# 555 GRAND STREET
# BROOKLYN, NEW YORK
# Block 2779 Lot 31

# SITE MANAGEMENT PLAN

**NYSDEC Site Number: C224185**

**Prepared for:**
555 Grand Units, LLC
183 Wilson Street, Suite 132
Brooklyn, NY 11211

**AMC Engineering PLLC**
18-36 42nd Street
Astoria, NY 11105

## Revisions to Final Approved Site Management Plan:

| Revision # | Submitted Date | Summary of Revision | DEC Approval Date |
|---|---|---|---|
| | | | - |
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**NOVEMBER 2019**

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## LIST OF ACRONYMS

| Acronym | Definition |
|---|---|
| AMC | AMC Engineering |
| AWQS | Ambient Water Quality Standards |
| BCA | Brownfield Cleanup Agreement |
| BCP | Brownfield Cleanup Program |
| BTEX | Benzene, Toluene, Ethylbenzene and Xylene |
| CQMP | Construction Quality Management Plan |
| DUSR | Data Usability Statement Report |
| EBC | Environmental Business Consultants |
| FER | Final Engineering Report |
| HDPE | High Density Polyethylene |
| IRM | Interim Remedial Measure |
| NYC | New York City |
| NYCDEP | New York City Department of Environmental Protection |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| PS | Public School |
| PVC | Polyvinyl Chloride |
| RAO | Remedial Action Objectives |
| RAWP | Remedial Action Work Plan |
| RI | Remedial Investigation |
| RSCOs | Recommended Site Cleanup Objectives |
| SCG | Standards, Criteria, and Guidelines |
| SMMP | Soil/Materials Management Plan |
| SSDS | Sub-slab Depressurization System |
| SWPPP | Stormwater Pollution Prevention Plan |
| SVOCs | Semi-Volatile Organic Compounds |
| USEPA | United States Environmental Protection Agency |
| UST | Underground Storage Tank |
| VOCs | Volatile Organic Compounds |

# CERTIFICATIONS

I, Ariel Czemerinski certify that I am currently a NYS registered professional engineer and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).


076508 — NYS Professional Engineer #

11/1/19 — Date

Signature

# ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: Site No: C224185

555 Grand Street, Brooklyn NY

| | |
|---|---|
| Institutional Controls: | 1. The property may be used for restricted residential use; |
| | 2. Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required; |
| | 3. All Engineering Controls must be operated and maintained as specified in this SMP; |
| | 4. All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP; |
| | 5. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP; |
| | 6. Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP; |
| | 7. On-Site environmental monitoring devices, including but not limited to, the SSDS system and monitoring ports, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP; |
| | 8. Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement; |
| | 9. Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose; |

Site Identification: Site No: C224185

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| | |
|---|---|
| | 10. Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; 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. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable. |
| | 11. All ECs must be inspected at a frequency and in a manner defined in the SMP. This statement is to be included here if there are ECs per the site's remedial program. |
| Engineering Controls: | 1. Sub Slab Depressurization System (SSDS)<br>2. Cover System |

| Inspections: | Frequency |
|---|---|
| 1. Sub Slab Depressurization System | Annually |
| 2. Cover System | Annually |
| Maintenance: | |
| Sub Slab Depressurization System:<br>1. Blower Maintenance | As needed |
| Reporting: | |
| 1. Periodic Review Report | Annually |

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

# 1.0 INTRODUCTION

## 1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the 555 Grand Street site at 555 Grand Street located in Brooklyn, New York (hereinafter referred to as the "Site"). The site location map can be found in **Figure 1**. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP) Site No. C224185, which is administered by New York State Department of Environmental Conservation (NYSDEC).

555 Grand Units, LLC entered into a Brownfield Cleanup Agreement (BCA) on April 16, 2014 with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in **Figure 2**. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement to be provided in **Attachment C**.

Institutional and Engineering Controls (ICs/ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement was submitted to the NYSDEC, and was recorded with the Kings County Clerk (under recording number CRFN-2016000342416), which requires compliance with this SMP and all ECs and ICs placed on the site. All references to the Environmental Easement herein, refer to document recording number CRFN-2016000342416.

This SMP was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);
- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the BCA (Site No. C224185) for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in **Attachment A** of this SMP.

This SMP was prepared by AMC Engineering, PLLC (AMC), on behalf of 555 Grand Units, LLC, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

## 1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shut-down of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

## 1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6NYCRR Part 375 and/or Environmental Conservation Law.
- 7-day advance notice of any field activity associated with the remedial program.
- 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA), and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

**Table 1**, below, includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in **Attachment A**.

**Table 1. Notifications***

| Name | Contact Information |
|---|---|
| NYSDEC Project Manager:<br>Sadique Ahmed, P.E. | (518) 402-9656<br>Sadique.ahmed@dec.ny.gov |
| NYSDEC Section Chief:<br>John Grathwol | (518) 402-9649;<br>John.grathwol@dec.ny.giv |
| Jane O'Connell<br>NYSDEC Region 2 | Jane.oconnell@dec.ny.gov<br>(718) 482-4599 |
| Kelly Lewandowski<br>Chief Site Control | Kelly.lewandoski@dec.ny.gov |
| Anthony Perretta<br>NYSDOH Project Manager | BEEI@health.ny.gov<br>(518) 402-7860 |

* Note: Notifications are subject to change and will be updated as necessary.

# 2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

## 2.1 Site Location and Description

The site is located in at 555 Grand Street, in the Williamsburg section of Brooklyn, Kings County, New York and is identified as Block 2779 and Lot 31 on the Brooklyn Tax Map (**Figure 1**). The site is an approximately 0.058-acre area (2,525 square feet), and is bounded by Powers Street to the north, Grand Street to the south, Lorimer Street to the east, and Union Avenue to the west (see **Figure 2** – Site Layout Map). **Figure 2** includes the site boundary including tax parcels. The boundaries of the site are more fully described in **Attachment C** –Environmental Easement. The owner(s) of the site parcel(s) at the time of issuance of this SMP is/are:

555 Grand Units, LLC
183 Wilson Street, Suite 133
Brooklyn, NY 11211

## 2.2 Physical Setting

### *2.2.1 LAND USE*

The Site consists of a six-story residential building. The building foot print occupies a 72 x 25 foot area and the rear yard is approximately 28 x 25 feet. The Site is zoned R7A (residential) with a C2-4 commercial overlay.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential properties. The properties immediately north of the Site include commercial-use properties; the properties immediately east and west of the Site include residential properties; and the properties to the south of the Site, across Grand Street include residential properties.

### *2.2.2 GEOLOGY*

The geologic setting of Long Island is well documented and consists of crystalline bedrock overlain by layers of unconsolidated deposits. According to geologic maps of the area created by the United States Geologic Survey (USGS), the bedrock in this area of Brooklyn / Queens is an igneous intrusive classified as the Ravenswood grano-diorite of middle Ordovician to middle Cambrian age. Unconsolidated sediments overlie the bedrock and consist of Pleistocene aged sand, gravel and silty clays, deposited by glacial-fluvial activity. Non-native fill materials consisting of dredge spoils, rubble and / or other materials have historically been used to raise and improve the drainage of low lying areas.

Subsurface soils at the Site consists of a mixture of a silty non-native fill, to a depth of approximately 2 feet below basement grade followed by sandy-silt to a depth of approximately 4 feet below basement grade.

A geologic cross section is included as Figure 9.

### *2.2.3 HYDROGEOLOGY*

The property has an elevation of approximately 28 feet above the National Geodetic Vertical Datum (NGVD). The depth to groundwater beneath the Site is approximately 22.5 feet below grade. Based on regional groundwater contour maps, groundwater flow is to the east. A groundwater contour map is shown in **Figure 3**.

## 2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

### *2.3.1 PHASE I REPORTS*

*June 2013 – Phase I Environmental Site Assessment Report by EBC*

A Phase I Environmental Site Assessment (ESA) was completed by Environmental Business Consultants (EBC), in June of 2013 for the site. EBC was able to establish a history for the property dating back to 1887. In 1887 the site was developed with the current three-story mixed use commercial residential building. According to historical city directories, the Site has been occupied by multiple commercial tenants such as, Slavin Building Co, Louis Lewitzky Dry Goods, Lewis Miracle Dollar Store, Rama Building Corp, Louis Bargain Department Store, Mayflower Bargain Store, Joel Bargain Store and Tru Val Cleaners. The Tru Val cleaners has been on-site since at least 1999 according the owners of the Site. In addition, the Site has been occupied by multiple commercial tenants since 1928. Historical sources and owner interviews indicate that Tru Val Cleaners was formerly located at 568 Grand Street from approximately 1960 to 2000. The presence of an on-site dry cleaner represents an REC due to the typical use of PCE associated with operations.

According to the regulatory database, the Site is listed as a RCRA SQG, US AIRS, E Designation, FINDS, NY Drycleaners and an EDR US Historic Cleaners sites. These listings are in association with the occupancy of the site as an on-site dry cleaner and according to the regulatory database, no violations were listed for the Site. The Site is equipped with an on site dry cleaning machine; Real Star 323 (RS 323); which is located on the east side of the 1st floor of site. EBC noted that the basement is below this area. Approximately four (4) 10-gallon containers of used tetrachloroethene ("perc", PCE, dry-cleaning fluid) were observed on the east side of the site adjacent to the RS 323. No secondary containment was noted under these containers.

Based upon reconnaissance of the subject and surrounding properties, interviews and review of historical records and regulatory agency databases, EBC noted the following recognized environmental conditions for the subject site.

- Occupancy of the first floor / cellar of the Site as an on-site drycleaner from at least 1999 and the use and storage of tetrachloroethene within the dry cleaning process.

### *2.3.2 REMEDIAL INVESTIGATION REPORTS*

*August 2013 [Revised March 2014] – Remedial Investigation Report by EBC*

The remedial investigation was performed from July 29, 2013 through August 20, 2013 in accordance with the Remedial Action Work Plan approved by the NYCOER as part of the E-designation review process. The goals of the Remedial Investigation were to define the nature and extent of contamination in soil, groundwater and any other impacted media; to identify the source(s) of the contamination; to assess the impact of the contamination on public health and/or the environment; and to provide information to support the development of a Remedial Work Plan to address the contamination.

Activities completed under the RI:

- Soil sampling and analysis for volatile and semi-volatile organic compounds (VOCs, SVOCs) in soil samples from soil boring locations;
- The installation of groundwater monitoring wells;
- The collection and analysis of groundwater samples for volatile and semi-volatile organic compounds;
- Sampling for non-petroleum contaminants such as pesticides, PCBs and metals in soil and groundwater including the analysis of soil and groundwater samples;
- The collection of analysis of subslab soil gas samples for VOCs.

The field work portion of the RI was conducted by Environmental Business Consultants (EBC) from July 29, 2013 through February 9, 2014, in accordance with the protocols and methods as established in the approved Remedial Investigation Work Plan).

The results of the RI identified elevated levels of both tetrachloroethene (PCE) and trichloroethene (TCE) in soil gas above mitigation levels established within the State DOH soil vapor guidance matrix. TCE concentrations in soil gas ranged from 84.8 µg/m3 to a high of 623 µg/m3. PCE concentrations ranged from 7,730 µg/m3 to 228,000 µg/m3. PCE and TCE were detected in all soil gas samples obtained as well as both the indoor and outdoor air samples.

Groundwater was encountered at a depth of approximately 22.5 feet below grade. Low levels of PCE (5.1 µg/l to 16 µg/l) were detected in the groundwater samples from MW1, MW2 and

MW3, at a concentration slightly above the GQS. No other VOCs, SVOCs, pesticides or PCBs were detected.

The RI noted the following results for soil contamination. SVOCs including benzo(a)anthracene (1,300 µg/kg), benzo(b)fluoranthene (1,300 µg/kg), and chrysene (1,300 µg/kg) were reported above unrestricted use soil cleanup objectives (SCOs) in shallow soil (2-4ft) at one boring location, B3.

One or more metals including arsenic (18 mg/kg to 29.3 mg/kg), copper (321 mg/kg to 790 mg/kg), lead (442 mg/kg to 452 mg/kg), and mercury (0.87 mg/kg to 2.72 mg/kg) were reported above restricted residential SCOs in shallow soil in all three boring locations. Zinc (173 mg/kg to 222 mg/kg) and cadmium (3.13 mg/kg) were reported above unrestricted SCOs at one boring location, B3. Elevated levels of SVOCs and metals reported in shallow soil throughout the site are characteristic of the historic fill materials present at the site and throughout the area.

### *2.3.3 REMEDIAL ACTION*

*March 2014 – Remedial Action Work Plan by AMC*

In response to the findings during the RI, a Remedial Action Work Plan (RAWP) was prepared by AMC in March 2014. The proposed remedy is a Track 4 alternative, which calls for the excavation between 5 to 9 feet below grade for underground structures, installation of a Soil Vapor Extraction (SVE) system beneath the existing basement foundation, eventual conversion of the SVE system into an active sub-slab depressurization system (SSDS); installation of an epoxy/polymer sealant across the entire basement slab, and the installation of a composite cover system across the entire site.

Addendums to the June 2015 RAWP, consisting of the SVE design work plan, were submitted to the NYSDEC for approval. This document was approved by NYSDEC on October 3, 2018.

Please refer to the Final Engineering Report (FER) for the detailed explanation of endpoint sampling and the findings.

## 2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in Decision Document dated April 23, 2014 are as follows:

### *2.4.1 SOIL*

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

### *2.4.2 SOIL VAPOR*

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

### *2.4.3 GROUNDWATER*

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles from contaminated groundwater

RAOs for Environmental Protection

- Restore groundwater aquifer to pre-disposal/ pre-release conditions, to the extent practicable

## 2.5 Remaining Contamination

### *2.5.1 SOIL*

The initial excavation plan noted in the approved RAWP was as follows:

The basement level and foundation will require minimal excavation; due to the use of the original structure. Excavation and soil disturbance will occur for the northeast side for installation of a section of foundation wall concrete slab to level with existing cellar concrete slab and excavation of elevator pit. The proposed work on the northeast side will slightly widen the cellar. The elevator pit will be excavated to a depth of 5 feet.

The excavation plan was changed to the following:
86% of the Site (building foot print and ½ of rear yard) was excavated to a depth of 11 feet bsg.

**Table 2** and **Figure 4** summarize the remaining soil parameters above Unrestricted Use and Protection of Groundwater SCOs following excavation.

*2.5.2 SOIL VAPOR*

Soil vapor sampling performed during the Remedial Investigation noted total petroleum related volatile organic compounds (BTEX) were at generally low concentrations. Elevated levels of the chlorinated VOCs trichloroethylene (TCE) and tetrachloroethylene (PCE) were also detected within sub-slab soil gas, indoor air and outdoor air samples collected at the Site. TCE concentrations in soil gas ranged from 84.8 µg/m3 to 623 µg/m3. TCE concentrations in indoor air and outdoor air were 13.7 6 µg/m3 and 3.92 µg/m3, respectively. PCE concentrations in soil gas ranged from 7,730 µg/m3 to 228,000 µg/m3. PCE concentrations were 6,230 µg/m3 in indoor air and 3,930 µg/m3 in the outdoor air control sample. It should be noted that 86% of the Site was excavated to a depth of 11 feet and the source area has been removed.

*2.5.3 GROUNDWATER*

PCE concentrations were detected in the groundwater sample from the monitoring wells MW1, MW2 and MW3 collected on February 4, 2014 and February 9, 2014, at concentrations slightly above the GQS. No other VOCs were detected in the groundwater sample.

# 3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

## 3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in **Attachment B**) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

## 3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to Restricted Residential use only. Adherence to these ICs on the site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on **Figure 5**. These ICs are:

- The property may be used for : restricted-residential use;
- All ECs must be operated and maintained as specified in this SMP;
- All ECs must be inspected at a frequency and in a manner defined in this SMP.
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on **Figure 5**, and any potential impacts that are identified must be monitored or mitigated; and
- Vegetable gardens and farming on the site are prohibited;

## 3.3 Engineering Controls

### *3.3.1 SOIL VAPOR EXTRACTION SYSTEM (SVE)*

Soil gas testing performed under the RI, identified elevated concentrations of CVOCs in soil gas beneath the entire slab, however, the highest concentrations were located in the front (south) of the building. The high concentrations reported in this area of the property indicate the presence of a contaminant source in this area. The elevated CVOCs in soil gas was likely related to isolated and shallow areas of CVOC contaminated soil.

The approved RAWP and approved SVE Design Document note installation of a Soil Vapor Extraction (SVE) system beneath the existing foundation. Based on soil type observed at the site and typical SVE system design parameters, the following preliminary design was proposed:

- Three horizontal extraction line system;
- Extraction lines constructed of 20 feet of 4-inch diameter 10 slot (0.010-inch) PVC well screen;
- No. 1 morie (or equivalent) filter sand as backfill around horizontal extraction well;
- Each extraction line will be tied to the system through a 3-inch diameter PVC main line.
- Each extraction line will be isolated from the main line with a 3-inch ball valve;
- 2 hp (150 cfm) regenerative blower with particulate filter;
- Discharge treatment with vapor-phase granular activated carbon (TIGG Econsorb or equivalent GAC Vapor Phase Carbon Canisters); and,
- Installation of a 20 mil vapor barrier beneath the concrete slab.

It should be noted that due to the change in excavation plans for the Site, the SVE system was not installed and a Sub Slab Depressurization System was installed instead. This system is further discussed below.

### *3.3.2 SUB SLAB DEPRESSURIZATION SYSTEM (SSDS)*

Since contaminated soil vapors are assumed to remain beneath the Site following the Remedial Action, ICs and ECs are required to protect human health and the environment. These ECs and ICs are described in the following sections. Short-term management of these EC/ICs will be performed under the Site Management Plan (SMP) approved by the NYSDEC.

An active sub-slab depressurization (SSD) system and vapor barrier were designed and installed beneath the occupied portions of the new building.

The SSD system beneath the building slab consists of a six venting zones. These zones provide coverage of approximately 1,800 sf of slab area. This is consistent with USEPA SSD design specifications, which recommend a separate vent loop for every 4,000 sf of slab area.

The horizontal vent lines are constructed with a central line of solid 4-inch PVC pipe, which runs north to south on Site, three horizontal vent line legs of 4 inch PVC 10-slot well screen on the east side of the Site and three horizontal vent line legs of 4 inch PVC 10-slot well screen on the west side of the Site. Ball valves and 4x4 tees or four way connections join the horizontal vent line legs to the solid central line. A manhole cover was placed over the ball valve connection points and the ball valves were used to balance the system. The SSDS lines were installed in a 6 inch layer of filter sand, topped with a 1' of ¾ inch RCA and below the vapor barrier. The 4 inch PVC lines connect to a 2-inch schedule 40 PVC pipe which connects to a 1.5 hp Regenerative Blower manufactured by Rotron. A 2-inch schedule 40 PVC pipe connects the 1.5 hp Regenerative Blower to the SSDS discharge line which consists of a solid 2 inch PVC riser pipe that extends to the roof. It should be noted that the decision document states that extracted air treatment air is required. Based on the change of excavation and removal of source; extracted air treatment was not installed for the system. A sample of exhaust was collected as per the DEC request on September 5, 2019. One 8-hr TO15 sample was collated and analyzed. Total VOCs were noted at 172.67 µg/m3, PCE was noted at 13.7 µg/m3, TCE was noted at 0.75 µg/m3, carbon tetrachloride was noted at 0.46 µg/m3 and 1,1,1,-trichloroethane was non detect. A second exhaust sample will be collected the week of October 7$^{th}$ 2019. The system is hardwired to an electric source. The exhaust from the blower is located a minimum of 10 feet from windows and ventilation inlets. The SSD system utilizes a manometer (Dwyer, 0-60 inches of water manometer) and an alarm (Radonaway alarm) installed on the cellar floor of the building to ensure proper operation of the blower.

A 20-mil vapor barrier was installed over the SSD system prior to pouring the building's concrete slab. The vapor barrier consists of Raven Industries' VaporBlock Plus 20, which is a seven-layer co-extruded 20 mil vapor barrier made from polyethylene and EVOH resins. The

vapor barrier extends over the entire slab at the Site. Vapor barrier seams, penetrations, and repairs were sealed either by the tape method, according to the manufacturer's recommendations and instructions.

Procedures for operating and maintaining the SSDS system are documented in the Operation and Maintenance Plan (Section 5.0 of this SMP). As built drawings, signed and sealed by a professional engineer, are included in **Attachment F** – Operations and Maintenance Manual. **Figure 6** shows the layout of the SSDS system installed at the Site.

### *3.3.3 COVER SYSTEM*

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of a 12 inch layer of ¾ inch RCA gravel, 20 mil vapor barrier and a 6-inch concrete slab within the footprint of the building and 1.5 feet of gravel capped with pavers in the rear yard. Figure 10 presents the location of the cover system and applicable demarcation layers. The Excavation Work Plan (EWP) provided in Appendix B outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the site and provided in Appendix D and Appendix H.

### *3.3.4 CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS*

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

#### *3.3.4.1 SUB SLAB DEPRESSURIZATION SYSTEM (SSDS)*

The active SSD system will not be discontinued unless prior written approval is granted by the NYSDEC and the NYSDOH. In the event that monitoring data indicates that the SSD system may no longer be required, a proposal to discontinue the SSD system will be submitted by the remedial party to the NYSDEC and NYSDOH.

#### *3.3.4.2 COVER OR CAP*

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

# 4.0 MONITORING PLAN AND SAMPLING PLAN

## 4.1 General

This Monitoring Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring Plan may only be revised with the approval of the NYSDEC. Details regarding inspection and evaluation of the ECs are provided in the following sections.

This Monitoring and Sampling Plan describes the methods to be used for:

- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

## 4.2 Site – Wide Inspection

Site-wide inspections will be performed at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in **Attachment E** – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date; and

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential

to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

## 4.3 SSD Monitoring

### *4.3.1 SSD SYSTEM MONITORING*

Monitoring of the SSD system will be performed on an annual basis as identified in **Table 3** – SSDS Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSD system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SSD system components to be monitored include, but are not limited to, the components included in **Table 3** below.

