

Identify

Evaluate

## REMEDIAL ACTION PLAN



**484 Greenwich Street  
New York, New York 10013  
Block 595, Lot 84  
OER Project Number 14EHAZ438M**

**Prepared by:**

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**Prepared for:**

**484 Greenwich Street Enterprises  
488 Greenwich Street  
New York, NY 10013**

**October 31, 2014**

Solve

Execute

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# LIST OF ACRONYMS

Acronym	Definition
AST	Aboveground Storage Tank
CAMP	Community Air Monitoring Plan
C&D	Construction & Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
CO	Certificate of Occupancy
CPC	City Planning Commission
DSNY	Department of Sanitation
“E”	E-Designation
EAS	Environmental Assessment Statement
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment
EC/IC	Engineering Control and Institutional Control
ELAP	Environmental Laboratory Accreditation Program
FDNY	New York City Fire Department
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IDW	Investigation Derived Waste
Notice - NNO	Notice of No Objection
Notice - NTP	Notice To Proceed
Notice - NOS	Notice Of Satisfaction
Notice - FNOS	Final Notice of Satisfaction
NYC BSA	New York City Board of Standards and Appeals
NYC DCP	New York City Department of City Planning
NYC DEP	New York City Department of Environmental Protection
NYC DOB	New York City Department of Buildings
NYC DOF	New York City Department of Finance
NYC HPD	New York City Housing Preservation and Development
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

<b>Acronym</b>	<b>Definition</b>
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DEC PBS	New York State Department of Environmental Conservation Petroleum Bulk Storage
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
OSHA	United States Occupational Health and Safety Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
PM	Particulate Matter
QEP	Qualified Environmental Professional
RA	Register Architect
RAP	Remedial Action Plan
RCA	Recycled Concrete Aggregate
RCR	Remedial Closure Report
RD	Restrictive Declaration
RI	Remedial Investigation
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOCs	Semi-Volatile Organic Compounds
USCS	Unified Soil Classification System
USGS	United States Geological Survey
UST	Underground Storage Tank
TAL	Target Analyte List
TCL	Target Compound List
TCO	Temporary Certificate of Occupancy
VB	Vapor Barrier
VOCs	Volatile Organic Compounds

# CERTIFICATION

ALC has prepared this RAP for the property located at 484 Greenwich Street, New York, NY 10013. This report has been prepared on behalf of and for the exclusive use of 484 Greenwich Street Enterprises, and is subject to and issued in connection with the Agreement and the provisions thereof.

I, Hazem M. Hijazi, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the Site at 484 Greenwich Street, OER Project Number 14EHAZ438M.

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

Hazem M. Hijazi  
Name

082819  
NYS PE License Number

  
Signature

10/8/14  
Date





## 1.0 EXECUTIVE SUMMARY

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On behalf of 484 Greenwich Street Enterprises (the Client), ALC Environmental (ALC) of Manhattan, New York prepared this Remedial Action Plan (RAP) to address potential vapor encroachment at the property located at 484 Greenwich Street in Manhattan, New York, NY 10013 (the Site). The Site consists of a vacant six story, commercial building with a caretaker's apartment.

The Site, *Block 595, Lots 84* as identified by the New York City Department of Finance, is currently zoned as a Commercial District (C6-2A). The Site is located on Greenwich Street between Spring Street and Canal Street. The nearest body of water to the Site is the Hudson River, approximately 0.12 mile west of the Site. The location of the Site is depicted on **Figure 1 - Site Topographic Map** and the project area is shown in greater detail on the Site Location Map which is provided as **Figure 2**.

A Phase I Environmental Site Assessment (ESA) was conducted by ALC in April 2014. The Phase I ESA identified a former gas station and a brownfield development on adjacent properties that could have potentially adverse impacts to the site. In June 2014, as part of a Soil Vapor Investigation, ALC collected air quality samples and sub-slab soil vapor samples. The Soil Vapor Investigation concluded that soil vapors were infiltrating into the structure onsite creating indoor air quality concerns.

Following discussions with the New York City Office of Environmental Remediation (OER), the following remedy is proposed and detailed in this RAP:

- Installation of an active sub-slab depressurization system comprised of one (1) suction pit with lateral piping, connected to a riser on the roof. The system should be installed closer along the walls towards Canal Street.
- Installation of a minimum 20-mil vapor barrier beneath the restored cellar slab at the suction pit location(s).
- Sealing all foundation cracks/voids, utility inlets, drains, etc. with an industry standard commercial grade 50-year rated caulking sealant as a standard construction practice.

The proposed remedial action achieves the remedial action goals established for the project. The proposed remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants and uses standard methods that are well established in the industry.

## **2.0 SITE BACKGROUND**

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The Site is located at 484 Greenwich Street, New York, New York 10013. The Site is identified on the New York City (NYC) Department of Finance Tax map as being comprised of Block 595, Lot 84. The subject lot is located on the western side of Greenwich Street, between Spring Street to the north and Canal Street to the south. See **Figure 1** for the Site Topographic Map and **Figure 2** for the Site Location Map. The Site consists of a six-story building with approximately 5,960 square feet of floor area with an attached garage and a basement.

### **2.1 Description of Surrounding Properties**

The land use of the adjacent properties is mixed residential and commercial. The general area surrounding the Site is considered to be urban due to the presence of predominately man-made ground cover and high-density development. The Site is bounded to the north by a 2½ mixed-use residential and art gallery building; to the east by Greenwich Street followed by a 6-story commercial building; to the south by a 9-story multi-family residential building; and to the west by an 8-story multi-family residential building.

### **2.2 Site and Regional Topographic Setting**

Based on a compilation of data from United States Geological Survey (USGS) Jersey City, NJ NY 7.5' Quadrangle topographic map (detail provided as **Figure 1**) the Site is approximately 10 feet above mean sea level. The Site has a relatively flat grade and maintains a level topography with properties in the immediate vicinity.

