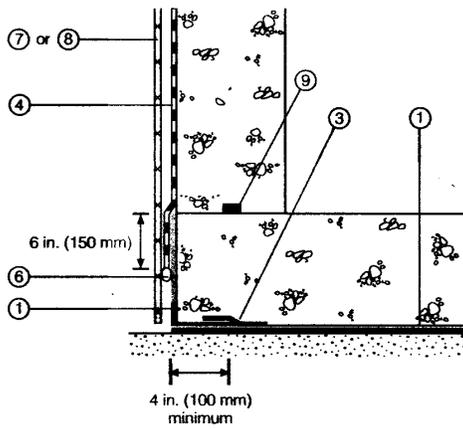
Details shown are typical illustrations and not working details. For a list of the most current details, visit us at graceconstruction.com.

For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

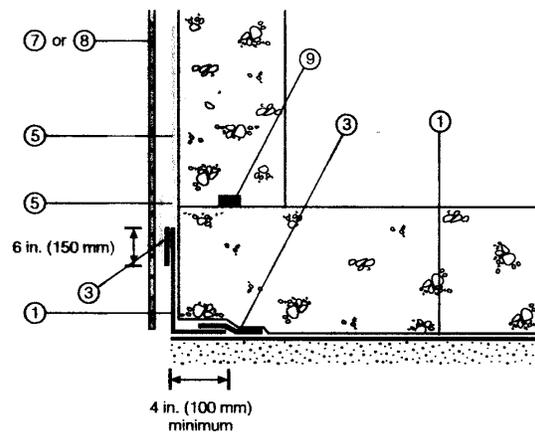
Wall base detail against permanent shutter



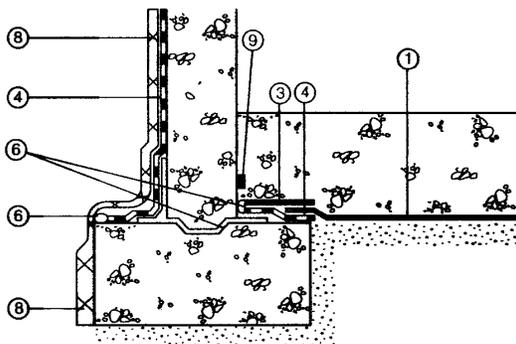
Bituthene wall base detail (Option 1)



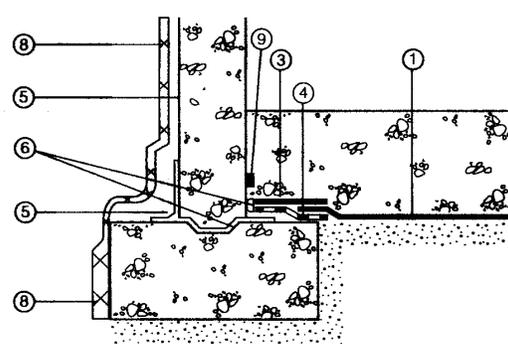
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



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

- 5 Procor
- 6 Bituthene Liquid Membrane
- 7 Protection

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

Grace Below Grade Waterproofing

GRACE

PROCOR®

Fluid applied waterproofing for below grade structures

Description

Procor® is a two component, synthetic rubber, cold vulcanized, fluid applied waterproofing membrane. It cures to form a resilient, monolithic, fully bonded elastomeric sheet.

Procor will protect below ground structures against water and water vapor ingress.

The Volatile Organic Compound (VOC) content of Procor waterproofing membranes is less than 75 g/L. Architectural and Industrial Maintenance Regulations limit the VOC content in products classified as Architectural Coatings. Refer to Technical Letters at www.graceconstruction.com for most current list of allowable limits.