**Table 3 – SSD Monitoring Requirements and Schedule**

| SSD System Component | Monitoring Parameter | Operating Range | Monitoring Schedule |
|---|---|---|---|
| Regenerative Blower | On or Off | - | Annual |
| Magnehelic Meter | Vacuum at Riser | >0.10”W.C. | Annual |
| Alarm | On or Off | - | Annual |

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment E**- Site Management Forms. If any equipment readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan (**Attachment F**), is required immediately.

### *4.3.2 Post Remediation Air Monitoring and Sampling*

Two ambient indoor air samples shall be collected from the cellar area; 2 weeks after the shutdown of the SSDS system. Sampling locations, required analytical parameters and schedule are provided in Table 4 – Post Remedial System Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

**Table 4 – Post Remediation Sampling Requirements and Schedule**

| **Sampling Location** | **Analytical Parameters** | **Schedule** |
|---|---|---|
| | VOC (EPA Method TO-15) | |
| Two Indoor Air Samples | X | 2 weeks after shut down of SSDS |

Detailed sample collection and analytical procedures and protocols are provided in Appendix J – Field Activities Plan and Appendix K – Quality Assurance Project Plan.

### *4.3.3 Indoor Air Sampling*

Indoor ambient air quality samples are required to be collected 2 weeks after the shutdown of the SSDS. Modification to the frequency or sampling requirements will require approval from the NYSDEC. Six liter summa canisters will be installed onsite during this sampling event to collect ambient air for 8 hours.

The summa canister will be placed at a height of 3-4 feet above the floor to be within the breathing zone. The ambient air samples will be collected in 6-Liter summa canisters fitted with 8 hour laboratory calibrated regulators. The sample identification, date, start time, start vacuum, end time and end vacuum must be recorded on the tags attached to each canister and on the chain

of custody. All samples will be submitted to Phoenix Environmental Laboratories (Phoenix) of 587 East Middle Turnpike, Manchester, CT 06040, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301). Transport to the laboratory will be through a Phoenix courier under strict chain-of custody documentation. The samples are undergo laboratory analysis of VOCs by EPA Method TO-15.

This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC. Deliverables for the soil vapor sampling program are specified in Section 7.0 – Reporting Requirements.

#### *4.3.4 Monitoring and Sampling Protocol*

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix E - Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Activities Plan provided as Appendix J of this document.

# 5.0 OPERATION AND MAINTENANCE PLAN

## 5.1 General

The Operation and Maintenance Plan (**Attachment F**) provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the SSD system;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SSD system are operated and maintained.

Further details regarding the Operation and Maintenance of the SSD system is provided in **Attachment F-** Operation and Maintenance Manual. A copy of this Operation and Maintenance Manual, along with the complete SMP, is maintained at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

## 5.2 Remedial System (or other Engineering Control) Performance Criteria

The SSD system has been designed with an air blower capable of producing enough negative pressure in the sub-slab as to be able to remove any potential off-gases. A minimum of 0.02" WC will be sought in the most remote sub-slab area. The vacuum achieved at the riser will be 0.10" WC or higher. The 1.5 HP regenerative blower, located on the 1$^{st}$ floor rear yard and is electrically fed with a dedicated circuit. The exhaust point is located on the roof and is installed a minimum distance of 10 ft from any vent or operable windows. A visual and audible alarm, which signals when vacuum is lost at the riser, is powered independently from the blower, such that if the blower causes the breaker to trip, the alarm will still provide an alarm status. The blower is designed for continuous duty, and will be used continuously.

## 5.3 Operation and Maintenance of the Sub Slab Depressurization (SSD) System

Cut-sheets and as-built drawings for the SSD system are provided in **Attachment F**- Operations and Maintenance Manual. The SSD system is not adjustable and the regenerative blower shall not be serviced or repaired at the Site. If the blower fails, the unit will need to be removed and shipped out for repairs, or replaced with another 1.5-hp regenerative blower.

### *5.3.1 SYSTEM START-UP AND TESTING*

The SSD system consists of a perforated sub-slab pipe, a gas permeable aggregate in the form of ¾" RCA, a stub out, a riser, a 1.5 HP regenerative blower and control.

Once the SSD system is fully installed, vacuum is measured at the riser via the Magnehelic meter. Vacuum at the foot of the riser shall be greater than 0.10"WC.

Monitoring ports points are identified which are remote from each other and from the SSD perforated pipe. Care should be exerted before penetrating the slab and membrane to not perforate any utility pipes.

Having identified the monitoring points locations, a ½" hole is drilled through the concrete slab and vapor barrier into the gravel. With the help of a portable vacuum meter vacuum is measured in the sub-slab. Vacuum reading should be at least 0.02"WC. If vacuum is less or non-existent, then corrective measures must be taken.

After sub-slab testing is conducted during the start-up, the drilled holes are filled up with nonshrink grout or any other sealant, making sure it creates a seal at the vapor barrier depth.

The system testing described above will be conducted if, in the course of the SSD system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

Please see the manufacturer's instructions regarding additional information regarding system start-up, maintenance, and testing, provided in **Appendix D – Operations and Maintenance Manual**.

### *5.3.2 ROUTINE SYSTEM OPERATION AND MAINTENANCE*

The system as designed is virtually maintenance free. If any of the components fail (blower, meter, alarm, they must be replaced with in kind. Please see the manufacturer's instructions regarding routine system operation and maintenance, provided in **Appendix D – Operations and Maintenance Manual**.

### *5.3.3 NON-ROUTINE OPERATION AND MAINTENANCE*

The system as designed has no non-routine operation and maintenance requirements. It is important to label the riser on every floor, even if it is concealed behind chases or walls, to prevent unwanted future taps. Please see the manufacturer's instructions regarding non-routine operation and maintenance, provided in **Appendix D – Operations and Maintenance Manual**.

### *5.3.4 SYSTEM MONITORING DEVICES AND ALARMS*

The SSD system has an alarm, which will provide an audible alarm sound when the fan is not working properly to maintain a minimum vacuum reading. The SSD system has warning devices to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSD system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.

# 6.0 PERIODIC ASSESSMENTS/EVALUATIONS

## 6.1 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focuses on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames.

## 6.2 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

The Site is located in the northern portion of Brooklyn, NY. It is located at an elevation of 28 feet above the National Geodetic Vertical Datum (NGVD), or approximately 31 feet above sea level. According to the FEMA Flood Map, this site is not located within a flood hazard area. The Site is served by the NYC Municipal sewer system and the completed building will meet all NYC building codes for drainage. Therefore, the Site is considered to be vulnerable to storm events related to climate change.

## 6.3 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the site during site management, and as reported in the Periodic Review Report (PRR).

### *6.3.1 TIMING OF GREEN REMEDIATION EVALUATIONS*

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the Project Manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

### *6.3.2 FREQUENCY OF SYSTEM CHECKS, SAMPLING AND OTHER PERIODIC ACTIVITIES*

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct system checks and or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

As part of this effort, consideration shall be given to:

- Reduced site visits and system checks;
- Coordination/consolidation of activities to maximize foreman/labor time; and
- Use of mass transit for site visits, where available.

### *6.3.3 METRICS AND REPORTING*

As discussed in Section 7.0 and as shown in **Attachment E** – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent

implementation of green remediation during site management and to identify corresponding benefits; a set of metrics has been developed.

# 7.0 REPORTING REQUIREMENTS

## *7.1 Site Management Reports*

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in **Attachment E**. These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of **Table 4** and summarized in the Periodic Review Report.

**Table 5 – Schedule of Interim Monitoring/Inspection Reports**

| Task/Report | Reporting Frequency* |
|---|---|
| Periodic Review Report | Initially 18 Months after the COC and then Annually, or as otherwise determined by the Department |
| Inspection Report | Annually |

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);

- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air, etc);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html

## 7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning eighteen (18) months after the Certificate of Completion (COC) is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the Department or at another frequency as may be required by the Department. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in **Attachment C** – Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.

- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific RAWP, ROD or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan; and
  - Trends in contaminant levels in the affected media will be evaluated to determine if the remedy continues to be effective in achieving remedial goals as specified by the Decision Document.
  - The overall performance and effectiveness of the remedy.

### *7.2.1 CERTIFICATION OF INSTITUTIONAL AND ENGINEERING CONTROLS*

Following the last inspection of the reporting period, a qualified environmental professional or Professional Engineer licensed to practice in New York State will prepare, and include in the

Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*
- *No new information has come to my attention, including groundwater monitoring data from wells located at the site, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*
- *The assumptions made in the qualitative exposure assessment remain valid.*

*I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative]* (and if the site consists of multiple properties): *[I have been authorized and designated by all site owners/remedial parties to sign this certification] for the site."*

If the remedy requires only an institutional control, include the following:
At the end of each certifying period, as determined by the NYSDEC, the following certification will be provided to the Department:

*"For each institutional identified for the site, I certify that all of the following statements are true:*

- *The institutional control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement.*
- *The information presented in this report is accurate and complete.*

*I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to*

*Section 210.45 of the Penal Law. I, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] (and if the site consists of multiple properties): [and I have been authorized and designated by all site owners to sign this certification] for the site."*

For BCP projects which the Department has determined do not represent a significant threat to public health or the environment, but where contaminants in groundwater exceed drinking water standards, the following should also be included for both IC/EC and IC scenarios listed above:

- *No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*

For BCP projects, every five years the following certification will be added:

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

### 7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a Corrective Measures Work Plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC.

## 7.4 Remedial Site Optimization Report

In the event that an RSO is to be performed (see Section 6.3) upon completion of an RSO, an RSO report must be submitted to the Department for approval. A general outline for the RSO report is provided in **Attachment G**. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located, Site Control and the NYSDOH Bureau of Environmental Exposure Investigation.

# 8.0 REFERENCES

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

AMC Engineering, PLLC, *Remedial Action Work Plan, 555 Grand Street Site, 555Grand Street, Brooklyn NY, March 2014*

AMC Engineering, PLLC, *Soil Vapor Extraction Remedial Design Work Plan, 555 Grand Street Site, 555 Grand Street, Brooklyn NY, September 2018*

Environmental Business Consultants, *Phase I Environmental Site Assessment*, *June 24 2013*

Environmental Business Consultants, *Remedial Investigation Report 555 Grand Street Site, 555 Grand Street, Brooklyn NY, August 2013*

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, Division of Water, June 1998, Addendum April 2000, *Technical and Administrative Guidance Series (TOGS) 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*

NYSDOH, Center for Environmental Health, October 2006, *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York*

# ***TABLES***

Table 2
555 Grand Street
Brooklyn, New York
Soil Exceedance Summary

| COMPOUND | Range in Exceedances | Frequency of Detection | SW1 | SW2 | SW3 | SW5 | SW6 |
|---|---|---|---|---|---|---|---|
| | | | ( 11' ) | ( 11' ) | ( 11' ) | ( 11' ) | ( 11' ) |
| | | | 8/7/2018 | 8/7/2018 | 8/17/2018 | 8/7/2018 | 8/17/2018 |
| | | | Result | Result | Result | Result | Result |
| *Sample Results in ug/kg* | | | | | | | |
| 4,4' -DDE | 3.70 | 1 | - | **3.7** | - | - | - |
| 4,4' -DDT | 4.5 - 5.7 | 3 | - | **5.7** | **4.6** | **4.5** | - |
| *Sample Results in mg/kg* | | | | | | | |
| Chromium | 31.7 - 48.1 | 2 | **48.1** | - | - | - | **31.7** |
| Lead | 130.00 | 1 | - | - | **130** | - | - |

**Notes:**

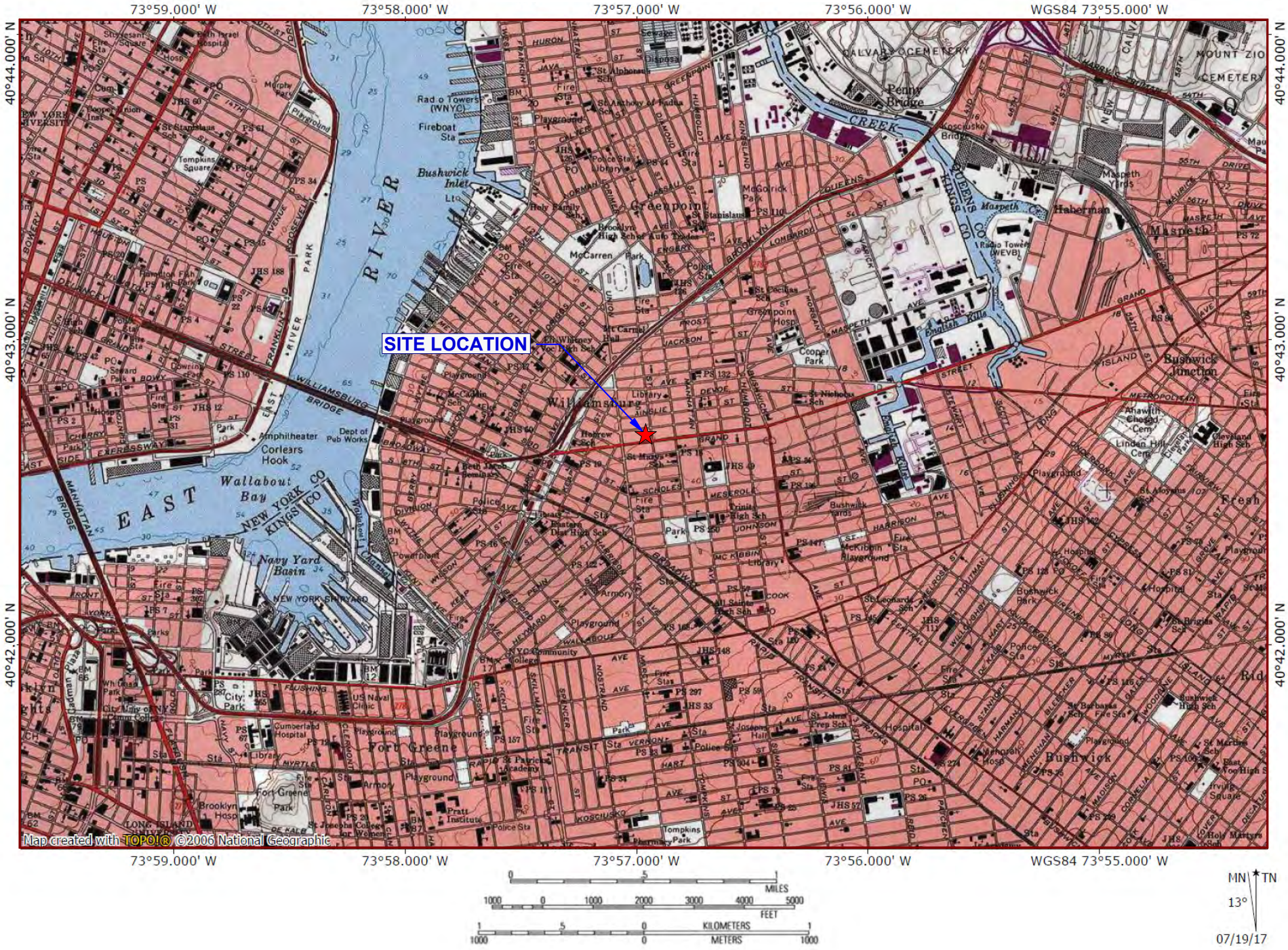
* - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

RL - Reporting Limit

**Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value**

**Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value**

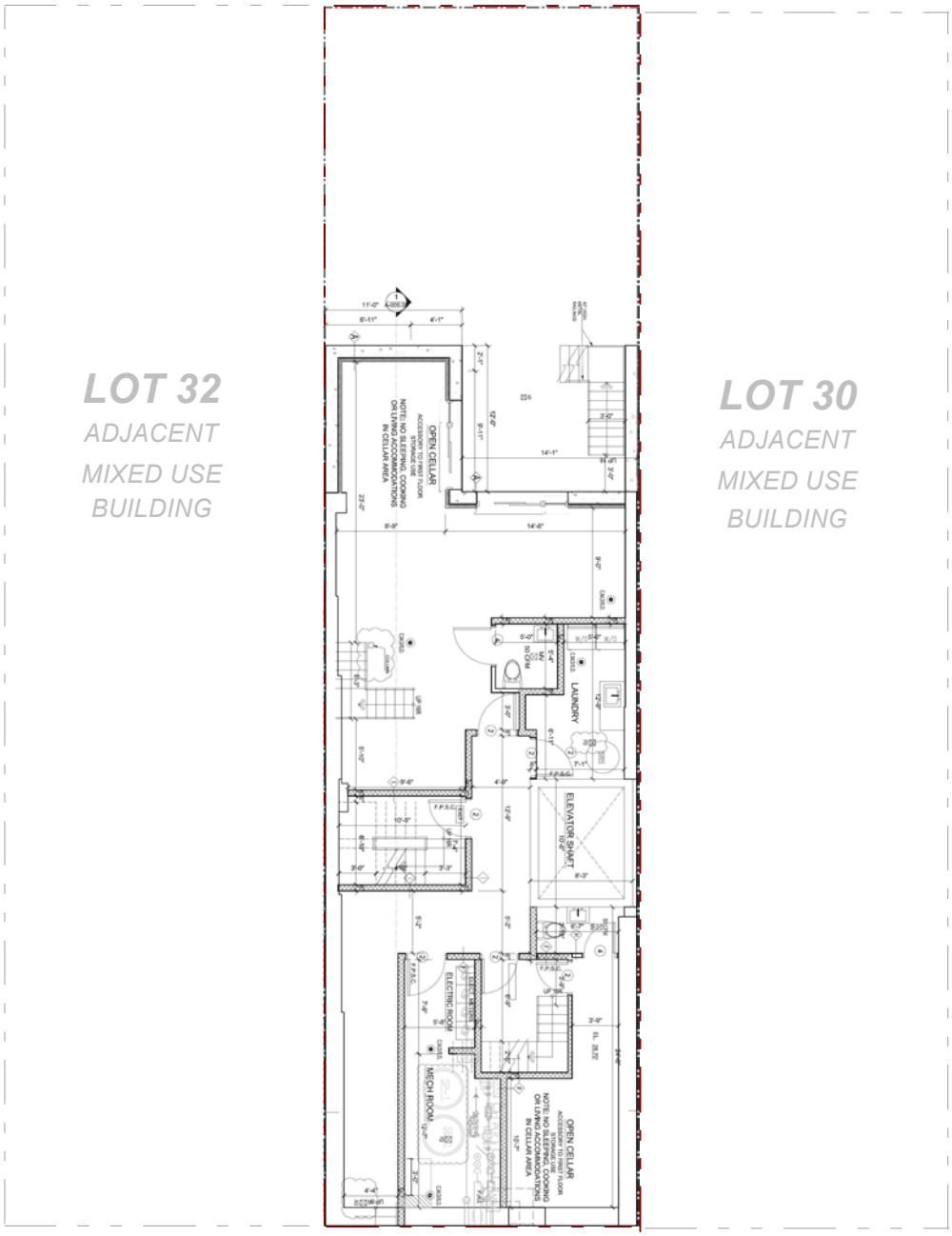
# ***FIGURES***




EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
Phone 631.504.6000
Fax 631. 924 .2870

Figure 1

Site Name: REDEVELOPMENT PROJECT
Site Address: 555 GRAND STREET, BROOKLYN, NY
Drawing Title: SITE LOCATION MAP




SIDEWALK

# GRAND STREET

KEY:

Property Boundary

SCALE:

0 10 15

1 Inch = 15 feet

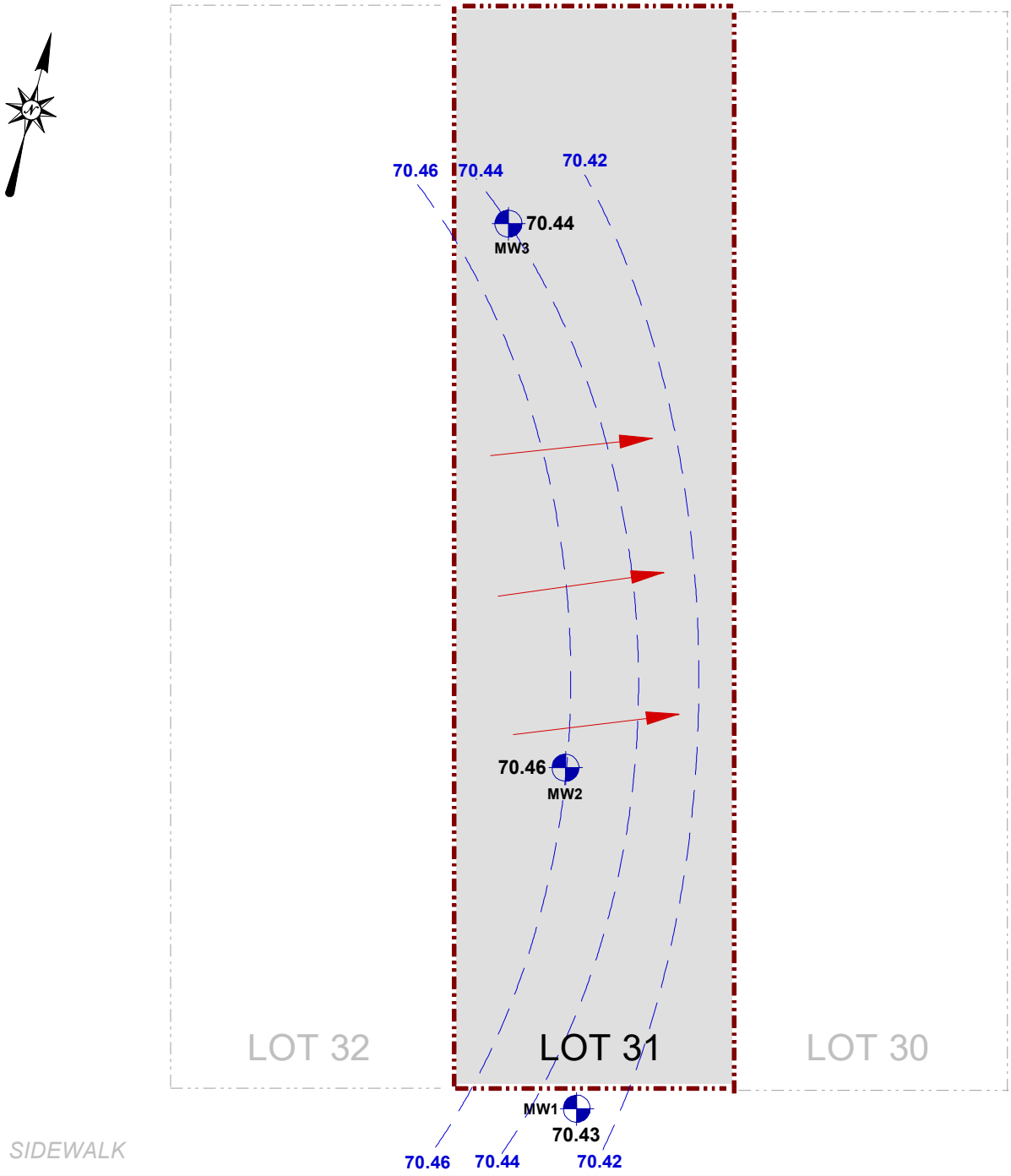
EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 2