### **2.3 Site and Regional Geology**

The Site is located in the Borough of Manhattan of New York City. The subsurface geologic units within the vicinity consist of sequences of Middle Ordovician ages. The site is sitting on the Manhattan Formation, consisting of pelitic schists.

### **2.4 Site and Regional Hydrogeology**

Based on a compilation of data from the USGS maps, groundwater at the Site is expected at approximately 20-30 feet below grade. Groundwater was not encountered during the previous onsite investigation. The nearest body of water to the Site is the Hudson River, approximately 0.12 miles west of the subject property.

### **2.5 Proposed Redevelopment Plan**

The proposed renovation of 484 Greenwich Street will convert an existing commercial building into a mixed-use (commercial and residential) building. There is no proposed change of use in the cellar floor, as this will be accessory space to the small commercial space on the first floor. The rest of the building (upper floors) will become residential use. The redevelopment project proposes only minor alterations to the existing building, no change of use on the cellar floor, no alterations being proposed to the site plan, no



alterations being proposed to the existing foundation, and no work that would disturb the existing soil.

## 3.0 FINDINGS OF SOIL VAPOR INVESTIGATION

On June 16, 2014, ALC performed a soil vapor investigation at the Site to evaluate potential impacts associated with the adjacent properties. Methodologies used for soil vapor assessment conform to the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). The following samples were collected and submitted for laboratory analysis as part of the investigation:

- Two soil vapor samples;
- One indoor air sample; and
- One outdoor air sample.

All samples were collected using SUMMA canisters equipped with an 8-hour regulator and sent to York Analytical Laboratories, Inc. a NYS-ELAP certified laboratory (NYS License No. 10854). The samples were analyzed for volatile organic compounds (VOCs) following EPA Method TO-15.

### 3.1 Soil Vapor Sampling

Two soil vapor probe were installed below the basement slab. The soil vapor implants were set at a depth of two feet below the basement floor. The soil vapor sampling locations are shown in **Figure 3**.

### 3.2 Indoor Air Quality Sampling

One Indoor Air Quality (IAQ) sample was collected from the basement. **Figure 3** depicts the sample location.

### 3.3 Outdoor Air Quality Sampling

One outdoor air sample (OAQ04) was collected along the Site's perimeter. The outdoor sampling location is shown in **Figure 3**.

### 3.4 Findings of Soil Vapor Analysis

Below is a summary of the findings (**Table 1** contains a summary of all air analytical results):

Summary of Target Compound List detected in Soil Vapor:

Compound	Air Guideline Value (mcg/m <sup>3</sup> )	SV01	SV02	IAQ03	OAQ04
Methylene chloride	60	ND	ND	130	76
Tetrachloroethene	100	ND	ND	0.79	0.88
Trichloroethene	5	ND	ND	ND	ND

The New York State Department of Health (NYSDOH) has issued indoor air standards for certain chlorinated volatile organic compounds (CVOCs), including tetrachloroethene, trichloroethene, and methylene chloride. In addition, NYSDOH has issued two matrices for decision-making and has assigned a total of four CVOCs (tetrachloroethene, trichloroethene, carbon tetrachloride, and 1,1,1-trichloroethane) to these matrices. It should be noted that the NYSDOH did not establish screening levels or other standards for soil vapor concentrations in the 2006 guidance document.

- Methylene chloride was not detected in the sub-slab soil gas samples, however it was detected in the indoor and outdoor air samples at concentrations above the NYSDOH air guidance value. Although the indoor levels were well above the NYSDOH air guidance value, the concentrations detected in indoor air do not appear to be associated with a Vapor Encroachment Condition (VEC).
- Tetrachloroethene was not detected in the sub-slab soil gas samples, however it was detected in both the indoor and outdoor air samples at concentrations well below the NYSDOH air guidance value. These factors indicate the concentrations detected in indoor air are not associated with a VEC. In addition, based on the NYSDOH decision matrix, no further action is recommended for tetrachloroethene with subslab soil gas concentrations of less than 100 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) coupled with indoor air concentrations of less than 3  $\text{mcg}/\text{m}^3$ .
- Trichloroethene was not detected in the sub-slab soil gas samples or in the indoor and outdoor air samples.
- Carbon tetrachloride was not detected in the sub-slab soil gases or indoor air samples, however it was detected in the outdoor air sample. Based on the NYSDOH decision matrix, no further action is recommended for carbon tetrachloride with a sub-slab soil gas concentration of less than 5  $\text{mcg}/\text{m}^3$  coupled with indoor air concentrations of less than 0.25  $\text{mcg}/\text{m}^3$ .
- Other compounds were detected in both the indoor and outdoor air samples and the sub-slab soil gas samples, including toluene, n-hexane, benzene, acetone, and 2-butanone. The sub-slab soil gas samples were significantly higher than those detected in indoor air, and higher than the concentrations detected in the outdoor air, indicating that the concentrations detected in indoor air can potentially be attributed to vapor encroachment.
- Compounds such as p-ethyltoluene, p- & m-xylenes, o-xylene, ethylbenzene, and 1,2,4-trimethylbenzene were detected in the indoor air sample and in the sub-slab soil gas samples, but were not detected in the outdoor air sample. The sub-slab concentrations were higher than the indoor concentrations, indicating the concentrations detected in indoor air can potentially be attributed to vapor encroachment.

- Compounds such as isopropanol and dichlorodifluoromethane were detected in both the indoor and outdoor air samples, but were not detected in the sub-slab soil gas samples, indicating the concentrations detected in indoor air cannot be attributed to vapor encroachment.
- Compounds such as cyclohexane, 2-hexanone, and 1,3,5-trimethylbenzene were only detected in the indoor air sample, indicating the concentrations detected cannot be attributed to vapor encroachment.