Advantages

- **Fully bonded**—water cannot track beneath the membrane
- **Waterproof**—resists a hydrostatic head in excess of 65 ft (20 m)
- **Elastomeric**—accommodates minor structural movements and will bridge concrete shrinkage cracks
- **Asphalt free formulation**—does not become brittle with age and remains flexible to -23°F (-30°C)
- **Chemical cure**—100% solids; wet thickness equals dry thickness
- **Seamless**—continuous waterproofing integrity with easy detailing
- **Primerless**—applied directly to the substrate with minimal surface preparation
- **Damp surface tolerant**—can be applied to damp-to-touch surfaces
- **Cold applied**—eliminates fire hazards during application
- **Quick and easy application**—by airless spray or trowel
- **Wide application window**—can be sprayed down to 20°F (-7°C)
- **Versatile**—easy to use at drains, pipe penetrations, internal and external corners, etc.
- **ASTM C836**—meets or exceeds all physical performance criteria

Principal Applications

New and remedial waterproofing applications:

- Concrete and masonry basements
- Retaining walls
- Elevator pits
- Service ducts
- Split slab applications
- Floors
- Wet rooms



System Components

- **Procor 75 Spray Grade**—for horizontal and vertical applications
- **Procor 10 Pourable Grade**—for horizontal applications
- **Procor 20 Trowel Grade**—for vertical applications and details
- **Hydroduct® Drainage Composites**—high compressive strength, high flow geocomposite drainage sheets
- **Bituthene® Liquid Membrane**—for detailing at pipe entries, etc.
- **Preprufe® Tape**—for tie-ins of Procor, Bituthene or Preprufe waterproofing sheet membranes

Installation

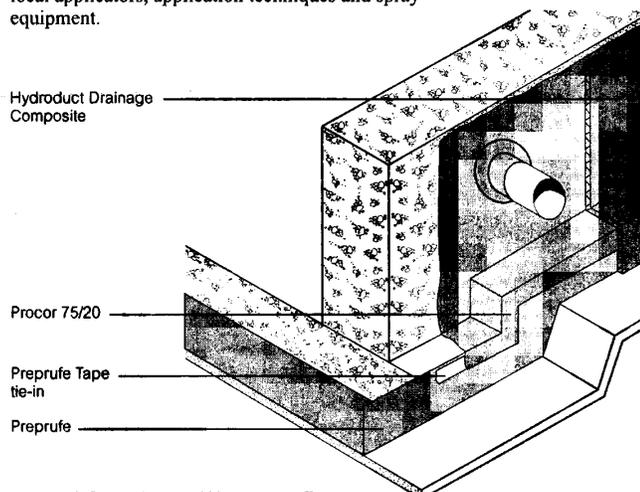
Safety

Refer to product label and Material Safety Data Sheet before use. All users should acquaint themselves with this information prior to working with the material. Carefully read detailed precaution statements on the product labels and MSDS before use. MSDSs can be obtained from our web site at www.graceconstruction.com or by contacting us toll free at 866-333-3SBM (3726).

Application

Procor fluid applied waterproofing membranes are typically applied at a minimum thickness of 60 mil (1.5 mm).

Procor can be installed by hand or using airless spray application. Grace has a network of Procor Specialist Spray Applicators who are trained and experienced in spray application. Contact Grace for further details of local applicators, application techniques and spray equipment.



Typical Foundation Waterproofing

Drawings are for illustration purposes only. Please refer to www.graceconstruction.com for specific application details.

Surface Preparation Concrete

Cementitious surfaces must be smooth, monolithic and free of frost, voids, spalled areas, loose substrate and sharp protrusions, dirt, oil, grease and debris and must contain no other contaminants or any visible coarse aggregate. Repair defects such as spalled or poorly consolidated areas.

Tie-holes and "bugholes" larger than ¼ in. (6 mm) in diameter or deeper than ⅛ in. (3 mm) or both, should be either pretreated with Procor or repaired with a lean concrete mix or grout. See ASTM D5295, *Preparation of Concrete Surfaces for Adhered Membrane Waterproofing Systems*, for further details on substrate preparation.