Site Name: Redevelopment Project

Site Address: 555 Grand Street, Brooklyn, NY

Drawing Title: Site Plan




# GRAND STREET

KEY:

- Property Boundary
- Groundwater Sampling Location

SCALE:

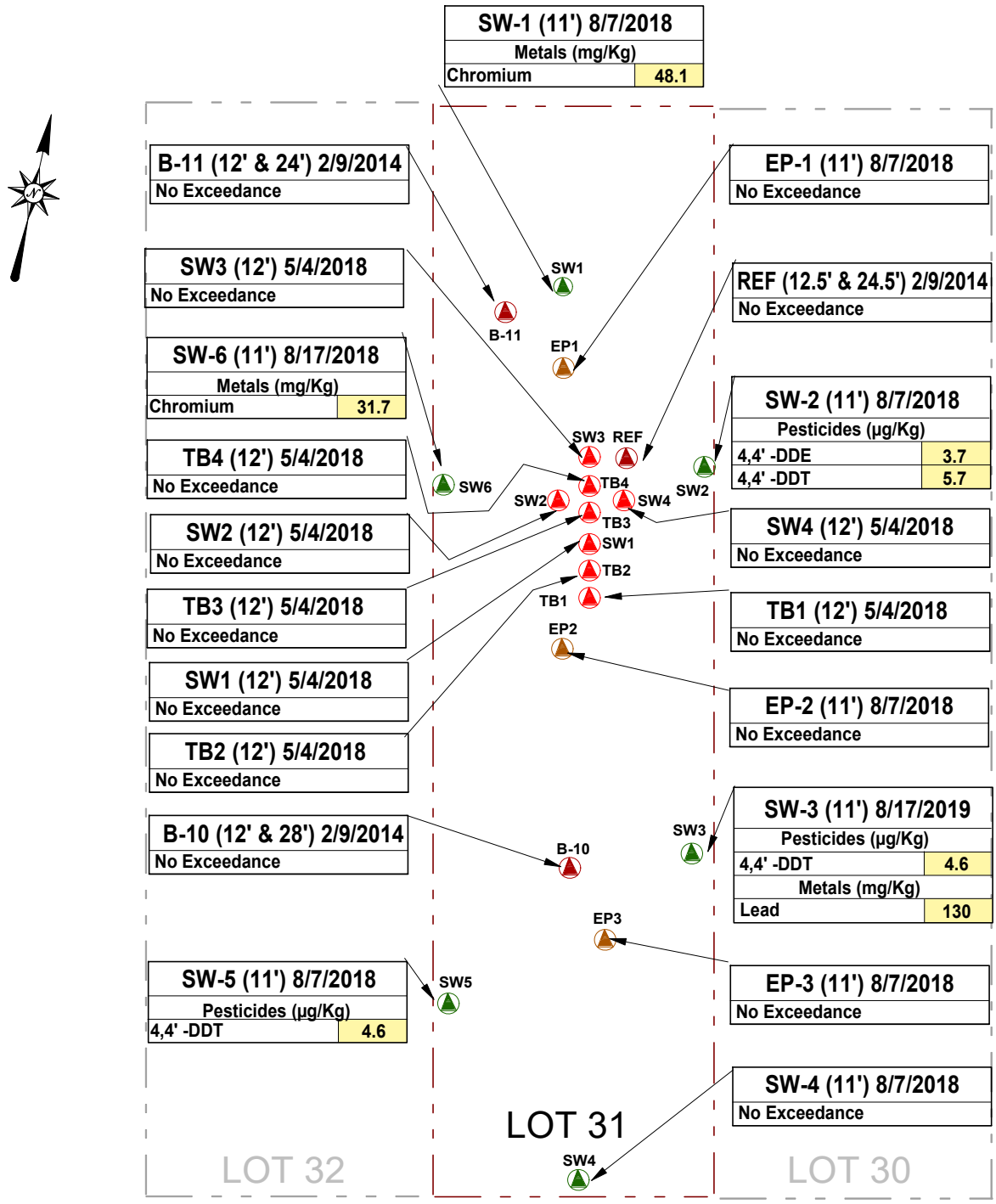
0 10 15

1 Inch = 15 feet

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 3

Site Name: Redevelopment Project
Site Address: 555 Grand Street, Brooklyn, NY
Drawing Title: Groundwater Contour Map




KEY:

- Property Boundary
- RI Sample Locations
- Endpoint Sample Locations
- Sidewall Endpoint Sample Locations
- Tank Endpoint Sample Locations
- Exceedence of Unrestricted Use SCO

SCALE:

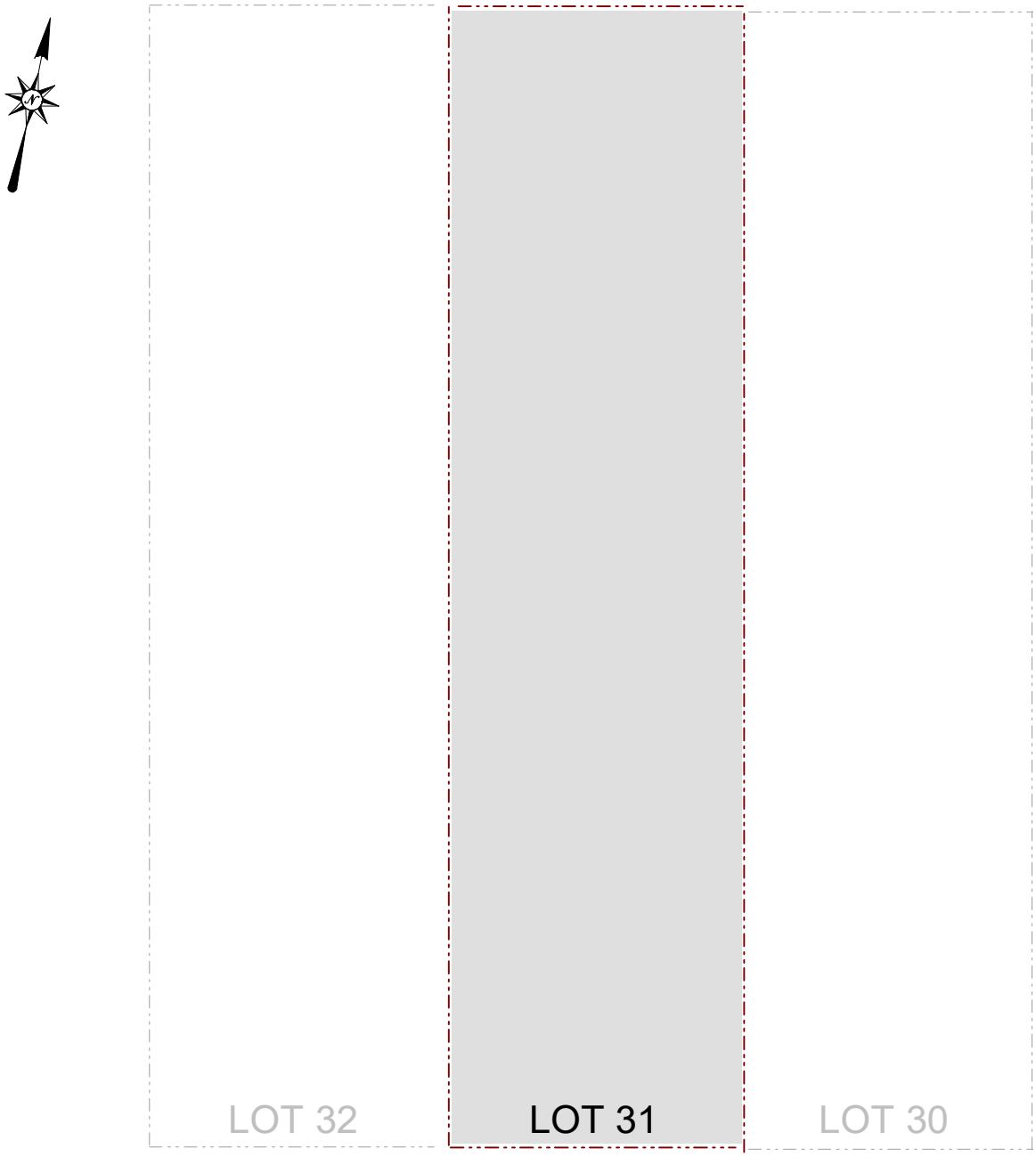
0 10 15

1 Inch = 15 feet

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 4

Site Name: Redevelopment Project
Site Address: 555 Grand Street, Brooklyn, NY
Drawing Title: Remaining Soil Above SCOs




Note: All ICs for this property are limited to within the property boundaries.

SIDEWALK

# GRAND STREET

KEY:

Institutional Controls Boudary

SCALE:

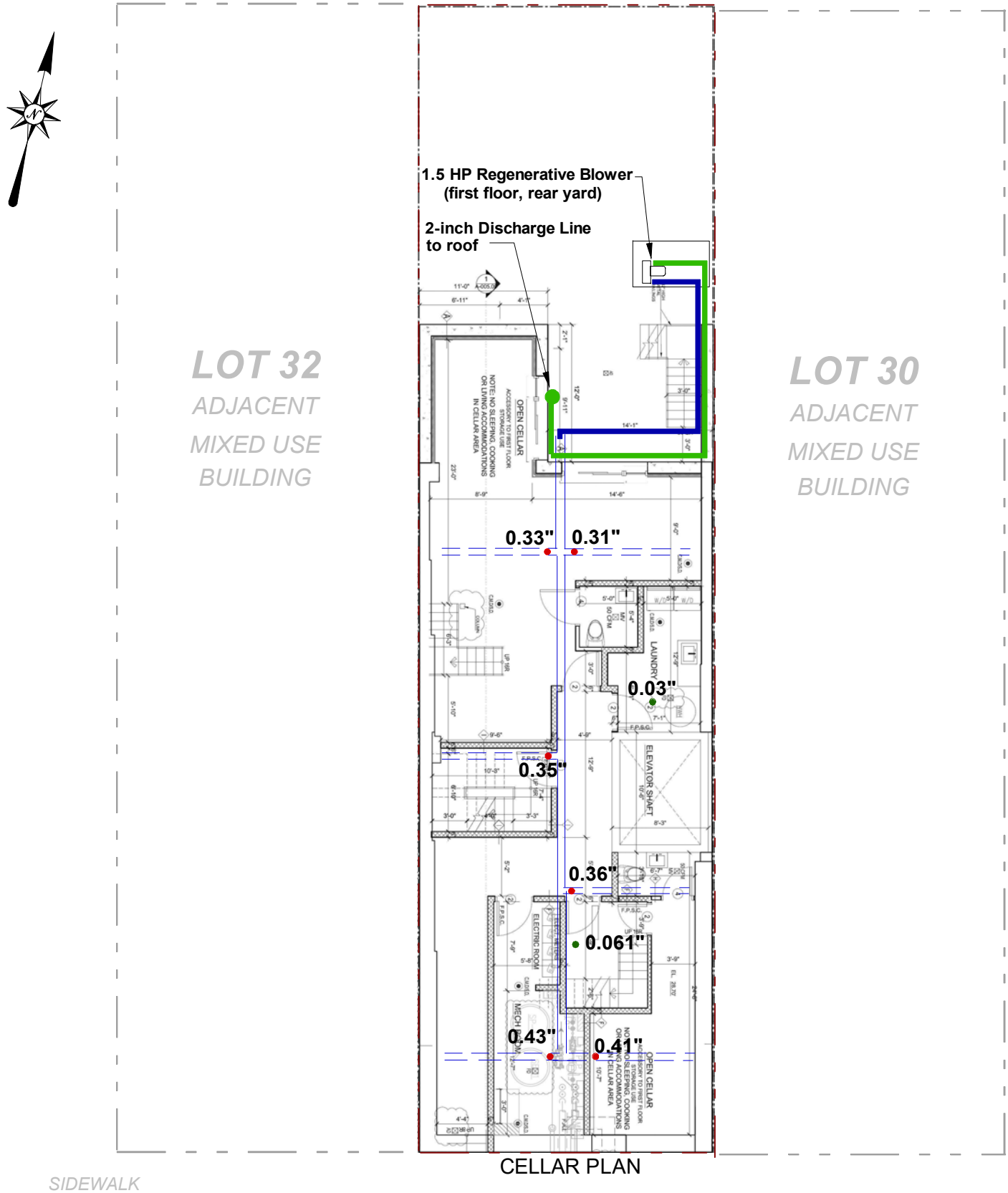
0 10 15

1 Inch = 15 feet

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 5

Site Name: Redevelopment Project
Site Address: 555 Grand Street, Brooklyn, NY
Drawing Title: Institutional Controls Boundaries




CELLAR PLAN

SCALE:

0 6 12

1 Inch = 12 feet

KEY:

- Property Boundary
- 4-inch PVC 10-slot Well Screen
- Subslab vacuum reading location
- SSDS leg vacuum reading location
- 4-inch Solid PVC

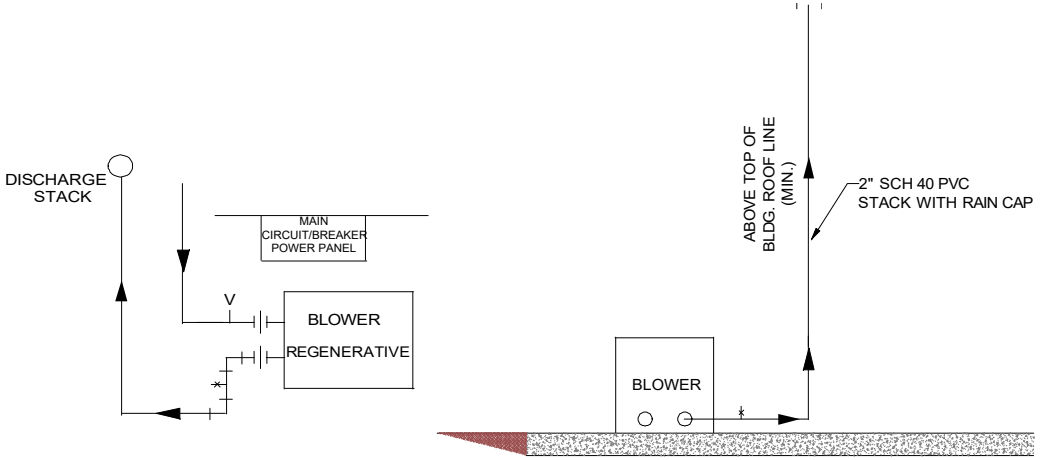
EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631.924.2870

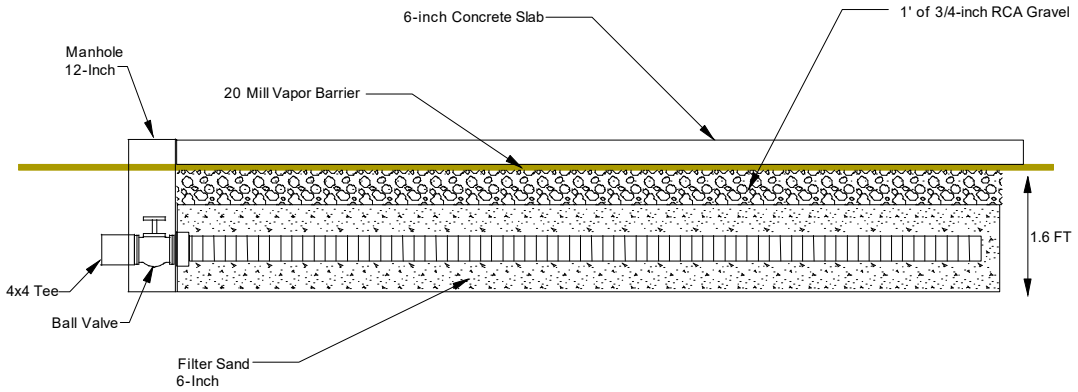
Figure No. 6

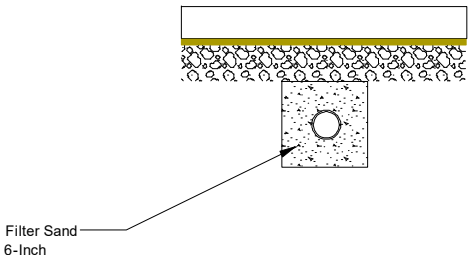
Site Name: Redevelopment Project

Site Address: 555 Grand Street, Brooklyn, NY

Drawing Title: Engineering Control Locations SSDS Layout



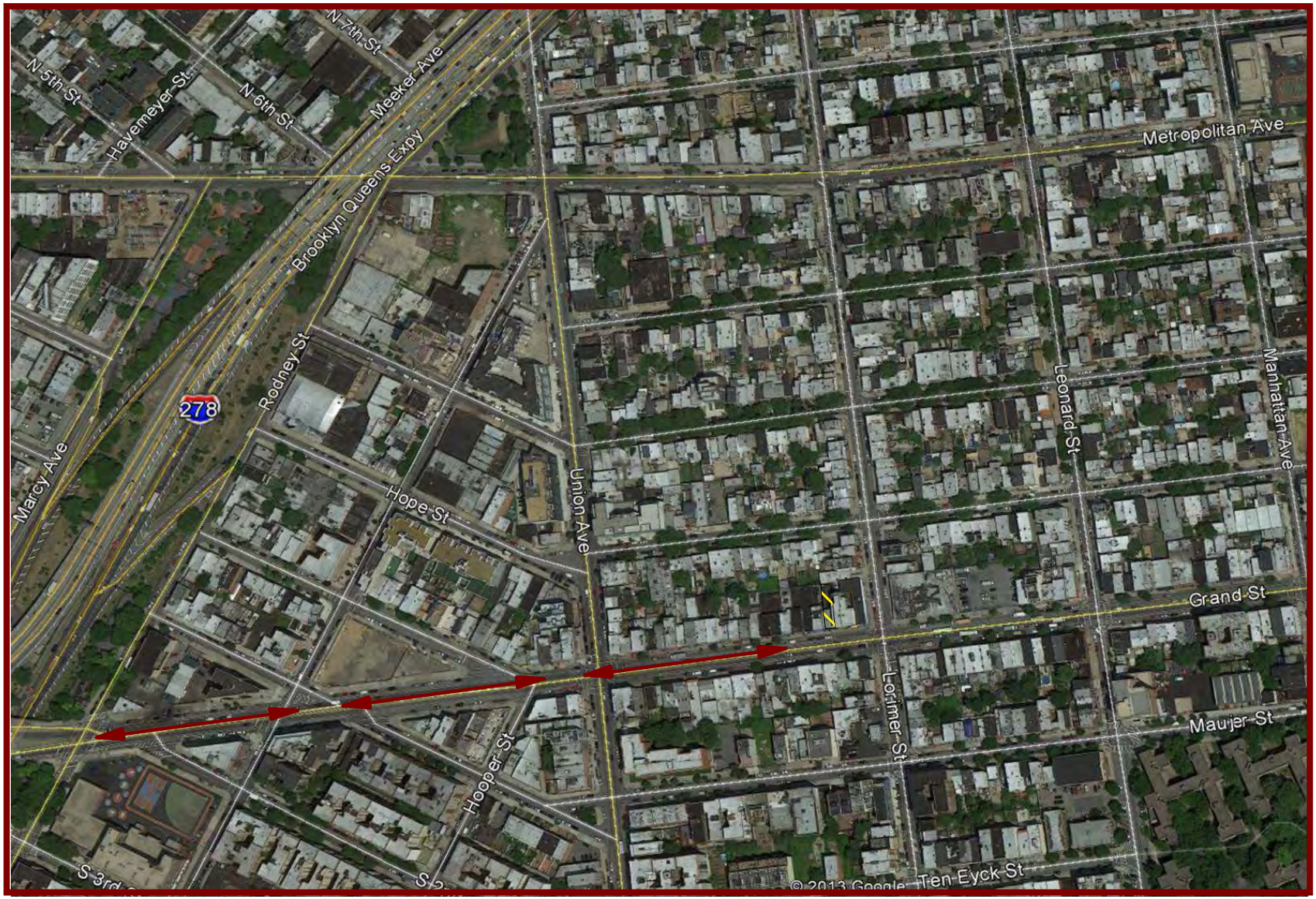

LEGEND

- 4"x2" SCH 40 PVC REDUCER
- FM 2" DIA. AIR FLOW METER
- V VACUUM GAUGE
- 2" DIA. SCH 40 PVC BALL VALVE
- BRASS SAMPLE TAP
- UNION OR QUICK CONNECT
- FLOW DIRECTION

**AMC Engineering**
1836 42nd Street
Astoria, NY 11105

*Figure No.* **7**

Site Name: Former Tomat Service Station
Site Address: 1815-1825 Ocean Avenue, Brooklyn, NY
Drawing Title: SSD System Details