## 4.0 DESCRIPTION OF REMEDIATION

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### 4.1 Objectives

Based on a review of the analytical results, it was concluded that the levels of VOCs in soil vapor and air exceed threshold standards. As such, remedial actions will be implemented in order to mitigate possible negative impacts and achieve the following objectives:

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

Remedial and mitigation measures described herein will be performed in accordance with applicable laws and regulations, and the site-specific CHASP. This remedy is protective of public health and the environment for the intended use.

### 4.2 Summary of Remedial Action

The following remedial measure will be implemented:

- Installation of an active sub-slab depressurization system comprised of one (1) suction pit with lateral piping, connected to a riser on the roof.
- Installation of a minimum 20-mil vapor barrier beneath the restored cellar slab at the suction pit location(s).
- Sealing all foundation cracks/voids, utility inlets, drains, etc. with an industry standard commercial grade 50-year rated caulking sealant as a standard construction practice.

A construction health and safety plan (CHASP) has been developed in association with the proposed remedial tasks.

### 4.3 Sub-Slab Depressurization System

The VOCs in sub-slab soil vapor should be mitigated by retrofitting the Site building with an active sub-slab depressurization system as described in the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006. The installation of the SSDS should be performed in accordance with the attached **Figure 4** and **Figure 5**.

The SSDS should be advanced by installing a one foot wide trench that traverses the length of the building cellar floor. The trench will be excavated to a depth of one foot below the existing basement concrete slab. The trench will contain a 4-inch diameter slotted PVC piping (0.02-inch slot) placed within pea gravel (1/4-inch in gravel size) to backfill the rest of the trench below the concrete floor slab. A 20-mil poly sheeting must then be installed above the pea gravel before concrete is poured in the area above the trench after the SSDS system has been installed to match the existing slab.

Solid PVC riser piping will be installed at the west end of the main trench and will extend up along the west wall of the cellar to the exterior of the Site. Outside the building, the

piping will connect to a 4" diameter riser pipe that will run to a roof exhaust. The riser pipe will be topped with a vent cap to prevent rain or pest from getting into the vent stack. An in-line vacuum fan or blower (Dayton ¾" HP radial blower or equivalent) will be connected to a port located in the riser pipe going to the roof to create an active system. Electrical power should be provided from the existing building electrical distribution system. All electrical connections should be made by a New York City licensed electrician. Installation of the SSDS including exact location of the trenching and riser piping should be observed and documented under the direction of a professional engineer (PE).

#### **4.4 Vapor Barrier**

A minimum 20-mil vapor barrier (Vaporblock Plus 20 by Raven Industries, or equivalent) shall be installed on top of the stone trench containing the vapor recovery piping of the SSDS before restoring the concrete cellar slab. Figure 5 details the barrier placement. The SSDS is intended to prevent sub-slab soil vapor from migrating into the building. The SSDS considered in this construction application should also include application of a complete interior basement floor sealant as described below.

#### **4.5 Sealant**

The basement floor should be sealed after the SSDS installation. Floor sealing includes the inspection and sealing of all foundation cracks/voids, utility inlets, drains, etc. with an industry standards commercial grade 50-year rated caulking sealant. Cut in the concrete slab to install the SSDS should also be sealed.

#### **4.6 Waste Disposal**

Soils excavated from trenching inside the basement along with any concrete broken in order to make way for the SSDS must be collected, segregated, and sent to an authorized disposal or recycling facility. Any excavated soil that may be temporarily stockpiled onsite must be covered with polyethylene sheeting while disposal options are determined. Additional testing may be required by the disposal/recycling facility. Solid waste debris shall be removed and disposed in accordance with all applicable local, state, and federal regulations. Detailed description for handling waste is provided in the Soil/Material Management Plan included as **Section 7**.



## **5.0 REMEDIAL ACTION MANAGEMENT**

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### **5.1 Project Organization and Oversight**

Principal personnel who will manage the remedial action include Mr. Peter Himmelstein who will represent 484 Greenwich Street Enterprises. A Professional Engineer will be hired to oversee the field work and ensure proper implementation of the RAP.

### **5.2 Site Security**

The property is a building with control access via locked entrance doors.

### **5.3 Work hours**

The hours for operation of remedial construction will be from 8AM to 5PM. These hours conform to the New York City Department of Buildings construction code requirements.

### **5.4 Construction Health and Safety Plan**

The site-specific Construction Health and Safety Plan (CHASP) is included as a separate attachment. The Site Safety Coordinator will be named and submitted to OER before the start of the work. Remedial work performed under this RAP 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 Satisfaction.

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. Site 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**

A community air monitoring plan is not required for this project, but onsite monitoring for VOCs during work will be performed with the use of a photoionization detector (PID). 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 exceeds 5 parts per million (ppm) above background for the 15-minute average, appropriate personal protection equipment such as respirators with appropriate filters shall be donned. 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.

## **5.6 Agency Approvals**

All permits or government approvals required for remediation and construction will be obtained prior to the start of remediation and construction. Acceptance of this RAP 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. 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 Mobilization Utility Marker Layouts, Easement Layouts**

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation 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. 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 RAP. 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 RAP.

## **5.8 Traffic Control**

Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. Due to the limited size of the project, it is not expected that many trucks will be required.

## **5.9 Reporting and Record Keeping**

### **5.9.1 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. 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.);
- 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 RAP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the RCR.