Cracked, pitted, honeycombed or heavily bugholed surfaces can be filled by spraying from close in (10 in. to 12 in.) but high material usage will result. Under these circumstances it may be more efficient to fill the surfaces with a parge coat of lean mortar mix before application of the Procor. It is also acceptable to fill in gaps with a compatible sealant or caulk.

Remove windrows, sharp protrusions and form match lines. Also remove high spots greater than .03 in. (0.8 mm) in height. On highly porous and rough surfaces, it may be necessary to apply Procor Concrete Sealer or a scratch coat of Procor to provide a smooth surface, before applying the liquid membrane.

All substrates must be wirebrushed, swept with a stiff broom or blown off with low pressure air to remove dirt, dust and loose stones. Poor quality surfaces with excessive laitance may require shotblasting or pressure washing to provide a dense smooth surface free from contaminants.

Please refer to Technical Letter 2 for more information on *Inspection and Repair of Concrete*.

Masonry

Waterproofing concrete block is critical since most concrete block is porous and therefore susceptible to moisture and water infiltration. Refer to Technical Letter *Waterproofing Concrete Block Walls* for surface preparation. Apply a scratch coat of Procor to provide a smooth surface before applying the liquid membrane.

Wood/Plywood

Apply Procor membrane over securely fastened sound surface. All joints and fasteners shall be flush to create a smooth surface.

Contact Grace Construction Products if in doubt about the suitability of the substrate.

Application to Green Concrete or Damp Surfaces

Procor may be applied to green (minimum 3 days cure time) concrete or over surfaces which are damp to the touch. Remove any visible water prior to application. In green concrete or damp substrate applications, direct sunlight may cause the surface temperature to rise rapidly, drawing moisture from the substrate and resulting in blisters and pinholes in the membrane. Under these conditions it may be necessary to apply Procor Concrete Sealer or a scratch coat of Procor before applying the full thickness Procor membrane.

Do not apply Procor waterproofing membranes in wet weather. Once applied, the membranes will not be affected by light rain showers.

Application Temperature

Hand Application—Apply Procor 10 and 20 membranes at ambient and substrate temperatures above 40°F (4°C). Do not apply the material if the ambient temperature is likely to fall below 32°F (0°C) within one hour of application completion.

Spray Application—In spray applications using Procor 75, it is possible to work at temperatures below 40°F (4°C) provided there is no frost or condensation on the substrate. The minimum temperature for spray application is 20°F (-7°C). Refer to Technical Letter *Spraying Procor 75 at Low Temperatures*, or contact your Grace Construction Products representative for details of cold weather spraying.

Detailing

Detailing should be completed prior to applying the full coverage of Procor membrane. The continuous field application should completely cover the detail areas to provide double thickness coverage. For a complete description and instructions on Procor details, consult the separate detail sheets.

Inside and Outside Corners

- Apply a 60 mil (1.5 mm) coating of Procor membrane starting in the corner and extending 6 in. (150 mm) from each side of the corner. For added protection over rough surfaces on inside corners install a 1 in. (25 mm) fillet of Procor 20 or Bituthene Liquid Membrane by hand to reinforce the corner.

Non-moving Joints and Hairline Cracks

- Apply a 60 mil (1.5 mm) coating of Procor membrane over non-moving joints or hairline cracks and extend the material 6 in. (150 mm) from each side of the opening.
- Non-moving joints are defined in ASTM C898, *Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Separate Wearing Course*, as cold joints, construction joints, isolation joints and control joints held together with steel reinforcing bars or wire fabric. These joints are generally considered by the designer of the structural system as non-moving or static joints. Hairline cracks are defined as cracks less than 60 mil (1.5 mm) in width.

Drains and Penetrations

- In drain applications, apply a 60 mil (1.5 mm) coating of Procor membrane over the drain flange and extend it 6 in. (150 mm) beyond the flange.
- Penetration openings must be sealed and stabilized prior to the application of Procor membrane.
- Once sealed and stabilized, install a 1 in. (25 mm) fillet of Procor 20 or Bituthene Liquid Membrane around the protrusion. Extend the Procor membrane 6 in. (150 mm) onto the structural substrate and at least 2 in. (50 mm) onto the penetration. For plastic pipes and other low adhesion substrates, a tie-in using Preprufe Tape will be needed.