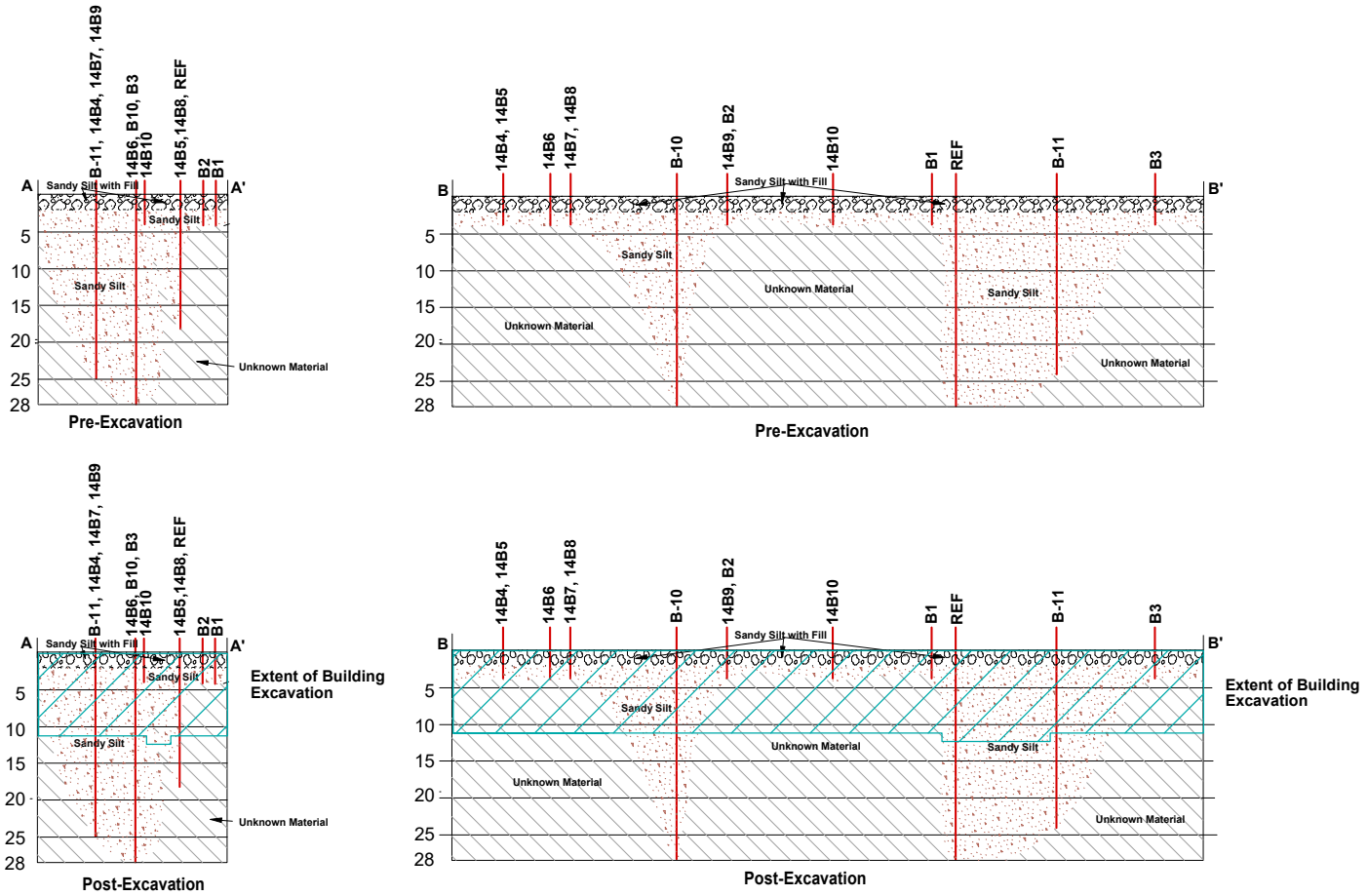

SITE LOCATION

IN-BOUND / OOUT-BOUND ROUTE

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

*Figure No.* **8**

| | |
|---|---|
| Site Name: | REDEVELOPMENT PROJECT |
| Site Address: | 555 GRAND STREET, BROOKLYN, NY |
| Drawing Title: | TRUCK ROUTE MAP |




KEY:
Property Boundary
xBx RI Boring Location

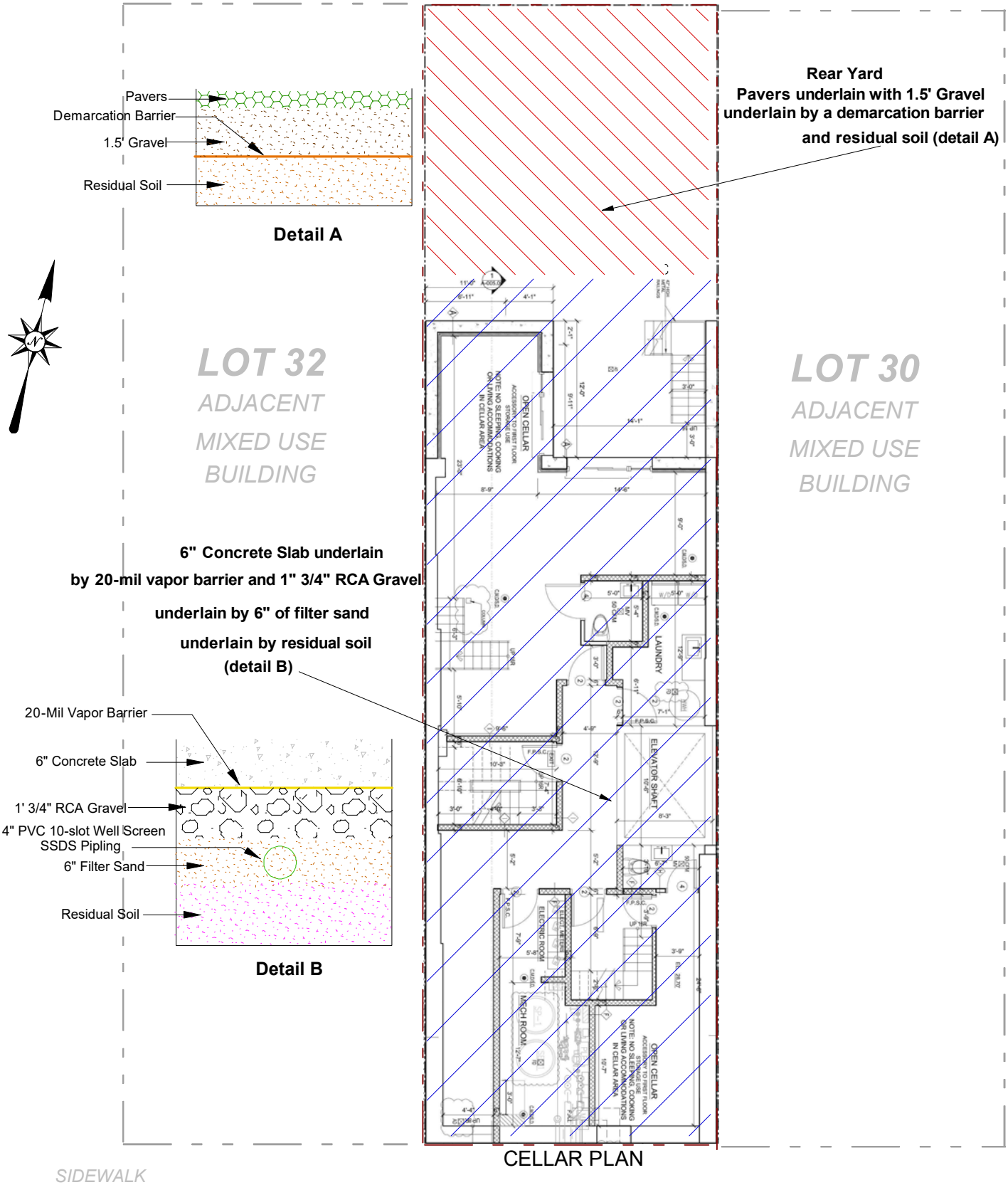
A = Lot 32 A' = Lot 30 B = Grand Street B' = Lot 26

SCALE:
0 10 25
Scale: 1 inch = 25 feet

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

Figure No. 9

Site Name: Redevelopment Project
Site Address: 555 Grand Street, Brooklyn, NY
Drawing Title: Geological Cross Section




CELLAR PLAN

SCALE:

0 6 12

1 Inch = 12 feet

KEY:

Property Boundary

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631.924.2870

Figure No. 10

Site Name: Redevelopment Project

Site Address: 555 Grand Street, Brooklyn, NY

Drawing Title: Composite Cover

# ***ATTACHMENT A***
# Site Contacts

## LIST OF SITE CONTACTS

| Name | Phone/Email Address |
|---|---|
| Site Owner and Remedial Party | |
| 555 Grand Units, LLC<br>Joel Schwartz | 718-599-6796<br>joel@southsideunits.com |
| Qualified Environmental Professional | |
| Environmental Business Consultants<br>Charles Sosik | 631.504.6000<br>CSosik@ebcincny.com |
| NYSDEC DER Project Manager | |
| Sadique Ahmed | 518-402-9656<br>sadique.ahmed@dec.ny.gov |
| NYSDEC Section Chief | |
| John Grathwol | 518-402-9649<br>john.grathwol@dec.ny.gov |
| Remedial Party Attorney | |
| Schnapf LLC<br>Lawrence Schnapf | 212-876-3189<br>Larry@SchnapfLaw.com |
| NYSDOH | |
| Anthony Perretta | BEEI@health.ny.gov |
| Remedial Engineer | |
| AMC Engineering, PLLC<br>Ariel Czemerinski | 718.545.0474<br>ariel@amc-engineering.com |

# ***ATTACHMENT B***
# Excavation Work Plan

# EXCAVATION WORK PLAN (EWP)

## B-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. Table B-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in **Attachment A**.

Table B-1: Notifications*

| Name | Contact Information |
|---|---|
| Sadique Ahmed | 518-402-9656, sadique.ahmed@dec.ny.gov |
| John Grathwol, P.E. | 518-402-9649, John.Grathwol@dec.ny.gov |

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in **Attachment D** of this SMP;

- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

## B-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section B-5 of this Attachment.

## B-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

## B-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible

for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

## B-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are as follows:

ENTERING SITE - from the Brooklyn Queens Expressway heading south; take the Metropolitan Ave/ Williamsburg Bridge / Manhattan Exit and merge on to Rodney Street. Turn right on to Ainslie Street and then turn left on to Ainslie Street. Make a right on to Union Avenue and turn left to Grand Street.
EXITING SITE – Take Grand Street going west and then take the Brooklyn Queens Expressway east or west.

All trucks loaded with site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting 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.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

## B-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this Site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will

be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

## B-7 MATERIALS REUSE ON-SITE

The qualified environmental professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines. This soil will undergo a testing program to confirm that it meets unrestricted SCOs prior to unregulated disposal or reuse on-site. Confirmation testing of clean soils will be in accordance with DER-10 as follows:

| **Contaminant** | **VOCs** | **SVOCs, Inorganics & PCBs/Pesticides** | |
|---|---|---|---|
| **Soil Quantity (cubic yards)** | **Discrete Samples** | **Composite** | **Discrete Samples/Composite** |
| 0-50 | 1 | 1 | Each composite sample for analysis is created from 3-5 discrete samples from representative locations in the fill. |
| 50-100 | 2 | 1 | |
| 100-200 | 3 | 1 | |
| 200-300 | 4 | 1 | |
| 300-400 | 4 | 2 | |
| 400-500 | 5 | 2 | |
| 500-800 | 6 | 2 | |
| 800-1000 | 7 | 2 | |
| 1000 | Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER | | |

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not

be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

## B-8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

## B-9 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

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

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 1. Soils that meet ‘exempt’ fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

## B-10 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

## B-11 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

## B-12 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

# ***ATTACHMENT C***
# Environmental Easement / Notice / Deed Restriction

**NYC DEPARTMENT OF FINANCE**
**OFFICE OF THE CITY REGISTER**

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument.The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2016092800985001001E2256

**RECORDING AND ENDORSEMENT COVER PAGE** **PAGE 1 OF 10**

**Document ID: 2016092800985001** Document Date: 08-11-2016 Preparation Date: 09-28-2016
Document Type: EASEMENT
Document Page Count: 9

**PRESENTER:**
AFFILIATED ABSTRACT LLC
119 SOUTH THIRD STREET
CTSY-195
BROOKLYN, NY 11249
718-799-5010
RECORDINGS@AFFABSTRACT.COM

**RETURN TO:**
AFFILIATED ABSTRACT LLC
119 SOUTH THIRD STREET
CTSY-195
BROOKLYN, NY 11249
718-799-5010
RECORDINGS@AFFABSTRACT.COM

**PROPERTY DATA**

| Borough | Block | Lot | Unit | Address |
|---|---|---|---|---|
| BROOKLYN | 2779 | 31 | Entire Lot | 555 GRAND STREET |

**Property Type:** 1-3 FAMILY WITH STORE / OFFICE

**CROSS REFERENCE DATA**

CRFN_____ *or* DocumentID_____ *or* _____ Year_____ Reel____ Page_____ *or* File Number_____

**PARTIES**

**GRANTOR/SELLER:**
555 GRAND UNITS LLC
183 WILSON STREET, SUITE 133
BROOKLYN, NY 11211

**GRANTEE/BUYER:**
THE PEOPLE OF THE STATE OF NEW YORK
625 BROADWAY
ALBANY, NY 12233

**FEES AND TAXES**

**Mortgage :**

| | | |
|---|---|---|
| Mortgage Amount: | $ | 0.00 |
| Taxable Mortgage Amount: | $ | 0.00 |
| Exemption: | | |
| TAXES: County (Basic): | $ | 0.00 |
| City (Additional): | $ | 0.00 |
| Spec (Additional): | $ | 0.00 |
| TASF: | $ | 0.00 |
| MTA: | $ | 0.00 |
| NYCTA: | $ | 0.00 |
| Additional MRT: | $ | 0.00 |
| TOTAL: | $ | 0.00 |
| Recording Fee: | $ | 82.00 |
| Affidavit Fee: | $ | 0.00 |

Filing Fee: $ 250.00

NYC Real Property Transfer Tax: $ 0.00

NYS Real Estate Transfer Tax: $ 0.00

**RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK**
Recorded/Filed 09-29-2016 15:06
City Register File No.(CRFN): **2016000342416**

*City Register Official Signature*

## ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

**THIS INDENTURE** made this 24th day of August, 2016, between Owner(s) 555 Grand Units LLC, having an office at 183 Wilson Street, Suite 132, Brooklyn, New York 11211, County of Kings, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

**WHEREAS,** the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

**WHEREAS,** the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

**WHEREAS,** the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

**WHEREAS,** Grantor, is the owner of real property located at the address of 555 Grand Street in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 2779 Lot 31, being the same as that property conveyed to Grantor by deed dated July 23, 2013 and recorded in the City Register of the City of New York as CRFN #2013000371647. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.5866 +/- acres, and is hereinafter more fully described in the Land Title Survey dated July 25, 2015 prepared by Vincent Teutonico, P.L.S. of Apple Surveying, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

**WHEREAS,** the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is

extinguished pursuant to ECL Article 71, Title 36; and

**NOW THEREFORE,** in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224185-02-14, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

**Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)**

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

**This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation**

**pursuant to Title 36 of Article 71 of the Environmental Conservation Law.**

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved b the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C224185
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail

and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

**Remainder of Page Intentionally Left Blank**

**IN WITNESS WHEREOF,** Grantor has caused this instrument to be signed in its name.

555 Grand Units LLC:

By: _____

Print Name: Joel Schwartz

Title: Manager Date: 8-11-16

**Grantor's Acknowledgment**

STATE OF NEW YORK )
) ss:
COUNTY OF KINGS )

On the 11th day of August, in the year 2016, before me, the undersigned, personally appeared Joel Schwartz, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

ORLEE FISHKIN
Notary Public, State of New York
Registration #02FI6314599
Qualified In Nassau County
Commission Expires Nov. 10, 2018

**THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK**, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

**Grantee's Acknowledgment**

STATE OF NEW YORK )
) ss:
COUNTY OF ALBANY )

On the 24th day of August, in the year 2016 before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public, State of New York

**David J. Chiusano**
**Notary Public, State of New York**
**No. 01CH5032146**
**Qualified in Schenectady County**
**Commission Expires August 22, 2018**

## SCHEDULE "A" PROPERTY DESCRIPTION

ALL that certain plot, piece or parcel of land, with the buildings and improvements thereon erected, situate, lying and being in the Borough of Brooklyn, County of Kings, City and State of New York, bounded and described as follows:

BEGINNING at a point on the northerly side of Grand Street, distant 65 feet westerly from the northwesterly corner of Grand Street and Lorimer Street;

RUNNING THENCE northerly on a line parallel with Lorimer Street 100 feet 6 ½ inches to a point;

THENCE westerly and parallel with Grand Street 25 feet 3;

THENCE southerly parallel with Lorimer Street, 100 feet 5 ¼ inches to the northerly side of Grand Street; and

THENCE easterly along the northerly side of Grand Street, 25 feet 3 inches to the point or place of BEGINNING.

Containing approximately .05866 acres more or less.

FOR INFORMATION ONLY: Said premises designated as Block 2779, Lot 31 and commonly known as 555 Grand Street, Brooklyn, New York.

# ***ATTACHMENT D***
# Health and Safety Plan

# 555 GRAND STREET

**BROOKLYN, NEW YORK 11211**
**Block 2279, Lot 31**

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# CONSTRUCTION HEALTH AND SAFETY PLAN

NOVEMBER 2013

*Prepared for:*
555 Grand Units, LLC
183 Wilson Street, Suite 132
Brooklyn, NY 11211

*Prepared by:*

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road
Ridge, NY 11961

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**CONSTRUCTION HEALTH AND SAFETY PLAN**
**555 Grand Street, Brooklyn, New York**



## *FIGURES*



## *APPENDICES*

# STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Action at 555 Grand Street, Brooklyn, New York.

This HASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. Contractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees.

# 1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for the planned Remedial Action at 555 Grand Street, Brooklyn, New York to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during remedial activities. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to excavation, loading and other soil disturbance activities and is based on the best information available. The CHASP may be revised by EBC at the request of Jackson Estates II LLC and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

## 1.1 Training Requirements

Personnel entering the exclusion zone or decontamination zone are required to be certified in health and safety practices for hazardous waste site operations as specified in the Federal OSHA Regulations CFR 1910.120e (revised 3/6/90).

Paragraph (e - 3) of the above referenced regulations requires that all on-site management personnel directly responsible for or who supervise employees engaged in hazardous waste operations, must initially receive 8 hours of supervisor training related to managing hazardous waste work.

Paragraph (e - 8) of the above referenced regulations requires that workers and supervisors receive 8 hours of refresher training annually on the items specified in Paragraph (e-1) and/or (e-3).

Additionally all on-site personnel must receive adequate site-specific training in the form of an on-site Health and Safety briefing prior to participating in field work with emphasis on the following:

- Protection of the adjacent community from hazardous vapors and / or dust which may be released during intrusive activities.
- Identification of chemicals known or suspected to be present on-site and the health effects and hazards of those substances.
- The need for vigilance in personnel protection, and the importance of attention to proper use, fit and care of personnel protective equipment.
- Decontamination procedures.
- Site control including work zones, access and security.
- Hazards and protection against heat or cold.
- The proper observance of daily health and safety practices, such as entry and exit of work zones and site. Proper hygiene during lunch, break, etc.
- Emergency procedures to be followed in case of fire, explosion and sudden release of hazardous gases.


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Health and Safety meetings will be conducted on a daily basis and will cover protective clothing and other equipment to be used that day, potential and chemical and physical hazards, emergency procedures, and conditions and activities from the previous day.

## 1.2 Medical Monitoring Requirements

Field personnel and visitors entering the exclusion zone or decontamination zone must have completed appropriate medical monitoring required under OSHA 29 CFR 1910.120(f) if respirators or other breathing related PPE is needed. Medical monitoring enables a physician to monitor each employee's health, physical condition, and his fitness to wear respiratory protective equipment and carry out on-site tasks.

## 1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

## 1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Health and Safety Plan are:

| Name | Title | Address | Contact Numbers |
|---|---|---|---|
| Ms. Chawinie Miller | EBC – Project Manager | 1808 Middle Country Rd Ridge, NY 11961 | (631) 504-6000 |
| Ms. Chawinie Miller | Health & Safety Manager | 1808 Middle Country Rd Ridge, NY 11961 | (631) 504-6000 |
| Mr. Kevin Waters | Site Safety Officer | 1808 Middle Country Rd Ridge, NY 11961 | (631) 504-6000 |

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to

be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.

2. Coordinating site safety decisions with the project manager.

3. Designating exclusion, decontamination and support zones on a daily basis.

4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.

5. Maintaining the work zone entry/exit log and site entry/exit log.

6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.



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## 2.0 SITE BACKGROUND AND SCOPE OF WORK

The street address of the subject site is 555 Grand Street, Brooklyn, New York. The subject site is identified as Block 2779, Lot 31 on the Borough of Brooklyn Tax Map. The lot is located in the City of New York and Borough of Brooklyn (Kings County. The lot consists of 25 feet of frontage on Grand Street and a total lot area of 2,525 $ft^2$ (0.058 acres). The Site is currently developed with a three-story mixed use (first floor retail, residential upper floors) building with a basement which covers approximately 65 percent of the Lot.

The building is currently vacant but was most recently occupied by a drycleaner 9Tru Val) on the 1st floor and two residential tenants on the second and third floor. According to the NYC Department of Buildings records and interviews with the operator, the dry-cleaner has been operating on-site since 1999. Prior to occupancy by the drycleaner the site had multiple commercial tenants such as, Slavin Building Co., Louis Lewitsky Dry Goods, Lewis Miracle Dollar Store, Rama Building Corp., Louis Bargain Department Store, Mayflower Bargain Store, and Joel Bargain Store.

The elevation of the property is approximately 28 feet above the National Geodetic Vertical Datum (NGVD). The area topography is relatively flat and consistent. The depth to groundwater beneath the site, as determined by field measurements, is approximately 22 feet below grade. Based on regional and local groundwater contour maps groundwater flow is expected to be northwest toward the East River approximately 1 miles from the Site.