### **5.9.2 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 RCR in digital format (i.e. jpeg files).

## **5.10 Complaint Management**

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

## **5.11 Deviations from the Remedial Action Plan**

All changes to the RAP will be reported to the OER Project Manager and will be documented in the reports from the field to the Project Manager and reported in the RCR. The process to be followed if there are any deviations from the RAP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAP;
- 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 SCHEDULE AND REPORTING

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### 6.1 Schedule

The remedial action schedule will be dictated by the project's proposed redevelopment plans schedule. It is expected to take approximately one week to install the SSDS along with the vapor barrier and sealant. A Remedial Closure Report will be submitted to OER four weeks after completion of the remedial action.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAP	0	-
Mobilization	4	-
Remedial Construction	5	1
Demobilization	6	-
Submit Remedial Closure Report	10	

### 6.2 Remedial Closure Report

A Professional Engineer (PE) should prepare a certified Remedial Closure Report (RCR) at the completion of all remedial activities associated with the Site. The RCR will include as-built plans depicting SSDS lateral, blower, and riser pipe configuration and locations, as well as documentation proving that the active SSDS was appropriately designed to maintain negative pressure beneath the entire area of the building slab. The RCR will be submitted to OER for review and project sign-off, will document each remedial activity specified within this RAP and should generally include the following:

- Introduction;
- Background;
- Environmental setting section;
- Discussion of environmental conditions;
- Detailed description of each remedial action implemented;
- Summary of unanticipated findings;
- Justification of deviations from the approved RAP;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Photo documentation log (especially of the sub-slab depressurization system construction);
- Tables including total material reused and/or managed off-site;
- Figures illustrating remedial action locations, areas and limits; and
- Appendices including:
  - Daily field logs including documentation (photographs, instrumentation readings, descriptive narrative) of the properly executed CHASP and CAMP;

- Waste characterization sample results;
- Fully executed manifests and bills of lading; and
- Disposal/recycling receipts.

### **6.3 Remedial Closure Report Certification**

The following certification will appear in front of the Executive Summary of the Remedial Closure 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 certify that the OER-approved Remedial Action 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 SOIL/MATERIAL MANAGEMENT PLAN**

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### **7.1 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 Remedial Closure Report. Soil screening will be performed during invasive work such as excavation to install the SSDS suction pit and lateral.

### **7.2 Stockpile Methods**

Excavated soil suspected of being contaminated (based on visual, olfactory or PID screening) 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. 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.

### **7.3 Characterization of Excavated Materials**

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

### **7.4 Materials Excavation, Load-out and Departure**

The PE/QEP overseeing the remedial action will work with the property owners or their representatives to:

- 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 will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAP;
- 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.

## **7.5 Offsite 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.

Outbound truck transport routes should take 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.

## **7.6 Materials Disposal Off-site**

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Applicant to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Applicant. 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 RCR.

The RCR 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 RCR.

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

## **7.7 Materials Reuse On-Site**

No material will be reused onsite.

## **7.8 Demarcation**

This will not be required as part of this plan.

## **7.9 Import of Backfill from Off-site Sources**

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAP. The RCR will report the source of the material, chemical sampling results if any, and a Site map indicating the locations where backfill was placed.

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

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

## **7.10 Fluids Management**

All liquids to be removed from the Site, including dewatering fluids if any, 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.

## **7.11 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 RAP (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 anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

## **7.12 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 Full List volatiles and semi-volatiles, pesticides/PCBs, and TAL metals, as appropriate.

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

### **7.13.1 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 odorants in spray or misting systems.

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

### **7.13.2 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 PE/QEP's responsible for certifying the Remedial Closure Report.

### **7.13.3 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.

## 8.0 REFERENCES

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ALC Environmental, April 16, 2014, Phase I Environmental Site Assessment for 484 Greenwich Street, New York, NY 10013.

ALC Environmental, June 25, 2014, Soil Vapor Investigation for 484 Greenwich Street, New York, NY 10013.



## **APPENDIX A**

### **TABLES**

Table 1  
Air Sampling Analytical Summary  
484 Greenwich Street

Sample Name			SV01	SV02	IAQ03	OAQ04
Description	VOCs - Indoor ug/m3	VOCs - Outdoor ug/m3	Soil Vapor ug/m3	Soil Vapor ug/m3	ug/m3	ug/m3
Acetone	19	16	<b>320</b>	<b>800</b>	<b>26</b>	<b>19</b>
Benzene	16	8.9	<b>15</b>	<b>87</b>	1.1	0.62
1,3-Butadiene	-	-	ND (8.4)	150	ND (0.46)	ND (0.47)
Carbon disulfide		0.3	<b>170</b>	<b>600</b>	ND (0.33)	ND (0.33)
Chloroform	4.1	3.1	<b>120</b>	<b>77</b>	ND (0.51)	ND (0.52)
Chloromethane		1.5	ND (4.0)	<b>71</b>	ND (0.22)	ND (0.22)
Carbon tetrachloride	2.5	1	ND (3.0)	ND (4.4)	ND (0.17)	0.47
Cyclohexane	-	-	ND (6.7)	ND (9.6)	0.54	ND (0.37)
Dichlorodifluoromethane		2.2	ND (9.6)	ND (14)	1.6	1.6
Ethylbenzene	13	20	<b>13</b>	<b>24</b>	0.78	ND (0.47)
Ethyl acetate	-	-	ND (14)	ND (20)	ND (0.76)	5.5
4-Ethyltoluene	-	-	20	26	0.98	ND (0.53)
Heptane	5.2	6.6	<b>12</b>	ND (11)	ND (0.43)	ND (0.44)
Hexane	2	13	<b>23</b>	<b>48</b>	<b>29</b>	<b>18</b>
2-Hexanone	-	-	ND (16)	ND (23)	1.2	ND (0.88)
Isopropyl Alcohol	-	-	ND (9.5)	ND (14)	4.6	5.9
Methylene chloride		5.6	ND (13)	ND (19)	<b>130</b>	<b>76</b>
Methyl ethyl ketone	27	1.9	<b>49</b>	<b>110</b>	<b>2.5</b>	1.6
1,2,4-Trimethylbenzene	2.8	6.7	<b>26</b>	<b>32</b>	1.5	ND (0.53)
1,3,5-Trimethylbenzene	4.5	4	ND (9.5)	ND (14)	0.57	ND (0.53)
Tetrachloroethylene	21	5.8	ND (3.3)	ND (4.7)	0.79	0.88
Tetrahydrofuran	-	-	13	ND (8.3)	ND (0.31)	ND (0.32)
Toluene	0	32	<b>68</b>	<b>140</b>	<b>6.1</b>	<b>16</b>
m,p-Xylene			60	97	2.9	ND (0.93)
o-Xylene	12	33	<b>23</b>	<b>38</b>	1.1	ND (0.47)
Xylenes (total)	89	129	83	<b>135</b>	4	ND (1.40)
Total Detections			15	15	18	11
Total Outdoor Air Exceedence			9	10	3	<b>3</b>
Total Indoor Air Exceedence			9	12	4	<b>3</b>