Hand Application on Horizontal Surfaces

On horizontal applications, use the "pour and spread" method. Pour the mixed material directly from the container and spread using a steel trowel, flexible spreader, float or screed. A metal squeegee with thickness guides at the ends is acceptable and flexible bladed rubber squeegees may also be used. Care must be taken to ensure that any thin areas are brought to the recommended thickness. A notched squeegee is not recommended since it will leave thin spots in the waterproofing. Plan the application sequence so that there is no need to walk on the freshly applied material. The membrane can typically accept foot traffic after 24 to 48 hours. However, in temperatures above 70°F (20°C), the membrane can accept foot traffic in less than 24 hours.

In horizontal applications where a minimum slope of 0.13 in./ft (11 mm/m) cannot be achieved, apply 2 coats of Procor membrane to achieve total thickness.

Hand Application on Vertical Surfaces

On vertical applications, scoop the Procor directly from the pail or apply using the "pour and trowel" method. Pour the mixed material directly from the container onto the vertical surface and follow directly behind it with a 12–18 in. (300–450 mm) straight edge steel trowel. Spread the material uniformly across the surface with only one or two passes, starting at the bottom of the wall and pulling the material up the wall. Additional passes with the trowel over the material will cause the material to become "stringy" and difficult to trowel.

Spray Application

Procor 75 Membrane may be spray applied to horizontal and vertical surfaces. Contact Grace Construction Products for qualified spray equipment.

Thickness Control

Application thickness is controlled in both horizontal and vertical applications by marking the area and spot checking the thickness with a wet film thickness gauge. Swipe and trowel marks on the Procor membrane are acceptable as long as the minimum thickness is maintained.

Mixing and Pot Life (Hand Application)

If Procor waterproofing membranes are stored in cold temperatures, allow the material to stand for several hours at room temperature to facilitate mixing and application.

Open the Part A container and stir or mix for about 15 seconds. Add the entire contents of the Part B container to the Part A container and mix either mechanically or by hand. For mechanical mixing, use a slow speed (300–450 RPM), heavy duty drill with a spiral mixing paddle (such as Goldblatt® Paint/Mud Mixer by Stanley Tools) and mix for about 1 minute. For hand mixing, use a flat board or paddle and mix for about 2 to 3 minutes using a slow folding motion.

The mixed product should have a uniform color, free from any white streaks. Take care to scrape material from the side and bottom of the container to assure thorough mixing. Once mixed use immediately. Do not overmix as overmixing will result in premature thickening of the material in the container and decrease the pot life. Once properly mixed, the pot life is typically 30 to 60 minutes depending on ambient temperature. The pot life may be reduced to about 15 minutes in temperatures above 86°F (30°C).

CAUTION:

Always install the entire contents of the container as soon as possible. The reaction that occurs between Part A and Part B is exothermic (gives off heat) and mixed material left in the pail will reach temperatures higher than 212°F (100°C).

Do not cover the material after it is mixed.

Do not add water or any other material to thin the product.

For Procor 75, use qualified spray equipment systems. Mixing occurs within the spray gun assembly. Pre-mix Part A prior to pumping to bring any settled material back into solution.

Coverage Rates

Procor fluid applied waterproofing membranes are typically applied at a minimum thickness of 60 mil (1.5 mm). The theoretical coverage rate (not including waste) at a 60 mil (1.5 mm) thickness is about 25 ft²/gal (0.6 m²/L). Coverage rates will be reduced over rough and uneven substrates.