### 2.1 Previous Investigations

#### *2.1.1 Phase I Environmental Site Assessment Report (EBC January 2012)*

A Phase I Environmental Site Assessment (ESA) was completed by Environmental Business Consultants (EBC), in June of 2013 for the site. EBC was able to establish a history for the property dating back to 1887. In 1887 the site was developed with the current three-story mixed use commercial residential building. According to historical city directories, the Site has been occupied by multiple commercial tenants such as, Slavin Building Co, Louis Lewitzky Dry Goods, Lewis Miracle Dollar Store, Rama Building Corp, Louis Bargain Department Store, Mayflower Bargain Store, Joel Bargain Store and Tru Val Cleaners. The Tru Val cleaners has been on-site since at least 1999 according the owners of the Site. In addition, the Site has been occupied by multiple commercial tenants since 1928. Historical sources and owner interviews indicate that Tru Val Cleaners was formerly located at 568 Grand Street from approximately 1960 to 2000. The presence of an on-site dry cleaner represents an REC due to the typical use of PCE associated with operations.

According to the regulatory database, the Site is listed as a RCRA SQG, US AIRS, E Designation, FINDS, NY Drycleaners and an EDR US Historic Cleaners sites. These listings are in association with the occupancy of the site as an on-site dry cleaner and according to the regulatory database, no violations were listed for the Site. The Site is equipped with an on site dry cleaning machine; Real Star 323 (RS 323); which is located on the east side of the 1st floor of site. EBC noted that the basement is below this area. Approximately four (4) 10-gallon containers of used tetrachloroethene ("perc", PCE, dry-cleaning fluid) were observed on the east


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side of the site adjacent to the RS 323. No secondary containment was noted under these containers.

Based upon reconnaissance of the subject and surrounding properties, interviews and review of historical records and regulatory agency databases, EBC noted the following recognized environmental conditions for the subject site.

- Occupancy of the first floor / cellar of the Site as an on-site drycleaner from at least 1999 and the use and storage of tetrachloroethene within the dry cleaning process.

### *2.1.2 Remedial Investigation, (EBC July 29, 2013 through August 20, 2013)*

The remedial investigation was performed from July 29, 2013 through August 20, 2013 in accordance with the Remedial Action Work Plan approved by the NYCOER as part of the E-designation review process. The goals of the Remedial Investigation were to define the nature and extent of contamination in soil, groundwater and any other impacted media; to identify the source(s) of the contamination; to assess the impact of the contamination on public health and/or the environment; and to provide information to support the development of a Remedial Work Plan to address the contamination.

Activities completed under the RI:

- Soil sampling and analysis for volatile and semi-volatile organic compounds (VOCs, SVOCs) in soil samples from soil boring locations;
- The installation of groundwater monitoring wells;
- The collection and analysis of groundwater samples for volatile and semi-volatile organic compounds;
- Sampling for non-petroleum contaminants such as pesticides, PCBs and metals in soil and groundwater including the analysis of soil and groundwater samples
- The collection of analysis of subslab soil gas samples for VOCs.

The field work portion of the RI was conducted by Environmental Business Consultants (EBC) from July 29, 2013 through August 20, 2013, in accordance with the protocols and methods as established in the approved Remedial Investigation Work Plan).

The results of the RI identified elevated levels of both tetrachloroethene (PCE) and trichloroethene (TCE) in soil gas above mitigation levels established within the State DOH soil vapor guidance matrix. TCE concentrations in soil gas ranged from 84.8 µg/m3 to a high of 623 µg/m3. PCE concentrations ranged from 7,730 µg/m3 to 228,000 µg/m3. PCE and TCE were detected in all soil gas samples obtained as well as both the indoor and outdoor air samples.

Groundwater was encountered at a depth of approximately 22.5 feet below grade. Low levels of PCE were detected in the groundwater samples from MW1, at a concentration below the GQS. No other VOCs were detected.

SVOCs including benzo(a)anthracene, benzo(b)fluoranthene, and chrysene were reported above unrestricted use soil cleanup objectives (SCOs) in shallow soil (2-4ft) at one boring location, B3.

One or more metals including arsenic, copper, lead, and mercury were reported above restricted


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residential SCOs in shallow soil in all three boring locations. Zinc and cadmium were reported above unrestricted SCOs at one boring location, B3. Elevated levels of SVOCs and metals reported in shallow soil throughout the site are characteristic of the historic fill materials present at the site and throughout the area.

## 2.2 Redevelopment Plans

The development project consists of redeveloping the current building in to a 6-story residential building. The building covers the 65% of the lot and has a full cellar, which will be utilized for storage areas. The basement level and foundation will require minimal excavation; due to the use of the original structure. Excavation and soil disturbance will occur for the northeast side for installation of a section of foundation wall concrete slab to level with existing cellar concrete slab and excavation of elevator pit. The proposed work on the northeast side will slightly widen the cellar. The elevator pit will be excavated to a depth of 5 feet.

## 2.3 Description of Remedial Action

Site activities included within the Remedial Action that are included within the scope of this HASP include the following:

1. Excavation of soil/fill as necessary for the elevator pit and foundation wall concrete slab on the northeast portion of the property to depths ranging from 5 feet to 9 feet below grade;
2. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
3. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track 4 Site Specific SCOs;
4. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
5. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in Table 1, (2) all Federal, State and local rules and regulations for handling and transport of material.
6. Installation of an active sub-slab depressurization system and vapor barrier within all excavated areas, SSDS trenches, and utility/plumbing conduits;
7. Installation of an epoxy/polymer sealant across entire existing basement slab;
8. Installation of a composite cover system consisting of the concrete building slab and concrete capped rear yard across the entire Site;
9. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
10. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.

# 3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical

hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

## 3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

### 3.1 Physical Hazards

#### *3.1.1 Tripping Hazards*

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

#### *3.1.2 Climbing Hazards*

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

#### *3.1.3 Cuts and Lacerations*

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

#### *3.1.4 Lifting Hazards*

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

#### *3.1.5 Utility Hazards*

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

#### *3.1.6 Traffic Hazards*

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his


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work and the public, during operations.

## 3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

### *3.2.1 Heat Stress*

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention
    a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
    b. Work in Pairs. Individuals should avoid undertaking any activity alone.
    c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
    d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment
    a Heat Rash (or prickly heat):
        Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
        Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
        Treatment: Remove source or irritation and cool skin with water or wet cloths.

    b. Heat Cramps (or heat prostration)
        Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
        Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.
        Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.
    c. Heat Stroke
        Cause: Same as heat exhaustion. This is also an extremely serious


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condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

*3.2.2 Cold Exposure*

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light and numbing of the toes and fingers.

## 3.3 Chemical Hazards

"Urban fill" materials, present throughout the New York City area typically contain elevated levels of semi-volatile organic compounds and metals. These "contaminants" are not related to a chemical release occurring on the site, but are inherent in the reworked fill material in the area which contains ash and bits of tar and asphalt. Considering the previous sampling results and the past and present use of the site, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and heavy metals such as arsenic, lead and mercury.

Volatile organic compounds reported to be present in soil, soil gas and/or groundwater include the following:

| | |
|---|---|
| Tetrachloroethene | Trichloroethylene |

Semi-Volatile organic compounds reported to be present in soil include the following:

| | | |
|---|---|---|
| Benzo(a)anthracene | Benzo(b)fluoranthene | Chrysene |

Metals reported to be present in soil and / or groundwater include the following

| | | | | | |
|---|---|---|---|---|---|
| Arsenic | Cadmium | Copper | Lead | Mercury | Zinc |

The primary routes of exposure to these contaminants are inhalation, ingestion and absorption.

**Appendix C** includes information sheets for suspected chemicals that may be encountered at the site.

*3.3.1 Respirable Dust*

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation



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detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

### *3.3.2 Dust Control and Monitoring During Earthwork*

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 $\mu g/m^3$ over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

### *3.3.3 Organic Vapors*

Elevated levels of VOCs were detected in soil gas samples collected during previous investigations at the site. Therefore, excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.



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## 4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

### 4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

### 4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.


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- chemical resistant coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves;
- disposable outer gloves;
- hard hat; and,
- ankles/wrists taped.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

## 4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of drilling locations, active venting, etc.) will be implemented before requiring the use of respiratory protection.


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## 5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

### 5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

### 5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

1 The SSO will be consulted immediately
2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
3 Monitoring will be continued until intrusive work resumes.

### 5.3 Action Levels During Excavation Activities

Instrument readings will be taken in the breathing zone above the excavation pit unless otherwise noted. Each action level is independent of all other action levels in determining responses.

| Organic Vapors (PID) | LEL % | Responses |
|---|---|---|
| 0-1 ppm above background | 0% | • Continue excavating<br>• Level D protection<br>• Continue monitoring every 10 minutes |


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| | | |
|---|---|---|
| 1-5 ppm Above Background, Sustained Reading | 1-10% | • Continue excavating<br>• Go to Level C protection or employ engineering controls<br>• Continue monitoring every 10 minutes |
| 5-25 ppm Above Background, Sustaineed Reading | 10-20% | • Discontinue excavating, unless PID is only action level exceeded.<br>• Level C protection or employ engineering controls<br>• Continue monitoring for organic vapors 200 ft downwind<br>• Continuous monitoring for LEL at excavation pit |
| >25 ppm Above Background, Sustained Reading | >20% | • Discontinue excavating<br>• Withdraw from area, shut off all engine ignition sources.<br>• Allow pit to vent<br>• Continuous monitoring for organic vapors 200 ft downwind. |

Notes: Air monitoring will occur in the breathing zone 30 inches above the excavation pit. Readings may also be taken in the excavation pit but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less then 5 ppm (see Community Air Monitoring Plan).



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# 6.0 SITE CONTROL

## 6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book.

**It is expected that an exclusion zone, decontamination zone, and support zone will only be established during the remedial work required to excavate the CVOC hotspot area.** A licensed Environmental Contractor with relative hazardous material handling experience and training is required to perform any soil disturbing activities within the hotspots identified within the Remedial Action Work Plan. All onsite workers must provide evidence of OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

## 6.1 General Site Work

Upon completion of CVOC hotspot remedial activities by an Environmental Contractor, a general excavation contractor may continue with site excavation/grading as needed for basement excavation, shoring, other building requirements, or as necessary to excavate petroleum related VOC contaminated soil as deemed necessary by the Remedial Action Work Plan and/or Project Manager. All onsite employees must have obtained OSHA 24-hour Hazardous Waste Operations and Emergency Response Operations training prior to performing soil disturbing activities.


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## 7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

### 7.1 Emergency Equipment On-site

| | |
|---|---|
| Private telephones: | Site personnel. |
| Two-way radios: | Site personnel where necessary. |
| Emergency Alarms: | On-site vehicle horns*. |
| First aid kits: | On-site, in vehicles or office. |
| Fire extinguisher: | On-site, in office or on equipment. |

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

### 7.2 Emergency Telephone Numbers

| | |
|---|---|
| General Emergencies | 911 |
| Suffolk County Police | 911 |
| NYC Fire Department | 911 |
| Woodhul Medical Center | (718) 963-8000 |
| NYSDEC Spills Hotline | 1-800-457-7362 |
| NYSDEC Project Manager | (718) 482-4909 |
| NYC Department of Health | (212) 676-2400 |
| National Response Center | 1-800-424-8802 |
| Poison Control | 1-800-222-1222 |
| Project Manager | 1-631-504-6000 |
| Site Safety Officer | 1-631-504-6000 |

### 7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;

- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,

- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager — Ms. Chawinie Miller (631) 504-6000
- Construction Superintendent — To be added
- Site Safety Officer — Mr. Kevin Waters (631) 504-6000

### 7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**).and information on the chemical(s) to which they may have been exposed (**Appendix C**).

### 7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

### 7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.

- Exit through the decontamination corridor if possible.

- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.

- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.

- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

## 7.7 Spill Control Procedures

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

## 7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

# *APPENDIX A*

# *SITE SAFETY ACKNOWLEDGEMENT FORM*

## DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc…):

_____

_____

_____

_____

2. OTHER ISSUES (HASP changes, attendee comments, etc…):

_____

_____

_____

3. ATTENDEES (Print Name):

| | |
|---|---|
| 1. | 11. |
| 2. | 12. |
| 3. | 13. |
| 4. | 14. |
| 5. | 15. |
| 6. | 16. |
| 7. | 17. |
| 8. | 18. |
| 9. | 19. |
| 10. | 20. |

# *APPENDIX B*

# *SITE SAFETY PLAN AMENDMENTS*

## SITE SAFETY PLAN AMENDMENT FORM

**Site Safety Plan Amendment #:** _____

**Site Name:** _____

**Reason for Amendment:** _____

_____

_____

_____

**Alternative Procedures:** _____

_____

_____

_____

**Required Changes in PPE:** _____

_____

_____

_____

_____ _____

**Project Superintendent (signature)** **Date**

_____ _____

**Health and Safety Consultant (signature)** **Date**

_____ _____

**Site Safety Officer (signature)** **Date**

# *APPENDIX C*

# *CHEMICAL HAZARDS*

# International Chemical Safety Cards

## TETRACHLOROETHYLENE

**ICSC: 0076**

1,1,2,2-Tetrachloroethylene
Perchloroethylene
Tetrachloroethene
$C_2Cl_4$ / $Cl_2C=CCl_2$
Molecular mass: 165.8

ICSC # 0076
CAS # 127-18-4
RTECS # KX3850000
UN # 1897
EC # 602-028-00-4
April 13, 2000 Validated

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. | | In case of fire in the surroundings: use appropriate extinguishing media. |
| **EXPLOSION** | | | |
| **EXPOSURE** | | STRICT HYGIENE! PREVENT GENERATION OF MISTS! | |
| **•INHALATION** | Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness. | Ventilation, local exhaust, or breathing protection. | Fresh air, rest. Artificial respiration may be needed. Refer for medical attention. |
| **•SKIN** | Dry skin. Redness. | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| **•EYES** | Redness. Pain. | Safety goggles , face shield . | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | Abdominal pain. (Further see Inhalation). | Do not eat, drink, or smoke during work. | Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours. | Separated from metals ,( see Chemical Dangers ), food and feedstuffs . Keep in the dark. Ventilation along the floor. | Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 40-51/53 S: (2-)23-36/37-61 UN Hazard Class: 6.1 UN Packing Group: III |

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0076**

# International Chemical Safety Cards

## TETRACHLOROETHYLENE

**ICSC: 0076**

**I M P O R T A N T D A T A**

**PHYSICAL STATE; APPEARANCE:**
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

**PHYSICAL DANGERS:**
The vapour is heavier than air.

**CHEMICAL DANGERS:**
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, beryllium.

**OCCUPATIONAL EXPOSURE LIMITS:**
TLV: 25 ppm as TWA, 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK: skin absorption (H);
Carcinogen category: 3B;
(DFG 2004).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours)
NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A
NIOSH IDLH: Ca 150 ppm See: 127184

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation and by ingestion.

**INHALATION RISK:**
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

**EFFECTS OF SHORT-TERM EXPOSURE:**
The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.

**PHYSICAL PROPERTIES**

Boiling point: 121°C
Melting point: -22°C
Relative density (water = 1): 1.6
Solubility in water, g/100 ml at 20°C: 0.015

Vapour pressure, kPa at 20°C: 1.9
Relative vapour density (air = 1): 5.8
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Octanol/water partition coefficient as log Pow: 2.9

**ENVIRONMENTAL DATA**

The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

**N O T E S**

Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1897

NFPA Code: H2; F0; R0;

**ADDITIONAL INFORMATION**





**IMPORTANT LEGAL NOTICE:**

| | |
|---|---|
| | modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values. |

# International Chemical Safety Cards

## TRICHLOROETHYLENE

**ICSC: 0081**

1,1,2-Trichloroethylene
Trichloroethene
Ethylene trichloride
Acetylene trichloride
$C_2HCl_3$ / $ClCH=CCl_2$
Molecular mass: 131.4

ICSC # 0081
CAS # 79-01-6
RTECS # KX4550000
UN # 1710
EC # 602-027-00-9
April 10, 2000 Validated

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Combustible under specific conditions. See Notes. | | In case of fire in the surroundings: all extinguishing agents allowed. |
| **EXPLOSION** | | Prevent build-up of electrostatic charges (e.g., by grounding). | In case of fire: keep drums, etc., cool by spraying with water. |
| **EXPOSURE** | | PREVENT GENERATION OF MISTS! STRICT HYGIENE! | |
| **•INHALATION** | Dizziness. Drowsiness. Headache. Weakness. Nausea. Unconsciousness. | Ventilation, local exhaust, or breathing protection. | Fresh air, rest. Artificial respiration may be needed. Refer for medical attention. |
| **•SKIN** | Dry skin. Redness. | Protective gloves. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| **•EYES** | Redness. Pain. | Safety spectacles, or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | Abdominal pain. (Further see Inhalation). | Do not eat, drink, or smoke during work. | Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Ventilation. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. | Separated from metals ( see Chemical Dangers ), strong bases, food and feedstuffs . Dry. Keep in the dark. Ventilation along the floor. Store in an area without drain or sewer access. | Do not transport with food and feedstuffs. Marine pollutant. T symbol R: 45-36/38-52/53-67 S: 53-45-61 UN Hazard Class: 6.1 UN Packing Group: III |

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0081** OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

## TRICHLOROETHYLENE

**ICSC: 0081**

**I M P O R T A N T D A T A**

**PHYSICAL STATE; APPEARANCE:**
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

**PHYSICAL DANGERS:**
The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.

**CHEMICAL DANGERS:**
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes ( phosgene , hydrogen chloride ). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.

**OCCUPATIONAL EXPOSURE LIMITS:**
TLV: 50 ppm as TWA; 100 ppm as STEL; A5; BEI issued; (ACGIH 2004).
MAK:
Carcinogen category: 1; Germ cell mutagen group: 3B; (DFG 2007).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)
NIOSH REL: Ca See Appendix A See Appendix C
NIOSH IDLH: Ca 1000 ppm See: 79016

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation and by ingestion.

**INHALATION RISK:**
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

**EFFECTS OF SHORT-TERM EXPOSURE:**
The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in respiratory failure . Exposure could cause lowering of consciousness.

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system , resulting in loss of memory. The substance may have effects on the liver and kidneys (see Notes). This substance is probably carcinogenic to humans.

**PHYSICAL PROPERTIES**

Boiling point: 87°C
Melting point: -73°C
Relative density (water = 1): 1.5
Solubility in water, g/100 ml at 20°C: 0.1
Vapour pressure, kPa at 20°C: 7.8
Relative vapour density (air = 1): 4.5
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3
Auto-ignition temperature: 410°C
Explosive limits, vol% in air: 8-10.5
Octanol/water partition coefficient as log Pow: 2.42
Electrical conductivity: 800pS/m

**ENVIRONMENTAL DATA**

The substance is harmful to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

**N O T E S**

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Transport Emergency Card: TEC (R)-61S1710

NFPA Code: H2; F1; R0;
Card has been partially updated in October 2004: see Occupational Exposure Limits, EU Classification, Emergency Response.
Card has been partially updated in April 2010: see Occupational Exposure Limits, Ingestion First Aid, Storage.

**ADDITIONAL INFORMATION**

**ICSC: 0081** **TRICHLOROETHYLENE**



| | |
|---|---|
| **IMPORTANT LEGAL NOTICE:** | Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values. |

# International Chemical Safety Cards

## BENZ(a)ANTHRACENE

**ICSC: 0385**

1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
$C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 0385
CAS # 56-55-3
RTECS # CV9275000
EC # 601-033-00-9
October 23, 1995 Validated

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Combustible. | | Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media. |
| **EXPLOSION** | Finely dispersed particles form explosive mixtures in air. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| **EXPOSURE** | | AVOID ALL CONTACT! | |
| **•INHALATION** | | Local exhaust or breathing protection. | Fresh air, rest. |
| **•SKIN** | | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| **•EYES** | | Safety goggles face shield or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | | Do not eat, drink, or smoke during work. Wash hands before eating. | Rinse mouth. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus. | Well closed. | T symbol<br>N symbol<br>R: 45-50/53<br>S: 53-45-60-61 |

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0385**



# International Chemical Safety Cards

# BENZ(a)ANTHRACENE

**I M P O R T A N T D A T A**

**PHYSICAL STATE; APPEARANCE:**
COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.

**PHYSICAL DANGERS:**
Dust explosion possible if in powder or granular form, mixed with air.

**CHEMICAL DANGERS:**

**OCCUPATIONAL EXPOSURE LIMITS:**
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK:
Carcinogen category: 2 (as pyrolysis product of organic materials)
(DFG 2005).

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

**INHALATION RISK:**
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

**EFFECTS OF SHORT-TERM EXPOSURE:**

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
This substance is probably carcinogenic to humans.

**PHYSICAL PROPERTIES**

Sublimation point: 435°C
Melting point: 162°C
Relative density (water = 1): 1.274
Solubility in water:
none

Vapour pressure, Pa at 20°C: 292
Octanol/water partition coefficient as log Pow: 5.61

**ENVIRONMENTAL DATA**

Bioaccumulation of this chemical may occur in seafood.

**N O T E S**

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name. Card has been partly updated in October 2005 and August 2006: see sections Occupational Exposure Limits, EU classification.