NY EPA 1988: National Ambient Air (NYSDOH 10/2006)

**Bold Cells indicate an exceedence in the outdoor air quality value**

**Highlighted Cells indicate an exceedence in the indoor air quality value**

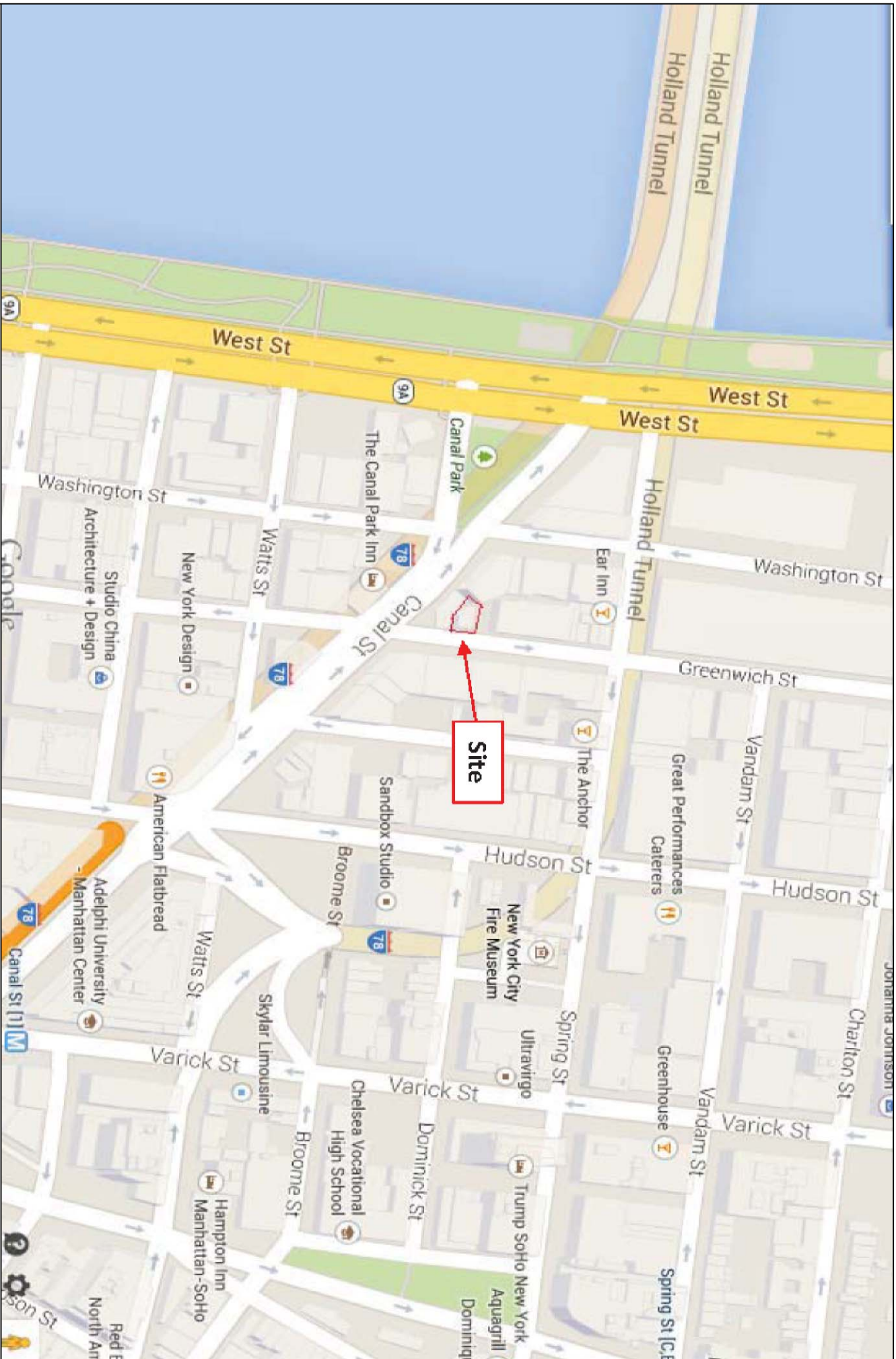
## **APPENDIX B**

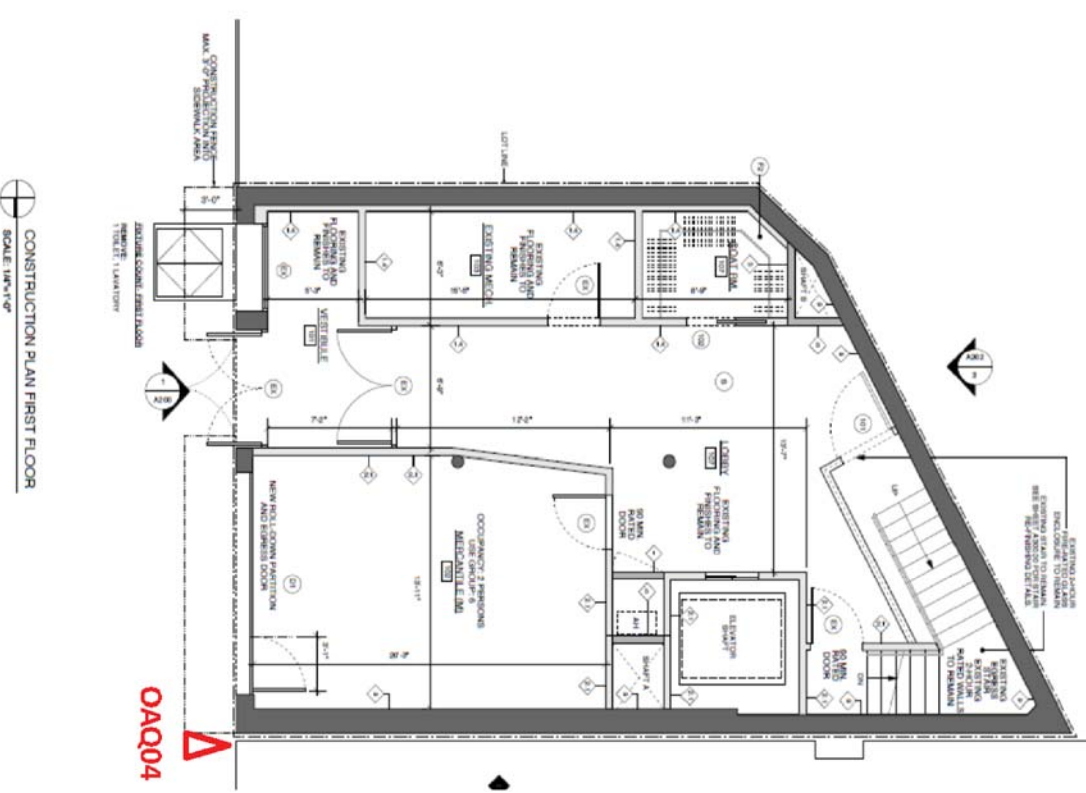