Drainage, Protection or Insulation

Protect Procor membranes to avoid damage from other trades, construction materials and backfill. Protection products may be installed on the same day as the Procor membrane. Bonding of the protection products to the Procor membrane is achieved if the protection products are installed when the Procor membrane is tacky, generally 1 to 2 hours after the Procor membrane is installed. To achieve non-bonded protection, wait until the Procor membrane surface is no longer tacky, or spread cement dust or lime to remove the tack prior to applying the protection. Take care not to displace the Procor membrane.

On horizontal applications, use Hydroduct 660 Drainage Composite. Alternate methods of protection are 1/8 in. (3 mm) or 1/4 in. (6 mm) asphalt hardboard. Extruded polystyrene insulation boards may also be used and are compatible with Procor membranes.

On vertical applications, use Hydroduct 220 Drainage Composite. Alternate methods of protection are 1/4 in. (6 mm) asphalt impregnated board or 1 in. (25 mm) extruded polystyrene. Such alternatives do not provide positive drainage to the system.

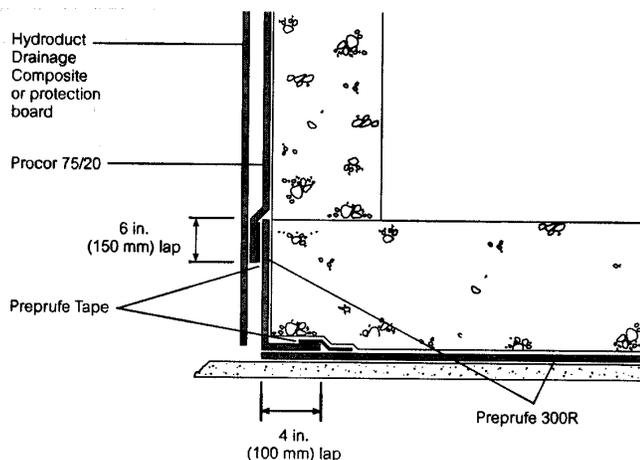
Backfill and Flood Tests

Allow Procor waterproofing membrane to cure at least 24 hours prior to backfill to avoid displacement of the membrane. Use care during the backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. Backfill should be added and compacted in 6 in. (150 mm) lifts to avoid stresses on the waterproofing system. Settlement stresses may compromise the integrity of the waterproofing system.

Flood test all horizontal applications with a maximum 2 in. (50 mm) head of water for at least 24 hours. Mark any leaks and repair when the membrane is dry. Before flood testing, be sure the structure will withstand the dead load of the water. For well-sloped decks, segment the flood test to avoid deep water near drains. Start flood test 48 hours after completing the application of Procor fluid applied waterproofing. Low voltage electronic leak detection techniques are also suitable.

Cleaning

Tools and equipment are most effectively cleaned by allowing the material to cure and simply peeling it off the next day. Procor Flushing Oil is available to clean spray equipment.



Typical Foundation Waterproofing

Supply

Product	Unit of Sale	Approx. Coverage at 60 mil (1.5 mm)	Weight	Palletization
Procor 75	75 gallon kit	1875 ft ² /kit	748 lbs/kit, net (573 lbs Part A + 175 lbs Part B)	1 or 2 kits/pallet, for orders of 1 or 2 kits only
Procor 10	5.3 gallon kit	132 ft ² /kit	53.4 lbs/kit, net (41.3 lbs Part A + 12.1 lbs Part B)	16 kits/pallet (16 pails Part A + 16 pails Part B = 32 pails total)
Procor 20	1.9 gallon kit	47 ft ² /kit	18.4 lbs/kit, net (14.0 lbs Part A + 4.4 lbs Part B)	40 kits/pallet (40 pails Part A + 40 pails Part B = 80 pails total)
Hydroduct 660	1 roll (4 ft x 50 ft roll)	200 ft ² /roll	54 lbs/roll	6 rolls/pallet
Hydroduct 220	1 roll (4 ft x 50 ft roll)	200 ft ² /roll	42 lbs/roll	6 rolls/pallet

Footnote:

1. Nominal coverage based on 25 sf/gal for smooth concrete. Coverage will vary with substrate condition.

Physical Properties

Property	Typical Value	Test Method
Resistance to hydrostatic head over ½ in. (3.2 mm) post formed crack	65 ft (20 m)	ASTM D5385
Water vapor permeance	0.08 perms (4.6 ng/Pa.s.m ²)	ASTM E96—method B
Peel adhesion to concrete	5 lbs/in. (880 N/m)	ASTM D903 modified ²
Elongation	500%	ASTM D412
Pliability, 180° bend over 1 in. (25 mm) mandrel at -23°F (-30°C)	Unaffected	ASTM D1970
Low temperature flexibility and crack bridging ½ in. (3.2 mm) crack cycling at -15°F (-26°C)	Pass	ASTM C836
Extensibility over ¼ in. (6.4 mm) crack after heat aging	Pass	ASTM C836
Solids content	100%	ASTM D1644

Footnote:

2. Procor waterproofing membrane is applied to concrete and allowed to cure. Peel adhesion of the membrane is measured at a rate of 2 in. (50 mm) per minute with a peel angle of 90° at room temperature.

Storage and Handling Information

Procor waterproofing membranes (Part A and Part B) should be stored under cover in original sealed containers above 40°F (4°C) and below 100°F (38°C). Keep Part B from freezing during storage. The shelf life is 9 months in unopened containers.

Limitations

Procor membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Maximum exposure period is 30 days.

Procor membranes should not be used in negative side waterproofing applications in hydrostatic condition.

Apply Procor membranes directly to structural surfaces. Do not apply Procor membranes over lightweight insulating concrete. Insulation, if used, must be installed over the membrane.

Procor membranes are not recommended for use as a tank or containment structure liner unless in split slab construction.

Procor is not compatible with petroleum solvents, fuels and oils, materials containing creosote, pentachlorophenol or linseed oil.

Do not use part mixes.

Specification Clauses

Below grade areas shall be waterproofed with Procor Fluid Applied Waterproofing.

All Procor materials shall be supplied or approved by Grace Construction Products. All detailing, application and protection shall be installed strictly in accordance with Grace instructions. Sample performance and formatted clauses are also available.

www.graceconstruction.com

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

Procor is a U.S. registered trademark of W. R. Grace & Co.—Conn., and is used in Canada under license from PROCOR LIMITED. Hydroduct, Bituthene and Preprufe are registered trademarks of W. R. Grace & Co.—Conn.

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

This product may be covered by patents or patents pending.
PRO-085G Printed in U.S.A. 4/07

Copyright 2007. W. R. Grace & Co.—Conn.
FA/LI/1M

GRACE

Appendix 7

Vapor Barrier Compatibility Letter
W.R. Grace & Co.

GRACE

Construction Products

Mark A. Franciosi
Technical Service Engineer - Americas

T 617-498-4303

mark.a.franciosi@grace.com

W. R. Grace & Co.-Conn.
62 Whittemore Avenue
Cambridge, MA 02140

November 8th, 2013

Mr. Joseph Horowitz, P.E.
76-06 137 Street
Flushing, NY 11367

Project: 89 Grand Street, Brooklyn, NY 11211; Block 2379, Lot 40, OER Project 12EH-N 299K

Mr. Horowitz,

I have reviewed the following documents for the above referenced project:

- Site Investigation Report prepared by Environmental Buildings Solutions, LLC., dated March 2013
- Soil Summary Tables pages 1-3
- Groundwater Summary Tables pages 1-13

The identified contaminants at the levels reported will not have an adverse effect on the waterproofing or vapor barrier properties of Preprufe[®] 300R, Preprufe[®] 160R, Florprufe[®] 120 and Procor[®] 20 systems along with all system accessories, provided standard design and application procedures are followed.

Standard installation instructions and details can be found on our website at www.graceconstruction.com.

If you have any questions, please feel free to call me at the number above.

Sincerely,



Mark Franciosi

Technical Services Engineer

cc: J. Ridgeway, K. Burke