**ADDITIONAL INFORMATION**

**ICSC: 0385** **BENZ(a)ANTHRACENE**

# International Chemical Safety Cards

## BENZO(b)FLUORANTHENE

**ICSC: 0720**

Benz(e)acephenanthrylene
2,3-Benzofluoroanthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0720
CAS # 205-99-2
RTECS # CU1400000
EC # 601-034-00-4
March 25, 1999 Peer reviewed

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | | | In case of fire in the surroundings: use appropriate extinguishing media. |
| **EXPLOSION** | | | |
| **EXPOSURE** | | AVOID ALL CONTACT! | |
| **•INHALATION** | | Local exhaust or breathing protection. | Fresh air, rest. |
| **•SKIN** | | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| **•EYES** | | Safety spectacles or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | | Do not eat, drink, or smoke during work. | Rinse mouth. Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. | Provision to contain effluent from fire extinguishing. Well closed. | T symbol<br>N symbol<br>R: 45-50/53<br>S: 53-45-60-61 |

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0720**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

## BENZO(b)FLUORANTHENE

**ICSC: 0720**

| | | |
|---|---|---|
| **I** | **PHYSICAL STATE; APPEARANCE:**<br>COLOURLESS CRYSTALS | **ROUTES OF EXPOSURE:**<br>The substance can be absorbed into the body by inhalation |

| | |
|---|---|
| **IMPORTANT DATA** | **PHYSICAL DANGERS:**<br><br>**CHEMICAL DANGERS:**<br>Upon heating, toxic fumes are formed.<br><br>**OCCUPATIONAL EXPOSURE LIMITS:**<br>TLV: A2 (suspected human carcinogen); (ACGIH 2004).<br>MAK:<br>Carcinogen category: 2;<br>(DFG 2004).<br><br>of its aerosol and through the skin.<br><br>**INHALATION RISK:**<br>Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.<br><br>**EFFECTS OF SHORT-TERM EXPOSURE:**<br><br>**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**<br>This substance is possibly carcinogenic to humans. May cause genetic damage in humans. |
| **PHYSICAL PROPERTIES** | Boiling point: 481°C<br>Melting point: 168°C<br>Solubility in water:<br>none<br><br>Octanol/water partition coefficient as log Pow: 6.12 |
| **ENVIRONMENTAL DATA** | This substance may be hazardous to the environment; special attention should be given to air quality and water quality.  |

**N O T E S**

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m$^3$. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

**ADDITIONAL INFORMATION**

**ICSC: 0720** **BENZO(b)FLUORANTHENE**

# International Chemical Safety Cards

## CHRYSENE

**ICSC: 1672**

Benzoaphenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene
$C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 1672
CAS # 218-01-9
RTECS # GC0700000
UN # 3077
EC # 601-048-00-0
October 12, 2006 Validated

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Combustible. | NO open flames. | Water spray. Dry powder. Foam. Carbon dioxide. |
| **EXPLOSION** | Finely dispersed particles form explosive mixtures in air. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| **EXPOSURE** | See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE. | AVOID ALL CONTACT! | |
| **•INHALATION** | | Local exhaust or breathing protection. | Fresh air, rest. |
| **•SKIN** | | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| **•EYES** | | Safety goggles | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | | Do not eat, drink, or smoke during work. | Rinse mouth. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. | Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access. | T symbol<br>N symbol<br>R: 45-68-50/53<br>S: 53-45-60-61<br>UN Hazard Class: 9<br>UN Packing Group: III<br>Signal: Warning<br>Aqua-Cancer<br>Suspected of causing cancer<br>Very toxic to aquatic life with long lasting effects<br>Very toxic to aquatic life |

**SEE IMPORTANT INFORMATION ON BACK**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European

# International Chemical Safety Cards

## CHRYSENE

ICSC: 1672

**IMPORTANT DATA**

**PHYSICAL STATE; APPEARANCE:**
COLOURLESS TO BEIGE CRYSTALS OR POWDER

**PHYSICAL DANGERS:**
Dust explosion possible if in powder or granular form, mixed with air.

**CHEMICAL DANGERS:**
The substance decomposes on burning producing toxic fumes Reacts violently with strong oxidants

**OCCUPATIONAL EXPOSURE LIMITS:**
TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006).
MAK not established.

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

**INHALATION RISK:**
A harmful concentration of airborne particles can be reached quickly when dispersed

**EFFECTS OF SHORT-TERM EXPOSURE:**

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
This substance is possibly carcinogenic to humans.

**PHYSICAL PROPERTIES**

Boiling point: 448°C
Melting point: 254 - 256°C
Density: 1.3 g/cm³

Solubility in water:
very poor
Octanol/water partition coefficient as log Pow: 5.9

**ENVIRONMENTAL DATA**

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.

**NOTES**

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.

Transport Emergency Card: TEC (R)-90GM7-III

**ADDITIONAL INFORMATION**

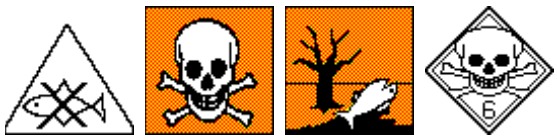
# International Chemical Safety Cards

## ARSENIC

**ICSC: 0013**

Grey arsenic
As
Atomic mass: 74.9

ICSC # 0013
CAS # 7440-38-2
RTECS # CG0525000
UN # 1558
EC # 033-001-00-X
October 18, 1999 Peer reviewed



| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Combustible. Gives off irritating or toxic fumes (or gases) in a fire. | NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces. | Powder, water spray, foam, carbon dioxide. |
| **EXPLOSION** | Risk of fire and explosion is slight when exposed to hot surfaces or flames in the form of fine powder or dust. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| **EXPOSURE** | | PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN! | IN ALL CASES CONSULT A DOCTOR! |
| **•INHALATION** | Cough. Sore throat. Shortness of breath. Weakness. See Ingestion. | Closed system and ventilation. | Fresh air, rest. Artificial respiration may be needed. Refer for medical attention. |
| **•SKIN** | Redness. | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse skin with plenty of water or shower. |
| **•EYES** | Redness. | Face shield or eye protection in combination with breathing protection if powder. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | Abdominal pain. Diarrhoea. Nausea. Vomiting. Burning sensation in the throat and chest. Shock or collapse. Unconsciousness. | Do not eat, drink, or smoke during work. Wash hands before eating. | Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. | Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed. | Do not transport with food and feedstuffs.<br>Marine pollutant.<br>T symbol<br>N symbol<br>R: 23/25-50/53<br>S: 1/2-20/21-28-45-60-61<br>UN Hazard Class: 6.1<br>UN Packing Group: II |

**SEE IMPORTANT INFORMATION ON BACK**

# International Chemical Safety Cards

## CADMIUM

**ICSC: 0020**

Cd
Atomic mass: 112.4

ICSC # 0020
CAS # 7440-43-9
RTECS # EU9800000
UN # 2570
EC # 048-002-00-0
April 22, 2005 Peer reviewed


| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Flammable in powder form and spontaneously combustible in pyrophoric form. Gives off irritating or toxic fumes (or gases) in a fire. | NO open flames, NO sparks, and NO smoking. NO contact with heat or acid(s). | Dry sand. Special powder. NO other agents. |
| **EXPLOSION** | Finely dispersed particles form explosive mixtures in air. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| **EXPOSURE** | | PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! | IN ALL CASES CONSULT A DOCTOR! |
| •**INHALATION** | Cough. Sore throat. | Local exhaust or breathing protection. | Fresh air, rest. Refer for medical attention. |
| •**SKIN** | | Protective gloves. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| •**EYES** | Redness. Pain. | Safety goggles or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| •**INGESTION** | Abdominal pain. Diarrhoea. Headache. Nausea. Vomiting. | Do not eat, drink, or smoke during work. | Rest. Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Evacuate danger area! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place. | Fireproof. Dry. Keep under inert gas. Separated from igntion sources, oxidants acids, food and feedstuffs | Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs.<br>Note: E<br>T+ symbol<br>N symbol<br>R: 45-26-48/23/25-62-63-68-50/53<br>S: 53-45-60-61<br>UN Hazard Class: 6.1 |

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0020**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

## CADMIUM

**ICSC: 0020**

**I M P O R T A N T D A T A**

**PHYSICAL STATE; APPEARANCE:**
SOFT BLUE-WHITE METAL LUMPS OR GREY POWDER. MALLEABLE. TURNS BRITTLE ON EXPOSURE TO 80°C AND TARNISHES ON EXPOSURE TO MOIST AIR.

**PHYSICAL DANGERS:**
Dust explosion possible if in powder or granular form, mixed with air.

**CHEMICAL DANGERS:**
Reacts with acids forming flammable/explosive gas (hydrogen - see ICSC0001.) Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium , causing fire and explosion hazard.

**OCCUPATIONAL EXPOSURE LIMITS:**
TLV: (Total dust) 0.01 mg/m³
(Respirable fraction)
0.002 mg/m³ as TWA A2 (suspected human carcinogen); BEI issued (ACGIH 2005).
MAK: skin absorption (H);
Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).
OSHA PEL*: 1910.1027 TWA 0.005 mg/m$^3$ *Note: The PEL applies to all Cadmium compounds (as Cd).
NIOSH REL*: Ca See Appendix A *Note: The REL applies to all Cadmium compounds (as Cd).
NIOSH IDLH: Ca 9 mg/m$^3$ (as Cd) See: IDLH INDEX

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

**INHALATION RISK:**
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

**EFFECTS OF SHORT-TERM EXPOSURE:**
The fume is irritating to the respiratory tract Inhalation of fume may cause lung oedema (see Notes). Inhalation of fumes may cause metal fume fever. The effects may be delayed. Medical observation is indicated.

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the kidneys , resulting in kidney impairment This substance is carcinogenic to humans.

**PHYSICAL PROPERTIES**

Boiling point: 765°C
Melting point: 321°C
Density: 8.6
g/cm3

Solubility in water: none
Auto-ignition temperature: (cadmium metal dust) 250°C

**ENVIRONMENTAL DATA**

**N O T E S**

Reacts violently with fire extinguishing agents such as water,foam,carbon dioxideand halons. Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Do NOT take working clothes home. Cadmium also exists in a pyrophoric form (EC No. 048-011-00-X), which bears the additional EU labelling symbol F, R phrase 17, and S phrases 7/8 and 43. UN numbers and packing group will vary according to the physical form of the substance.

**ADDITIONAL INFORMATION**

# International Chemical Safety Cards

## COPPER

**ICSC: 0240**

Cu
(powder)

ICSC # 0240
CAS # 7440-50-8
RTECS # GL5325000
September 24, 1993 Validated

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Combustible. | NO open flames. | Special powder, dry sand, NO other agents. |
| **EXPLOSION** | | | |
| **EXPOSURE** | | PREVENT DISPERSION OF DUST! | |
| **•INHALATION** | Cough. Headache. Shortness of breath. Sore throat. | Local exhaust or breathing protection. | Fresh air, rest. Refer for medical attention. |
| **•SKIN** | Redness. | Protective gloves. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| **•EYES** | Redness. Pain. | Safety goggles. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | Abdominal pain. Nausea. Vomiting. | Do not eat, drink, or smoke during work. | Rinse mouth. Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place. (Extra personal protection: P2 filter respirator for harmful particles). | Separated from - See Chemical Dangers. | R:<br>S: |

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0240**



# International Chemical Safety Cards

## COPPER

**ICSC: 0240**

**I**

**M**

**P**

**PHYSICAL STATE; APPEARANCE:**
RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.

**PHYSICAL DANGERS:**

**CHEMICAL DANGERS:**

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation and by ingestion.

**INHALATION RISK:**
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

| | | |
|---|---|---|
| **O**<br>**R**<br>**T**<br>**A**<br>**N**<br>**T**<br><br>**D**<br>**A**<br>**T**<br>**A** | Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard.<br><br>**OCCUPATIONAL EXPOSURE LIMITS:**<br>TLV: 0.2 mg/m³ fume (ACGIH 1992-1993).<br>TLV (as Cu, dusts & mists): 1 mg/m³ (ACGIH 1992-1993).<br>Intended change 0.1 mg/m³<br>Inhal.,<br>A4 (not classifiable as a human carcinogen);<br>MAK: 0.1 mg/m³ (Inhalable fraction)<br>Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005).<br>OSHA PEL*: TWA 1 mg/m$^3$ *Note: The PEL also applies to other copper compounds (as Cu) except copper fume.<br>NIOSH REL*: TWA 1 mg/m$^3$ *Note: The REL also applies to other copper compounds (as Cu) except Copper fume.<br>NIOSH IDLH: 100 mg/m$^3$ (as Cu) See: 7440508 | **EFFECTS OF SHORT-TERM EXPOSURE:**<br>Inhalation of fumes may cause metal fume fever. See Notes.<br><br>**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**<br>Repeated or prolonged contact may cause skin sensitization. |
| **PHYSICAL PROPERTIES** | Boiling point: 2595°C<br>Melting point: 1083°C<br>Relative density (water = 1): 8.9 | Solubility in water:<br>none |
| **ENVIRONMENTAL DATA** | | |

**N O T E S**

The symptoms of metal fume fever do not become manifest until several hours.

**ADDITIONAL INFORMATION**

| | |
|---|---|
| | |

**ICSC: 0240** **COPPER**



| | |
|---|---|
| **IMPORTANT LEGAL NOTICE:** | Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values. |

# International Chemical Safety Cards

## LEAD

**ICSC: 0052**

Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

ICSC # 0052
CAS # 7439-92-1
RTECS # OF7525000
October 08, 2002 Peer reviewed

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. | | In case of fire in the surroundings: use appropriate extinguishing media. |
| **EXPLOSION** | Finely dispersed particles form explosive mixtures in air. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| **EXPOSURE** | See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE. | PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN! | |
| **•INHALATION** | | Local exhaust or breathing protection. | Fresh air, rest. |
| **•SKIN** | | Protective gloves. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| **•EYES** | | Safety spectacles. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | Abdominal pain. Nausea. Vomiting. | Do not eat, drink, or smoke during work. Wash hands before eating. | Rinse mouth. Give plenty of water to drink. Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles. | Separated from food and feedstuffs incompatible materials See Chemical Dangers. | R:<br>S: |

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0052**

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

# LEAD

**ICSC: 0052**

**I M P O R T A N T D A T A**

**PHYSICAL STATE; APPEARANCE:**
BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.

**PHYSICAL DANGERS:**
Dust explosion possible if in powder or granular form, mixed with air.

**CHEMICAL DANGERS:**
On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.

**OCCUPATIONAL EXPOSURE LIMITS:**
TLV: 0.05 mg/m³ A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004).
MAK:
Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004).
EU OEL: as TWA 0.15 mg/m³ (EU 2002).
OSHA PEL*: 1910.1025 TWA 0.050 mg/m$^3$ See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH REL*: TWA 0.050 mg/m$^3$ See Appendix C
*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH IDLH: 100 mg/m$^3$ (as Pb) See: 7439921

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation and by ingestion.

**INHALATION RISK:**
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

**EFFECTS OF SHORT-TERM EXPOSURE:**

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.

| | | |
|---|---|---|
| **PHYSICAL PROPERTIES** | Boiling point: 1740°C<br>Melting point: 327.5°C | Density: 11.34 g/cm3<br>Solubility in water: none |
| **ENVIRONMENTAL DATA** | Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.  | |

**N O T E S**

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-51S1872

**ADDITIONAL INFORMATION**

**ICSC: 0052** **LEAD**

# International Chemical Safety Cards

## MERCURY

**ICSC: 0056**

Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

ICSC # 0056
CAS # 7439-97-6
RTECS # OV4550000
UN # 2809
EC # 080-001-00-0
April 22, 2004 Peer reviewed

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. | | In case of fire in the surroundings: use appropriate extinguishing media. |
| **EXPLOSION** | Risk of fire and explosion. | | In case of fire: keep drums, etc., cool by spraying with water. |
| **EXPOSURE** | | STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN! | IN ALL CASES CONSULT A DOCTOR! |
| **•INHALATION** | Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature. | Local exhaust or breathing protection. | Fresh air, rest. Artificial respiration if indicated. Refer for medical attention. |
| **•SKIN** | MAY BE ABSORBED! Redness. | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. |
| **•EYES** | | Face shield, or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| **•INGESTION** | | Do not eat, drink, or smoke during work. Wash hands before eating. | Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus. | Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed. | Special material. Do not transport with food and feedstuffs.<br>T symbol<br>N symbol<br>R: 23-33-50/53<br>S: 1/2-7-45-60-61<br>UN Hazard Class: 8<br>UN Packing Group: III |

**SEE IMPORTANT INFORMATION ON BACK**

# International Chemical Safety Cards

## MERCURY

**ICSC: 0056**

**IMPORTANT DATA**

**PHYSICAL STATE; APPEARANCE:**
ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.

**PHYSICAL DANGERS:**

**CHEMICAL DANGERS:**
Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.

**OCCUPATIONAL EXPOSURE LIMITS:**
TLV: 0.025 mg/m³ as TWA (skin) A4 BEI issued (ACGIH 2004).
MAK: 0.1 mg/m³ Sh
Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003).
OSHA PEL†: C 0.1 mg/m$^3$
NIOSH REL: Hg Vapor: TWA 0.05 mg/m$^3$ skin
Other: C 0.1 mg/m$^3$ skin
NIOSH IDLH: 10 mg/m$^3$ (as Hg) See: 7439976

**ROUTES OF EXPOSURE:**
The substance can be absorbed into the body by inhalation of its vapour and through the skin , also as a vapour!

**INHALATION RISK:**
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

**EFFECTS OF SHORT-TERM EXPOSURE:**
The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous systemandkidneys. The effects may be delayed. Medical observation is indicated.

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
The substance may have effects on the central nervous system kidneys , resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

**PHYSICAL PROPERTIES**

Boiling point: 357°C
Melting point: -39°C
Relative density (water = 1): 13.5
Solubility in water:
none

Vapour pressure, Pa at 20°C: 0.26
Relative vapour density (air = 1): 6.93
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009

**ENVIRONMENTAL DATA**

The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.

**N O T E S**

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

**ADDITIONAL INFORMATION**

**ICSC: 0056** **MERCURY**

# International Chemical Safety Cards

## ZINC POWDER

**ICSC: 1205**

Blue powder
Merrillite
Zn
Atomic mass: 65.4
(powder)




ICSC # 1205
CAS # 7440-66-6
RTECS # ZG8600000
UN # 1436 (zinc powder or dust)
EC # 030-001-00-1
October 24, 1994 Peer reviewed

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---|---|---|---|
| **FIRE** | Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire. | NO open flames, NO sparks, and NO smoking. NO contact with acid(s), base (s) and incompatible substances (see Chemical Dangers). | Special powder, dry sand, NO other agents. NO water. |
| **EXPLOSION** | Risk of fire and explosion on contact with acid(s), base(s), water and incompatible substances. | Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Prevent deposition of dust. | In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water. |
| **EXPOSURE** | | PREVENT DISPERSION OF DUST! STRICT HYGIENE! | |
| •**INHALATION** | Metallic taste and metal fume fever. Symptoms may be delayed (see Notes). | Local exhaust. | Fresh air, rest. Refer for medical attention. |
| •**SKIN** | Dry skin. | Protective gloves. | Rinse and then wash skin with water and soap. |
| •**EYES** | | Safety spectacles. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| •**INGESTION** | Abdominal pain. Nausea. Vomiting. | Do not eat, drink, or smoke during work. Wash hands before eating. | Rinse mouth. Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|---|
| Extinguish or remove all ignition sources. Do NOT wash away into sewer. Sweep spilled substance into containers. then remove to safe place. Personal protection: self-contained breathing apparatus. | Fireproof. Separated from acids, bases oxidants Dry. | Airtight.<br>F symbol<br>N symbol<br>R: 15-17-50/53<br>S: 2-7/8-43-46-60-61<br>UN Hazard Class: 4.3<br>UN Subsidiary Risks: 4.2 |

**SEE IMPORTANT INFORMATION ON BACK**

# International Chemical Safety Cards

## ZINC POWDER

**ICSC: 1205**

| | |
|---|---|
| **I M P O R T A N T D A T A** | **PHYSICAL STATE; APPEARANCE:**<br>ODOURLESS GREY TO BLUE POWDER.<br><br>**PHYSICAL DANGERS:**<br>Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.<br><br>**CHEMICAL DANGERS:**<br>Upon heating, toxic fumes are formed. The substance is a strong reducing agent and reacts violently with oxidants. Reacts with water and reacts violently with acids and bases forming flammable/explosive gas (hydrogen - see ICSC0001) Reacts violently with sulfur, halogenated hydrocarbons and many other substances causing fire and explosion hazard.<br><br>**OCCUPATIONAL EXPOSURE LIMITS:**<br>TLV not established.<br><br>**ROUTES OF EXPOSURE:**<br>The substance can be absorbed into the body by inhalation and by ingestion.<br><br>**INHALATION RISK:**<br>Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.<br><br>**EFFECTS OF SHORT-TERM EXPOSURE:**<br>Inhalation of fumes may cause metal fume fever. The effects may be delayed.<br><br>**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**<br>Repeated or prolonged contact with skin may cause dermatitis. |
| **PHYSICAL PROPERTIES** | Boiling point: 907°C<br>Melting point: 419°C<br>Relative density (water = 1): 7.14<br>Solubility in water: reaction<br>Vapour pressure, kPa at 487°C: 0.1<br>Auto-ignition temperature: 460°C |
| **ENVIRONMENTAL DATA** | |

**N O T E S**

Zinc may contain trace amounts of arsenic, when forming hydrogen, may also form toxic gas arsine (see ICSC 0001 and ICSC 0222). Reacts violently with fire extinguishing agents such as water, halons, foam and carbon dioxide. The symptoms of metal fume fever do not become manifest until several hours later. Rinse contaminated clothes (fire hazard) with plenty of water.