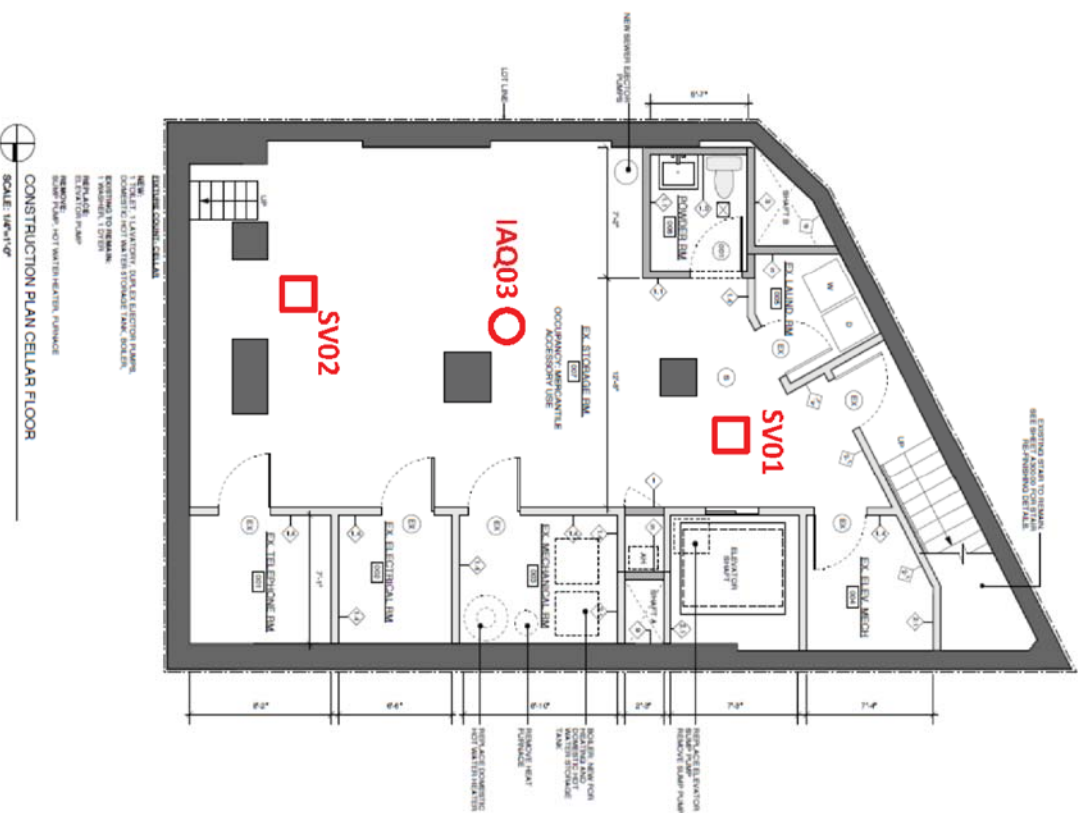
### **FIGURES**













## Legend



4" Diameter Manhole Cover



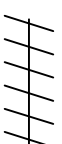
4" Diameter Exterior Piping  
With In Line Blower



Ball Valve



1/4" Stopcock Valve



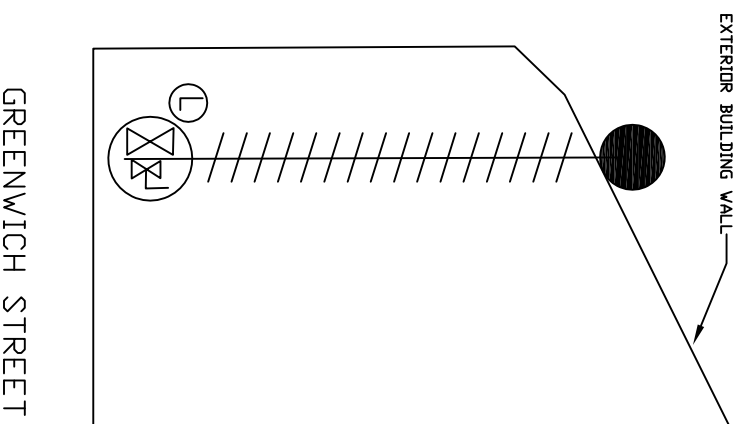
4" Sched 40 PVC Slotted  
Pipe (0.02 Inch Slot)