Transport Emergency Card: TEC (R)-43GWS-II+III
NFPA Code: H0; F1; R1;

**ADDITIONAL INFORMATION**

**ICSC: 1205** **ZINC POWDER**

# *APPENDIX D*

# *HOSPITAL INFORMATION AND MAP*

# *FIELD ACCIDENT REPORT*

# FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO._____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

_____

Description of Accident _____

_____

_____

Action Taken _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

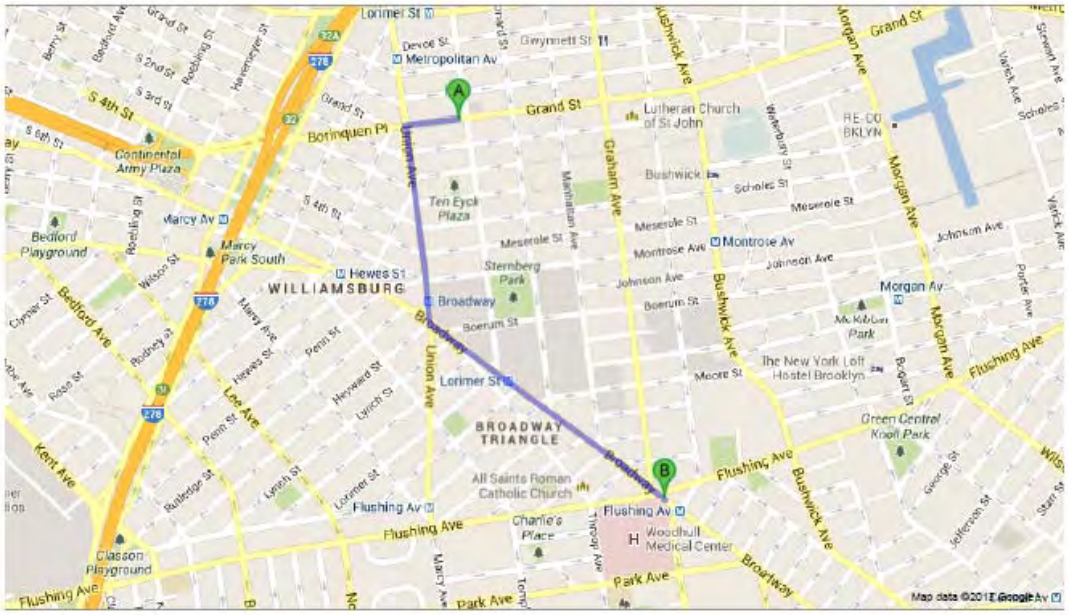
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

## HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

**Woodhull Medical Center**
760 Broadway, Brooklyn, NY 11206
718-963-8000
1.0 Mile – About 4 Minutes




**Driving directions to Woodhull Medical Center**
(718) 963-8000

3D

**555 Grand St**
Brooklyn, NY 11211

1. Head west on Grand St toward Union Ave — 0.1 mi
2. Take the 1st left onto Union Ave — 0.4 mi
3. Turn left onto Broadway
   Destination will be on the right — 0.6 mi

**Woodhull Medical Center**
760 Broadway
Brooklyn, NY 11206
(718) 963-8000

# ***ATTACHMENT E***
# Site Management Forms

# SITE INSPECTION CHECKLIST

**Site Inspection Checklist**
**555 Grand Street**
**Brooklyn, NY**

Date: _____ Time: _____

Inspector Name/Organization: _____

**Physical Inspection of Fan**

| **Fan 1 :** | **yes** | **no** | Fan Model No. Manufacturer: |
|---|---|---|---|
| Operational? | _____ | _____ | _____ |
| Observed Leaks at Seals? | _____ | _____ | |
| Air Flow at Exhaust Stack? | _____ | _____ | Other Comments / Observations |
| Vacuum Reading: _____ | | | _____ |

Repairs Needed and / or Maintenance at this time?

_____

_____

_____

_____

Signature: _____ Date: _____

**Site Inspection Checklist - Cover System**
**555 Grand Street**
**Brooklyn, NY**

Date: _____ Time: _____

Inspector Name/Organization: _____

**Visual Inspection of Concrete Slabs**

**555 Grand Street** Inspect concrete slab for cracks, perforations and patching

Describe General Condition of Slab _____

Describe any Cracks or New Penetrations _____

Describe any Patching _____

**Exterior Impervious Cap Areas (Rear Courtyard)** Inspect for cracks, perforations and patching

Describe General Condition of Impervious Cap _____

Describe any Cracks or New Penetrations _____

Describe any Patching _____

Repairs Needed and / or Maintenance at this time?

_____

Signature: _____ Date: _____

# CHAIN OF CUSTODY RECORD AIR ANALYSES

PHOENIX
Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
**Client Services (860) 645-1102**



**Data Delivery:**
☐ Fax #: _____
☐ Email: _____

| | | |
|---|---|---|
| **Report to:** | **Invoice to:** | **Project Name:** |
| **Address:** | **Address:** | **Location:** |
| **Project Mgr:** | **P.O. #** | **State:** |
| **Phone #** | **Quote #** | **Sampled by:** |

| Phoenix ID # | Client Sample ID | Canister ID # | Canister Size (L) | Outgoing Canister Pressure (" Hg) | Incoming Canister Pressure ("Hg) | Flow Regulator ID # | Flow Controller Setting (mL/min) | Sampling Start Time | Sampling End Time | Sample Start Date | Canister Pressure at Start (" Hg) | Canister Pressure at End ("Hg) | Ambient/Indoor Air | Soil Gas | Grab ( G ) Composite ( C ) | | TO-14 | TO-15 | | | | Is Canister Returned Unused? Y/N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *LAB USE ONLY* | | | | | | | | | | | MATRIX | | | | ANALYSES | | | | | |
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| Relinquished by: | Accepted by: | Date: | Time: |
|---|---|---|---|
| | | | |
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| | | | |

**Criteria Requested:** **Deliverable:**
RCP ☐
MCP ☐
**State where samples collected:** _____

**Data Format:**
Excel ☐ Equis ☐
PDF ☐ Other: ☐
GISKey ☐

**SPECIAL INSTRUCTIONS, QC REQUIREMENTS, REGULATORY INFORMATION:**

*I attest that all media released by Phoenix Environmental Laboratories, Inc. have been received in good working condition and agree to the terms and conditions as listed on the back of this document:*

Signature: _____Date: _____

# ***ATTACHMENT F***
# O&M Manual

# 1.0 OPERATION AND MAINTENANCE PLAN

## 1.1 General

The Operation and Maintenance Plan provides a brief description of the measures necessary to operate, monitor and maintain the mechanical components of the remedy selected for the site. This Operation and Maintenance Plan:

- Includes the procedures necessary to allow individuals unfamiliar with the Site to operate and maintain the SSD system;
- Will be updated periodically to reflect changes in site conditions or the manner in which the SSD system are operated and maintained.

A copy of this Operation and Maintenance Manual, along with the complete SMP, is maintained at the site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of this SMP.

## 1.2 Remedial System (or other Engineering Control) Performance Criteria

The SSD system has been designed with an air blower capable of producing enough negative pressure in the sub-slab as to be able to remove any potential off-gases. A minimum of 0.02" WC will be sought in the most remote sub-slab area. The vacuum achieved at the riser will be 0.10" WC or higher. The 1.5 HP regenerative blower, located on the 1$^{st}$ floor rear yard and is electrically fed with a dedicated circuit. The exhaust point is located on the roof and is installed a minimum distance of 10 ft from any vent or operable windows. A visual and audible alarm, which signals when vacuum is lost at the riser, is powered independently from the blower, such that if the blower causes the breaker to trip, the alarm will still provide an alarm status. The blower is designed for continuous duty, and will be used continuously.

## 1.3 Operation and Maintenance of the Sub Slab Depressurization (SSD) System

Cut-sheets and as-built drawings for the SSD system are provided. The SSD system is not adjustable and the regenerative blower shall not be serviced or repaired at the Site. If the blower fails, the unit will need to be removed and shipped out for repairs, or replaced with another 1.5-hp regenerative blower.

### *1.3.1 SYSTEM START-UP AND TESTING*

The SSD system consists of a perforated sub-slab pipe, a gas permeable aggregate in the form of ¾" RCA, a stub out, a riser, a 1.5 HP regenerative blower and control.

Once the SSD system is fully installed, vacuum is measured at the riser via the Magnehelic meter. Vacuum at the foot of the riser shall be greater than 0.10"WC.

Monitoring ports points are identified which are remote from each other and from the SSD perforated pipe. Care should be exerted before penetrating the slab and membrane to not perforate any utility pipes.

Having identified the monitoring points locations, a ½" hole is drilled through the concrete slab and vapor barrier into the gravel. With the help of a portable vacuum meter vacuum is measured in the sub-slab. Vacuum reading should be at least 0.02"WC. If vacuum is less or non-existent, then corrective measures must be taken.

After sub-slab testing is conducted during the start-up, the drilled holes are filled up with nonshrink grout or any other sealant, making sure it creates a seal at the vapor barrier depth.

The system testing described above will be conducted if, in the course of the SSD system lifetime, the system goes down or significant changes are made to the system and the system must be restarted.

Please see the manufacturer's instructions regarding additional information regarding system start-up, maintenance, and testing, provided.

### *1.3.2 ROUTINE SYSTEM OPERATION AND MAINTENANCE*

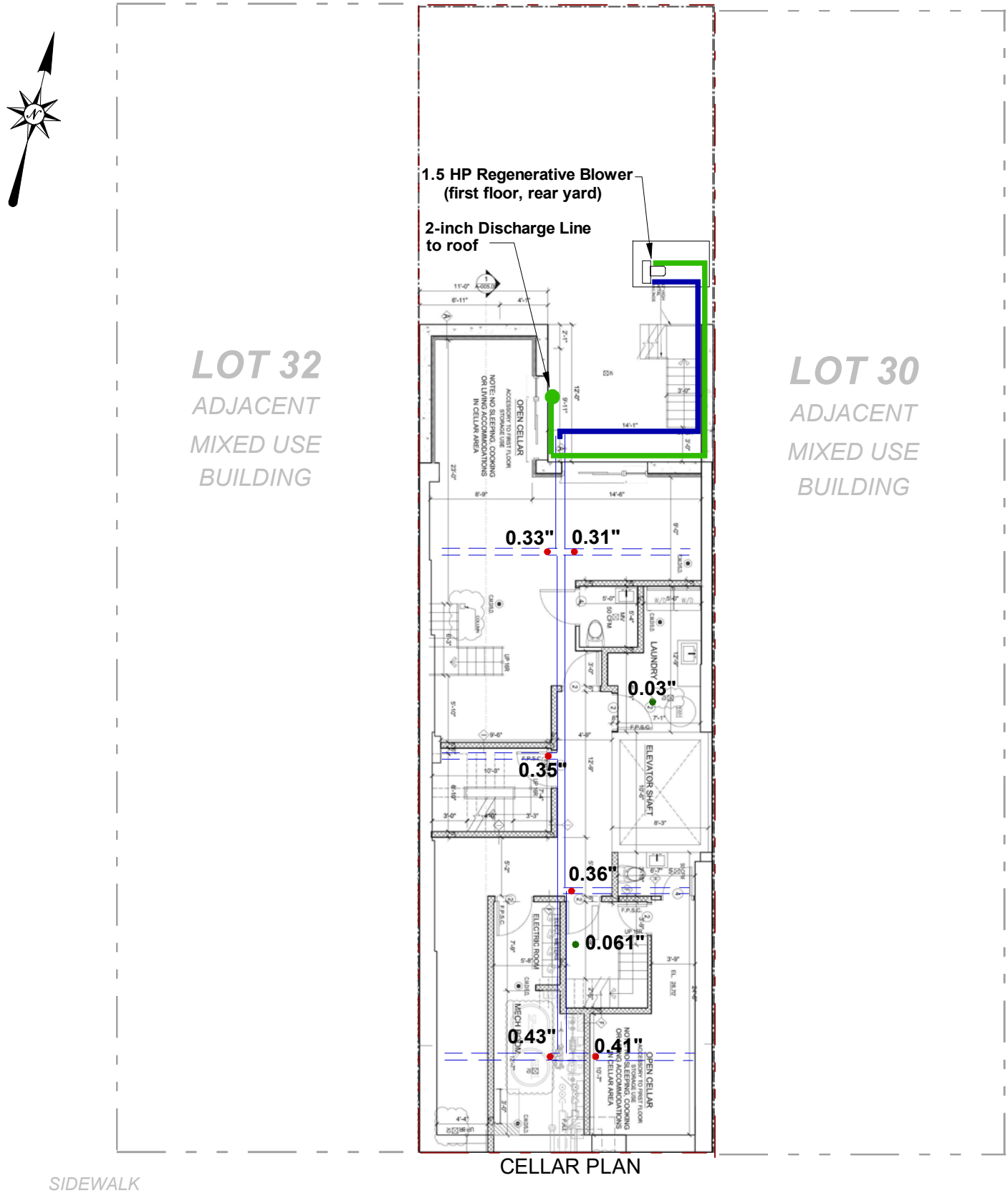
The system as designed is virtually maintenance free. If any of the components fail (blower, meter, alarm, they must be replaced with in kind. Please see the manufacturer's instructions regarding routine system operation and maintenance, provided.

### *1.3.3 NON-ROUTINE OPERATION AND MAINTENANCE*

The system as designed has no non-routine operation and maintenance requirements. It is important to label the riser on every floor, even if it is concealed behind chases or walls, to prevent unwanted future taps. Please see the manufacturer's instructions regarding non-routine operation and maintenance, provided.

### *1.3.4 SYSTEM MONITORING DEVICES AND ALARMS*

The SSD system has an alarm, which will go off when the fan is not working properly to maintain a minimum vacuum reading. The SSD system has warning devices to indicate that the system is not operating properly. In the event that warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSD system will be restarted. Operational problems will be noted in the Periodic Review Report to be prepared for that reporting period.




CELLAR PLAN

SCALE:

0 6 12

1 Inch = 12 feet

KEY:

- Property Boundary
- 4-inch PVC 10-slot Well Screen
- Subslab vacuum reading location
- SSDS leg vacuum reading location
- 4-inch Solid PVC

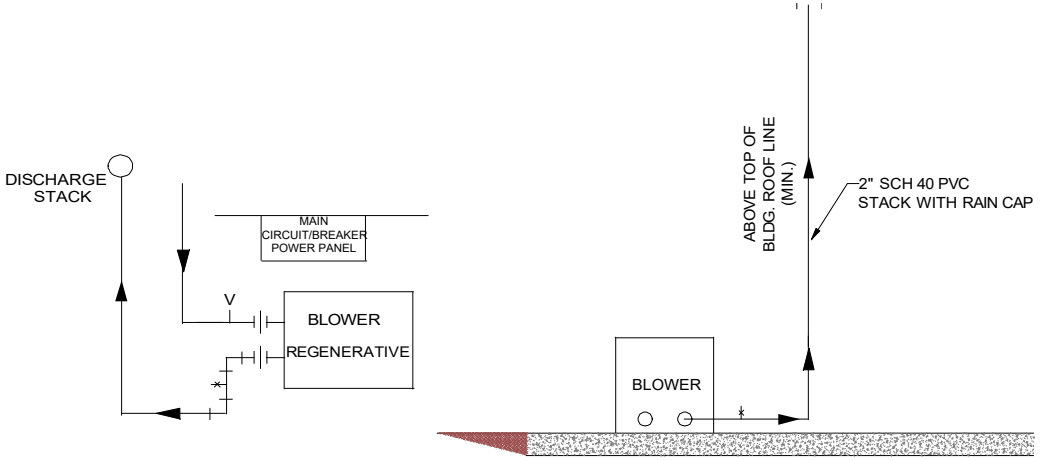
EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631.924.2870

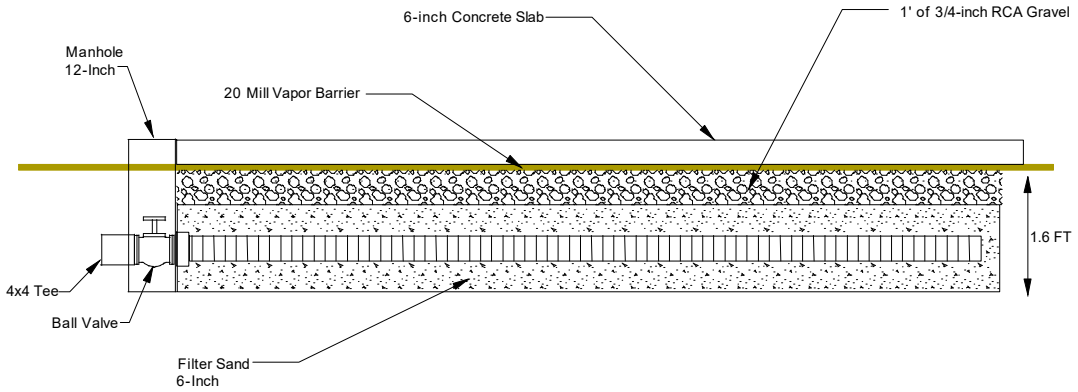
Figure No. 6

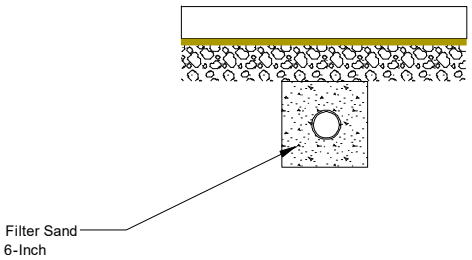
Site Name: Redevelopment Project

Site Address: 555 Grand Street, Brooklyn, NY

Drawing Title: Engineering Control Locations SSDS Layout




LEGEND

- 4"x2" SCH 40 PVC REDUCER
- FM 2" DIA. AIR FLOW METER
- V VACUUM GAUGE
- 2" DIA. SCH 40 PVC BALL VALVE
- BRASS SAMPLE TAP
- UNION OR QUICK CONNECT
- FLOW DIRECTION

**AMC Engineering**
1836 42nd Street
Astoria, NY 11105

*Figure No.* **7**

Site Name: Former Tomat Service Station
Site Address: 1815-1825 Ocean Avenue, Brooklyn, NY
Drawing Title: SSD System Details

**INSTALLATION & OPERATING INSTRUCTIONS**
**Instruction P/N IN015 Rev E**
**FOR *CHECKPOINT IIa*™ P/N 28001-2 & 28001-3**
**RADON SYSTEM ALARM**

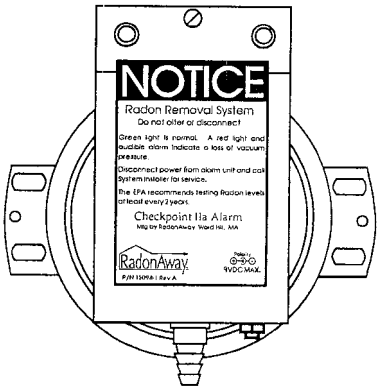
**INSTALLATION INSTRUCTIONS**
(WALL MOUNTING)

Select a suitable wall location near a vertical section of the suction pipe. The unit should be mounted about four or five feet above the floor and as close to the suction pipe as possible. Keep in mind that with the plug-in transformer provided, the unit must also be within six feet of a 120V receptacle. **NOTE: The Checkpoint IIa is calibrated for vertical mounting, horizontal mounting will affect switchpoint calibration.**

Drill two ¼" holes 4" apart horizontally where the unit is to be mounted.

Install the two ¼" wall anchors provided.

Hang the CHECKPOINT IIa from the two mouting holes located on the mounting bracket. Tighten the mounting screws so the unit fits snugly and securely against the wall.




Drill a 5/16" hole into the side of the vent pipe about 6" higher than the top of the unit.

Insert the vinyl tubing provided about 1" inside the suction pipe.

Cut a suitable length of vinyl tubing and attach it to the pressure switch connector on the CHECKPOINT IIa.

**CALIBRATION AND OPERATION.**

The CHECKPOINT IIa units are calibrated and sealed at the factory to alarm when the vacuum pressure falls below the factory setting and should not normally require field calibration. Factory Settings are:
**28001-2 -.25" WC Vacuum**
**28001-3 -.10" WC Vacuum**

**To Verify Operation:**

With the exhaust fan off or the pressure tubing disconnected and the CHECKPOINT IIa plugged in, both the red indicator light and the audible alarm should be on.

Turn the fan system on or connect the pressure tubing to the fan piping. The red light and the audible alarm should go off. The green light should come on.

Now turn the fan off. The red light and audible alarm should come on in about two or three seconds and the green light should go out.

**WARRANTY INFORMATION**

Subject to applicable consumer protection legislation, RadonAway warrants that the CHECKPOINT IIa will be free from defective material and workmanship for a period of (1) year from the date of purchase. Warranty is contingent on installation in accordance with the instructions provided. This warranty does not apply where repairs or alterations have been made or attempted by others; or the unit has been abused or misused. Warranty does not include damage in shipment unless the damage is due to the negligence of RadonAway. All other warranties, expressed or written, are not valid. To make a claim under these limited warranties, you must return the defective item to RadonAway with a copy of the purchase receipt. RadonAway is not responsible for installation or removal cost associated with this warranty. In no case is RadonAway liable beyond the repair or replacement of the defective product FOB RadonAway.

**THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO WARRANTY OF MERCHANTIBILITY. ALL OTHER WARRANTIES, EXPRESSED OR WRITTEN, ARE NOT VALID.**

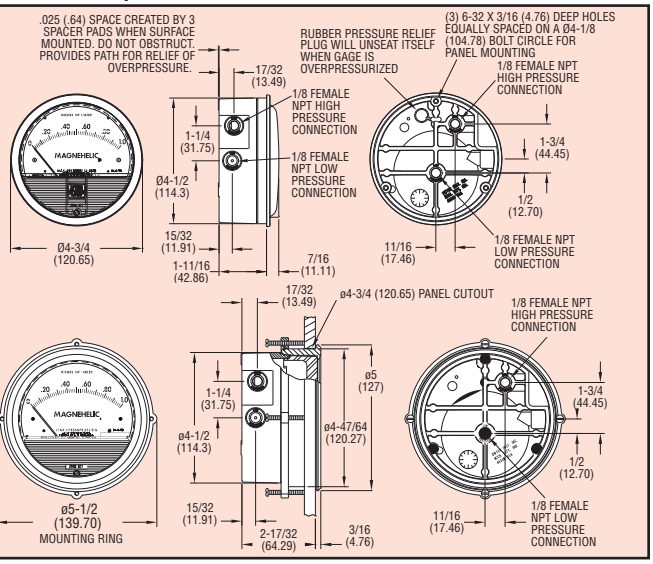
For service under these warranties, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. **No returns can be accepted without an RMA.** If factory return is required, the customer assumes all shipping costs to and from factory.

Manufactured by:
RadonAway
Ward Hill, MA
(978)-521-3703

Series 2000

# Magnehelic® Differential Pressure Gages

## Indicate Positive, Negative or Differential, Accurate within 2%


**Select the Dwyer® Magnehelic® gage** for high accuracy – guaranteed within 2% of full-scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

### Mounting

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. Although calibrated for vertical position, many ranges above 1″ may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4-9/16″ hole is required for flush panel mounting. Complete mounting and connection fittings, plus instructions, are furnished with each instrument. See page 7 for more information on mounting accessories.