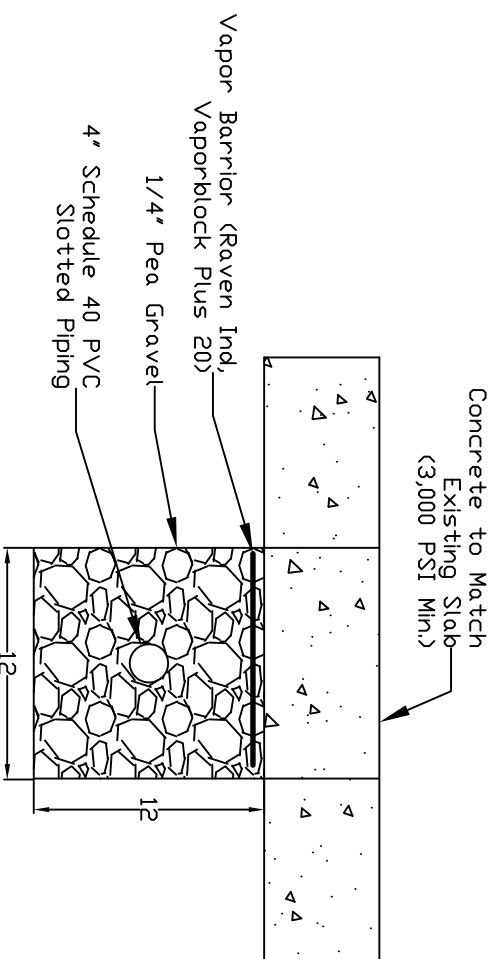


Dwyer Mark II Inclined Liquid  
Manometer

Notes:

1. In-line vacuum fan or blower (Dayton 3/4" HP Radial blower or equivalent) shall be connected to riser pipe.
2. Locations of all components of the system must be reviewed & approved by the field engineer of record.





Cross Section of SSDS Trench

**APPENDIX C**  
**SITE MANAGEMENT PLAN**

# **SITE MANAGEMENT PLAN**

Site Management is the last phase of the remedial process and begins after the approval of the Remedial Action Report (RAR) *and issuance of the Notice of Completion (NOC)* by OER. It is the responsibility of the property owner to ensure that all Site Management responsibilities are performed. *Failure to implement the SMP will result in revocation of the Notice of Completion and all associated certifications and liability protections.*

Engineering Controls and Institutional Controls have been incorporated into this Remedial Action to ensure that the site remains protective of public health and the environment. Generally, EC's provide physical protective measures and IC's provide restrictions on Site usage and establish remedial operation, maintenance, inspection and certification measures. This Site Management Plan has been established to govern long-term performance of EC's and IC's for this property.

The SMP provides a detailed description of procedures required to manage residual material at the Site following the completion of remedial construction *in accordance with the NYC Voluntary Cleanup Agreement with OER*. This includes: (1) operation and maintenance of Engineering Controls; (2) inspection of EC's and IC's; and (3) certification of performance of EC's and IC's.

## **ENGINEERING CONTROLS**

Engineering Controls were employed in the remedial action to address residual materials remaining at the site. The Site has 3 Engineering Control Systems. Engineering Controls for this property are:

- Installation of an active sub-slab depressurization system comprised of one (1) suction pit with lateral piping, connected to a riser on the roof. The system should be installed closer along the walls towards Canal Street.
- Installation of a minimum 20-mil vapor barrier beneath the restored cellar slab at the suction pit location(s).
- Sealing all foundation cracks/voids, utility inlets, drains, etc. with an industry standard commercial grade 50-year rated caulking sealant as a standard construction practice.

### **Operation and Maintenance of Vapor Barrier System**

The RAP describes the Vapor Barrier System utilized in this Remedial Action and provides design details and the system location. The Vapor Barrier System is a permanent Engineering Control for the Site. The system will be inspected and its performance certified at specified intervals defined in this SMP.

The Vapor Barrier System does not require any special operation or maintenance activities. If the system is breached during future construction activities, the system will be rebuilt by reconstructing the vapor barrier layers and adhering the newly constructed materials with

existing barrier materials in accordance with manufacturer specifications.

### **Operation and Maintenance of Active Sub-Slab Depressurization System**

The RAP describes the Active Sub-Slab Depressurization System utilized in this Remedial Action and provides design details and the system location. The Active SSDS is a permanent Engineering Control for the Site. The system will be inspected and its performance certified at specified intervals defined in this SMP.

The Active SSDS will be operated and maintained per the manufacturer's recommendation as prescribed below.

- The Model 40 manometer is provided with convenient shut-off tubing connections to prevent loss of fluid when transporting the gage. To use the gage, turn each barbed tubing connection counterclockwise 1-2 turns from the closed (fully clockwise) position. Rotate the zero adjustment for an exact zero reading and the gage is ready for use. In stationary installations, these steps need only be performed upon initial installation. In portable use, each time the gage is used the connections must be opened, the gage leveled and zeroed; prior to storage, the gage connections must be closed.
- The Dayton blower is a sealed maintenance free unit. No preventative maintenance is needed. If the blower ceases to operate, just replace in kind.

## **INSPECTIONS**

Engineering Controls and Institutional Controls will be inspected on a regular basis and certified periodically as described below. Inspections will include routine evaluation by custodial and maintenance staff to identify obvious signs of potential failure of system components (i.e., cracks or fissures in the foundation or building slab, erosion of cover soils, Active SSDS alarm warnings, etc.) and periodic inspections by trained personnel for the purpose of certification of the performance of EC's and IC's. The periodic inspections will evaluate the following:

- If Engineering Controls or Institutional Controls employed at the Site continue to perform as designed and continue to be protective of human health and the environment;
- If anything has occurred that impairs the ability of the Engineering Controls or Institutional Controls to protect public health and the environment;
- If changes are needed to the remedial systems or controls;
- If compliance with this SMP has been maintained;
- If site records are complete and up to date; and
- General Site conditions at the time of inspection.

In addition, if an emergency occurs, such as a natural disaster, or if an unforeseen failure of any of the Engineering Controls occurs, an inspection of the Site will be performed within 30 days to evaluate the Engineering Controls and a letter report of findings will be submitted to OER.

### **Inspection of Vapor Barrier System**

The vapor barrier will be buried below the concrete slab. Inspection should be done to the

concrete floor to ensure that no cracks have developed. If cracks are developed, seal as soon as possible with an industry standards commercial grade 50-year rated caulking sealant.

### **Inspection of Active Sub-Slab Depressurization System**

The SSDS should be inspected to ensure it is running. If the blower is not running, exchange with a like one.

### **Site Use Prohibitions**

Inspections to evaluate the status of site use prohibitions will include an evaluation of whether there is vegetable gardening or farming in residual soil/fill; whether groundwater underlying the site has been used without treatment rendering it safe for its intended use; whether activities that have disturbed site soil/fill have been conducted pursuant to the Soil/Material Management provisions of the SMP, or otherwise approved by OER; and whether the site has been used for a higher level of use other than the use addressed by the Remedial Action.

## **INSPECTION AND CERTIFICATION LETTER REPORT**

Results of inspections performed during a reporting period and certification of performance of all Engineering Controls and Institutional Controls will be included in an Inspection and Certification Letter Report to be submitted by July 30, 2015 (for the reporting period calendar years 2014-2015), July 30, 2016 (for the reporting period calendar years 2015-2016) and every 5 years thereafter (for the reporting period consisting of the 5 prior calendar years). Inspection and Certification Letter Reports will be submitted to OER in digital format.

Generally, certification frequency for remedial actions consist of:

- Engineered cover systems (slabs, pavement, etc.) including vapor barrier: routine inspections monthly to annually with Certification Letter Report every 5 to 10 years;
- Active SSDS: routine inspections weekly to monthly with detailed inspections bi-annually and Certification Letter Report after the first full year of operation and every 1 to 3 years thereafter;

The Certification Letter Report will include, at a minimum:

- Date of inspections;
- Personnel conducting inspections;
- Description of the inspection activities performed;
- Any observations, conclusions, or recommendations;
- Copy of any inspection forms;
- A determination as to whether groundwater plume conditions, if any, have changed since the last reporting event; and
- Certification of the performance of Engineering Controls and Institutional Controls, as discussed below.

The certification of the performance of EC's and IC's will establish:

- If Engineering Controls or Institutional Controls employed at the Site continue to be in place and perform as designed and continue to be protective of human health and the

environment;

- If anything has occurred that impairs the ability of Engineering Controls or Institutional Controls to protect public health and the environment;
- If changes are needed to the remedial systems or controls;
- If compliance with this Site Management Plan has been maintained;
- If vegetable gardening and farming in residual soils has been prevented;
- If groundwater underlying the Site is being utilized without treatment rendering it safe for the intended purpose has been prevented;
- If activities on the Site that have disturbed residual soil/fill material have been in accordance with the Soil/Materials Management Plan in this SMP;
- If the Site has been used for a higher level of use other than the use addressed by the Remedial Action;
- If site records are complete and up to date;
- If the Site continues to be registered as an E-Designated property by the NYC Department of Buildings; or
- If the Site continues to have an OER-approved Declaration of Covenants and Restrictions recorded with the property deed by the County Clerk.

OER may enter the Site upon notice for the purpose of evaluating the performance of EC's and IC's.

## **NOTIFICATIONS**

Notifications will be submitted by the property owner to OER as described below:

- 60-day advance notice of any proposed changes in Site use, such as an upgrade from existing use to another use that was not contemplated in the Remedial Action.
- Notice within 14 days of any emergency, such as a fire, flood, or earthquake that has the potential to reduce the effectiveness of Engineering Controls in place at the Site.

## **SOIL/MATERIALS MANAGEMENT PLAN**

Any future intrusive work that will disturb residual soil/fill beneath the property, including modifications or repairs to the existing composite cover system, will be performed in compliance with this Soil/Materials Management Plan (SMMP) included in the RAP. Intrusive work will also be conducted in accordance with the procedures defined in the Community Air Monitoring Plan (CAMP) included in the RAP and the Construction Health and Safety Plan (HASP) for the site. The HASP is the responsibility of the property owner and should be in compliance with NYSDEC DER-10 Technical Guide and 29 CFR 1910 and 1926, and all other applicable Federal, State and City regulations. Intrusive construction work should be compliant with the SMMP and described in the next Inspection and Certification Letter Report.

## **CONTINGENCY PLAN**

### **Emergency Telephone Numbers**

In the event of any emergency condition pertaining to these remedial systems, the Owner's representative(s) should contact the appropriate parties from the contact list below. Prompt contact should also be made to Tania Castro. These emergency contact lists must be maintained in an easily accessible location at the Site.

### **Emergency Contact Numbers**

Medical, Fire, and Police:	911
One Call Center: 3 day notice required for utility markout	(800) 272-4480
Poison Control Center:	(800) 222-1222
Pollution Toxic Chemical Oil Spills:	(800) 424-8802
NYSDEC Spills Hotline	(800) 457-7362

### **Contact Numbers**

Tania Castro, ALC Environmental	(212) 675-5544
Office of Environmental Remediation	(212) 788-8841; 311