**Flush, Surface or Pipe Mounted**

**Enclosure Mounted**

### SPECIFICATIONS

**Service:** Air and non-combustible, compatible gases (natural gas option available).
**Note:** May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
**Wetted Materials:** Consult factory.
**Housing:** Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
**Accuracy:** ±2% of FS (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on - 00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
**Pressure Limits:** -20 in Hg to 15 psig† (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
**Overpressure:** Relief plug opens at approximately 25 psig (1.72 bar), standard gages only. See Overpressure Protection Note on next page.
**Temperature Limits:** 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
**Size:** 4″ (101.6 mm) diameter dial face.
**Mounting Orientation:** Diaphragm in vertical position. Consult factory for other position orientations.
**Process Connections:** 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
**Weight:** 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
**Standard Accessories:** Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapter, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
**Agency Approval:** RoHS. **Note:** -SP models not RoHS approved.
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

### ACCESSORIES

**Model A-432 Portable Kit**
Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder . . . . . **$48.00**

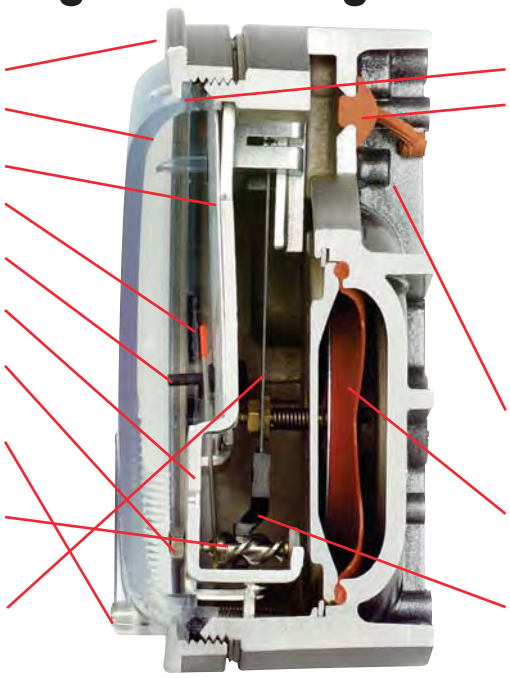
**Model A-605 Air Filter Gage Accessory Kit**
Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves . . . . . **35.00**

**A-605B Air Filter Gage Accessory Kit,** Air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange . . . . . **26.00**

**A-605C Air Filter Gage Accessory Kit,** Air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange . . . . . **21.00**

Series 2000

# Magnehelic® Gage Models & Ranges



**Bezel** provides flange for flush mounting in panel.

**Clear plastic face** is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

**Precision litho-printed scale** is accurate and easy to read.

**Red tipped pointer** of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

**Pointer stops** of molded rubber prevent pointer over-travel without damage.

**"Wishbone" assembly** provides mounting for helix, helix bearings and pointer shaft.

**Jeweled bearings** are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

**Zero adjustment screw** is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.

**Helix** is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

**Calibrated range** spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

**O-ring seal** for cover assures pressure integrity of case.

**OVERPRESSURE PROTECTION**
**Blowout plug** is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads. The blowout plug is not used on models above 180″ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm. The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings or any component.

**Die cast aluminum case** is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

**Silicone rubber diaphragm** with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

**Samarium Cobalt magnet** mounted at one end of range spring rotates helix without mechanical linkages.

| Model | Range Inches of Water | Price |
|---|---|---|
| 2000-00N†•• | .05-0-.2 | $77.45 |
| 2000-00†•• | 0-.25 | 73.00 |
| 2000-0†• | 0-.50 | 63.50 |
| 2001 | 0-1.0 | 63.50 |
| 2002 | 0-2.0 | 63.50 |
| 2003 | 0-3.0 | 63.50 |
| 2004 | 0-4.0 | 63.50 |
| 2005 | 0-5.0 | 63.50 |
| 2006 | 0-6.0 | 63.50 |
| 2008 | 0-8.0 | 63.50 |
| 2010 | 0-10 | 63.50 |
| 2012 | 0-12 | 63.50 |
| 2015 | 0-15 | 63.50 |
| 2020 | 0-20 | 63.50 |
| 2025 | 0-25 | 63.50 |
| 2030 | 0-30 | 63.50 |
| 2040 | 0-40 | 63.50 |
| 2050 | 0-50 | 63.50 |
| 2060 | 0-60 | 63.50 |
| 2080 | 0-80 | 63.50 |
| 2100 | 0-100 | 63.50 |
| 2120 | 0-120 | 63.50 |
| 2150 | 0-150 | 63.50 |
| 2160 | 0-160 | 63.50 |
| 2180* | 0-180 | 148.50 |
| 2250* | 0-250 | 148.50 |
| **Zero Center Ranges** | | |
| 2300-00†•• | 0.125-0-0.125 | $74.00 |
| 2300-0†• | .25-0-.25 | 74.00 |
| 2301 | .5-0-.5 | 74.00 |
| 2302 | 1-0-1 | 74.00 |
| 2304 | 2-0-2 | 74.00 |
| 2310 | 5-0-5 | 74.00 |
| 2320 | 10-0-10 | 74.00 |
| 2330 | 15-0-15 | 74.00 |

| Model | Range PSI | Price |
|---|---|---|
| 2201 | 0-1 | $67.95 |
| 2202 | 0-2 | 67.95 |
| 2203 | 0-3 | 67.95 |
| 2204 | 0-4 | 67.95 |
| 2205 | 0-5 | 67.95 |
| 2210* | 0-10 | 127.95 |
| 2215* | 0-15 | 127.95 |
| 2220* | 0-20 | 127.95 |
| 2230** | 0-30 | 207.50 |

| Model | Range, CM of Water | Price |
|---|---|---|
| 2000-15CM | 0-15 | $63.50 |
| 2000-20CM | 0-20 | 63.50 |
| 2000-25CM | 0-25 | 63.50 |
| 2000-50CM | 0-50 | 63.50 |
| 2000-80CM | 0-80 | 63.50 |
| 2000-100CM | 0-100 | 63.50 |
| 2000-150CM | 0-150 | 67.95 |
| 2000-200CM | 0-200 | 67.95 |
| 2000-250CM | 0-250 | 67.95 |
| 2000-300CM | 0-300 | 67.95 |
| **Zero Center Ranges** | | |
| 2300-4CM | 2-0-2 | $78.45 |
| 2300-10CM | 5-0-5 | 78.45 |
| 2300-30CM | 15-0-15 | 78.45 |

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%
• • Accuracy +/-4%
*MP option standard
**HP option standard

| Model | Range MM of Water | Price |
|---|---|---|
| 2000-6MM†•• | 0-6 | $73.00 |
| 2000-10MM†• | 0-10 | 63.50 |
| 2000-15MM | 0-15 | 63.50 |
| 2000-25MM | 0-25 | 63.50 |
| 2000-30MM | 0-30 | 63.50 |
| 2000-50MM | 0-50 | 63.50 |
| 2000-80MM | 0-80 | 63.50 |
| 2000-100MM | 0-100 | 63.50 |
| 2000-125MM | 0-125 | 63.50 |
| 2000-150MM | 0-150 | 63.50 |
| 2000-200MM | 0-200 | 63.50 |
| 2000-250MM | 0-250 | 63.50 |
| 2000-300MM | 0-300 | 63.50 |
| **Zero Center Ranges** | | |
| 2300-6MM†•• | 3-0-3 | $99.00 |
| 2300-10MM†• | 5-0-5 | 74.00 |
| 2300-20MM†• | 10-0-10 | 74.00 |

| Model | Range, Pa | Price |
|---|---|---|
| 2000-60NPA†•• | 10-0-50 | $77.45 |
| 2000-60PA†•• | 0-60 | 73.00 |
| 2000-100PA†• | 0-100 | 63.50 |
| 2000-125PA†• | 0-125 | 63.50 |
| 2000-250PA | 0-250 | 63.50 |
| 2000-300PA | 0-300 | 63.50 |
| 2000-500PA | 0-500 | 63.50 |
| 2000-750PA | 0-750 | 63.50 |
| 2000-1000PA | 0-1000 | 63.50 |
| **Zero Center Ranges** | | |
| Model | Range, Pa | Price |
| 2300-60PA†•• | 30-0-30 | $74.00 |
| 2300-100PA†• | 50-0-50 | 74.00 |
| 2300-120PA | 60-0-60 | 74.00 |
| 2300-200PA | 100-0-100 | 74.00 |
| 2300-250PA | 125-0-125 | 74.00 |
| 2300-300PA | 150-0-150 | 74.00 |
| 2300-500PA | 250-0-250 | 74.00 |
| 2300-1000PA | 500-0-500 | 74.00 |

| Model | Range, kPa | Price |
|---|---|---|
| 2000-0.5KPA | 0-0.5 | $63.50 |
| 2000-1KPA | 0-1 | 63.50 |
| 2000-1.5KPA | 0-1.5 | 63.50 |
| 2000-2KPA | 0-2 | 63.50 |
| 2000-2.5KPA | 0-2.5 | 63.50 |
| 2000-3KPA | 0-3 | 63.50 |
| 2000-4KPA | 0-4 | 63.50 |
| 2000-5KPA | 0-5 | 63.50 |
| 2000-8KPA | 0-8 | 63.50 |
| 2000-10KPA | 0-10 | 63.50 |
| 2000-15KPA | 0-15 | 63.50 |
| 2000-20KPA | 0-20 | 63.50 |
| 2000-25KPA | 0-25 | 63.50 |
| 2000-30KPA | 0-30 | 63.50 |
| **Zero Center Ranges** | | |
| 2300-1KPA | .5-0-.5 | $74.00 |
| 2300-2KPA | 1-0-1 | 74.00 |
| 2300-2.5KPA | 1.25-0-1.25 | 74.00 |
| 2300-3KPA | 1.5-0-1.5 | 74.00 |

**Dual Scale Air Velocity Units**
For use with pitot tube

| Model | Range in W.C./ Velocity F.P.M. | Price |
|---|---|---|
| 2000-00AV†•• | 0-.25/ 300-2000 | $98.00 |
| 2000-0AV†• | 0-.50/ 500-2800 | 88.50 |
| 2001AV | 0-1.0/ 500-4000 | 67.95 |
| 2002AV | 0-2.0/ 1000-5600 | 67.95 |
| 2005AV | 0-5.0/ 2000-8800 | 67.95 |
| 2010AV | 0-10/ 2000-12500 | 67.95 |

**Dual Scale English/Metric Models**

| Model | Range, in w.c. | Range, Pa or kPa | Price |
|---|---|---|---|
| 2000-00D†•• | 0-.25 | 0-62 Pa | $73.00 |
| 2000-0D†• | 0-0.5 | 0-125 Pa | 67.95 |
| 2001D | 0-1.0 | 0-250 Pa | 67.95 |
| 2002D | 0-2.0 | 0-500 Pa | 67.95 |
| 2003D | 0-3.0 | 0-750 Pa | 67.95 |
| 2004D | 0-4.0 | 0-1.0 kPa | 67.95 |
| 2005D | 0-5.0 | 0-1.25 kPa | 67.95 |
| 2006D | 0-6.0 | 0-1.5 kPa | 67.95 |
| 2008D | 0-8.0 | 0-2.0 kPa | 67.95 |
| 2010D | 0-10 | 0-2.5 kPa | 67.95 |
| 2015D | 0-15 | 0-3.7 kPa | 67.95 |
| 2020D | 0-20 | 0-5 kPa | 88.50 |
| 2025D | 0-25 | 0-6.2 kPa | 88.50 |
| 2050D | 0-50 | 0-12.4 kPa | 88.50 |
| 2060D | 0-60 | 0-15 kPa | 88.50 |

**VELOCITY AND VOLUMETRIC FLOW UNITS**
Scales are available on the Magnehelic® that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, $m^3/s$, $m^3/h$). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure. Example: 0.5 in w.c. = 16,000 CFM.

**ACCESSORIES**

**A-321,** Safety Relief Valve . . . . . **35.25**
**A-448,** 3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface . . . . . **10.75**
**A-135,** Rubber gasket for panel mounting . . . . . **1.50**
**A-401,** Plastic Carry Case . . . . . **26.25**

**A-310A 3-Way Vent Valves** . . . . . **$16.50**
In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

# *ATTACHMENT G*
# Remedial System Optimization
# Table of Contents

# REMEDIAL SYSTEM OPTIMIZATION FOR 555 GRAND STREET SITE

# ***ATTACHMENT H***
# Community Air Monitoring Plan

# COMMUNITY AIR MONITORING PLAN

555 GRAND STREET
BROOKLYN, NY

JULY- 2019

**555 GRAND STREET, BROOKLYN NY**

**COMMUNITY AIR MONITORING PLAN**
**TABLE OF CONTENTS**



## *APPENDICES*

## 1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for the excavation and building activities to be performed under a Remedial Action Work Plan (RAWP) at 555 Grand Street, Brooklyn NY. The CAMP provides measures for protection for the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the investigation activities) from potential airborne contaminant releases resulting from investigative activities at the site.

Compliance with this CAMP is required during all activities associated with drilling and sampling activities that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include drilling and soil and groundwater sampling. This CAMP has been prepared to ensure that investigation activities do not adversely affect passersby, residents, or workers in the area immediately surrounding the Site and to preclude or minimize airborne migration of investigation-related contaminants to off-site areas.

### 1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan as presented in DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC May 3, 2010). This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air;

- New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

## 2.0 AIR MONITORING

Chlorinated volatile organic compounds (VOCs) are the constituents of concern at the Site. The appropriate method to monitor air for these constituents during remediation activities is through real-time VOC and air particulate (dust) monitoring.

### 2.1 Meteorological Data

At a minimum, wind direction will be evaluated at the start of each workday, noon of each workday, and the end of each workday. These readings will be utilized to position the monitoring equipment in appropriate upwind and downwind locations.

### 2.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before activities begin. These points will be monitored periodically in series during the site work. When the drilling area is within 20 feet of potentially exposed populations or occupied structures, the perimeter monitoring points will be located to represent the nearest potentially exposed individuals at the downwind location.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor (or equivalent). Air will be monitored for VOCs with a portable Ionscience 3000 photoionization detector (PID), or equivalent. All air monitoring data will be documented in a site log book by the designated site safety officer. The site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan

## 3.0 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 or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present.

The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should 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 must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can 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 must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can 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 must be shutdown. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed.

### 3.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during remediation activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- Collection of purge water in covered containers;
- storage of excess sample and drill cuttings in drums or covering with plastic

## 4.0 PARTICULATE MONITORING

Air monitoring for particulates (i.e., dust) will be performed continuously during drilling activities using both air monitoring equipment and visual observation at upwind and downwind locations. Monitoring equipment capable of measuring particulate matter smaller than 10 microns ($PM_{10}$) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at upwind (i.e., background) and downwind locations, at heights approximately four to five feet above land surface (i.e., the breathing zone). Monitoring equipment will be MIE Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter (µg/m3). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 µg/$m^3$ above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive work activities.

The following summarizes particulate action levels and the appropriate responses:

- If the downwind PM-10 particulate level is 100 µg/$m^3$ greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 µg/$m^3$ 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 µg/$m^3$ above the upwind level, work must be stopped and an evaluation of activities initiated. Work can resume provided that dust suppression measures (as described in Section 2.3.1 below) and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 µg/$m^3$ of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report as shown in **Appendix A** will be completed.

### 4.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the downwind location exceeds the upwind level by more than 100 µg/m3 at any time during drilling activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- Placement of drill cuttings in drums or covering stockpiles with plastic;
- Misting of the drilling area with a fine water spray from a hand-held spray bottle

Work may continue with dust suppression techniques provided that downwind $PM_{10}$ levels are not more than 150 µg/$m^3$ greater than the upwind levels.

There may also be situations where the dust is generated by drilling activities and migrates to downwind locations, but is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the working area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 µg/$m^3$, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review.

# 5.0 DATA QUALITY ASSURANCE

## 5.1 Calibration

Instrument calibration shall be documented on instrument calibration and maintenance sheets or in the designated field logbook. All instruments shall be calibrated as required by the manufacturer. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

## 5.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the SSO for reference.

## 5.3 Data Review

The SSO will interpret all monitoring data based the established criteria and his/her professional judgment. The SSO shall review the data with the PM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PM.

## 6.0 RECORDS AND REPORTING

All air readings must be recorded on daily air monitoring log sheets and made available for review by personnel from NYSDEC and NYSDOH.


1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

# ***APPENDIX A***
# ***ACTION LIMIT REPORT***

**CAMP**
**ACTION LIMIT REPORT**

Project Location: _____

Date: _____ Time: _____

Name: _____

Contaminant: _____ PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

Temperature: _____ Barometric Pressure: _____

**DOWNWIND DATA**

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

**UPWIND DATA**

Monitor ID #: _____ Location: _____ Level Reported: _____

Monitor ID#: _____ Location: _____ Level Reported: _____

**BACKGROUND CORRECTED LEVELS**

Monitor ID #: Location: _____ Level Reported: Level Reported: _____

**ACTIONS TAKEN**

_____
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_____
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# *ATTACHMENT I*
# Responsibilities of the Owner and Remedial Party

## Responsibilities

The responsibilities for implementing the Site Management Plan ("SMP") for the 555 Grand Street site (the "site"), number C224185, are divided between the site owner(s) and a Remedial Party, as defined below. The owner(s) is/are currently listed as:

555 Grand Units LLC
183 Wilson Street, Suite 133
Brooklyn, New York 11211

**Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out,** the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

555 Grand Units LLC
183 Wilson Street, Suite 133
Brooklyn, New York 11211

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

## Site Owner's Responsibilities:

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation at the site.

2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in a(n) Environmental

Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC in accordance with the timeframes indicated in Section 1.3-Notifications.

6) In the event some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC in accordance with the time frame indicated in Section 1.3- Notifications and (ii) coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site property. 6 NYCRR Part contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) The owner and the RP are the same entity and remains ultimately responsible for maintaining the engineering controls.

9) Until such time as the NYSDEC deems the vapor mitigation system unnecessary, the owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the RP and the NYSDEC.

10) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP,

or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

**Remedial Party Responsibilities**

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html .

6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 1.3- Notifications of the SMP.

7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the site, as required in Section 5.3 or Appendix I (Operation , Monitoring and Maintenance Manual) of the SMP.

8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.

9) Any change in use, change in ownership, change in site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

# ***ATTACHMENT J***
# Field Sampling Plan

**555 Grand Street**
**Brooklyn, New York**
**Block 2779 Lot 31**

# FIELD SAMPLING PLAN

***NYSDEC Site Number:*** **C224185**

*Prepared for:*
555 Grand Units, LLC
183 Wilson Street, Suite 132
Brooklyn, NY 11211

*Prepared by:*

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 Middle Country Road
Ridge, NY 11961

**OCTOBER 2019**

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## 555 GRAND STREET
## FIELD SAMPLING PLAN

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## 555 GRAND STREET
## FIELD SAMPLING PLAN

***TABLES***



***FIGURES***



***APPENDICES***

## List of Acronyms

| | |
|---|---|
| AS | Air Sparging |
| ASP | Analytical Services Protocol |
| BCA | Brownfield Cleanup Agreement |
| BCP | Brownfield Cleanup Program |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| CAMP | Community Air Monitoring Plan |
| C/D | Construction and Demolition |
| CFR | Code of Federal Regulation |
| CLP | Contract Laboratory Program |
| COC | Certificate of Completion |
| CO2 | Carbon Dioxide |
| CP | Commissioner Policy |
| DER | Division of Environmental Remediation |
| EC | Engineering Control |
| ECL | Environmental Conservation Law |
| ELAP | Environmental Laboratory Approval Program |
| ERP | Environmental Restoration Program |
| EWP | Excavation Work Plan |
| GHG | Green House Gas |
| GWE&T | Groundwater Extraction and Treatment |
| HASP | Health and Safety Plan |
| IC | Institutional Control |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| NYCRR | New York Codes, Rules and Regulations |
| O&M | Operation and Maintenance |
| OM&M | Operation, Maintenance and Monitoring |
| OSHA | Occupational Safety and Health Administration |
| OU | Operable Unit |
| PID | Photoionization Detector |
| PRP | Potentially Responsible Party |
| PRR | Periodic Review Report |
| QA/QC | Quality Assurance/Quality Control |
| QAPP | Quality Assurance Project Plan |
| RAO | Remedial Action Objective |
| RAWP | Remedial Action Work Plan |
| RCRA | Resource Conservation and Recovery Act |

| | |
|---|---|
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RP | Remedial Party |
| RSO | Remedial System Optimization |
| SAC | State Assistance Contract |
| SCG | Standards, Criteria and Guidelines |
| SCO | Soil Cleanup Objective |
| SMP | Site Management Plan |
| SOP | Standard Operating Procedures |
| SOW | Statement of Work |
| SPDES | State Pollutant Discharge Elimination System |
| SSD | Sub-slab Depressurization |
| SVE | Soil Vapor Extraction |
| SVI | Soil Vapor Intrusion |
| TAL | Target Analyte List |
| TCL | Target Compound List |
| TCLP | Toxicity Characteristic Leachate Procedure |
| USEPA | United States Environmental Protection Agency |
| UST | Underground Storage Tank |
| VCA | Voluntary Cleanup Agreement |
| VCP | Voluntary Cleanup Program |

# 1.0 INTRODUCTION

## 1.1 General

This Field Sampling Plan is a part of the Site Management Plan for the Site located at 555 Grand Street, Brooklyn, New York (hereinafter referred to as the "Site").

555 Grand Units, LLC (the Volunteer) entered into a Brownfield Cleanup Agreement with the New York State Department of Environmental Conservation (NYSDEC) in December 2013 to remediate a 0.058-acre parcel located in Brooklyn, Kings County, New York (Site No. C224185). The Site was remediated to Restricted Residential Use and will be used for restricted residential use.

The Site address is 555 Grand Street, Brooklyn, New York 11211. It is located on the north side of Grand Street between Union Avenue and Lorimer Street in Brooklyn, New York. The site is designated as Block 2779 Lot 31 on the Brooklyn Tax Map. The Site consists of a single tax parcel with 25.25 feet of street frontage on Grand Street and is 100 feet deep for a total of 2,525 square feet (0.058 acres). The surrounding land use includes older mixed use commercial (retail) and residential buildings to the east (Block: 2779 Lot: 30) and west (Block: 2779 Lot: 32) along Grand Street, with mixed use and multi-family apartment buildings to the north (Block: 2779 Lot: 21) and south (Block: 2785 Lot: 25).

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". The Site will be limited to Restricted Residential Use, groundwater use is prohibited, and future excavation will be handled as per the SMP. A soil vapor extraction system has been installed to control exposure to remaining contamination to ensure protection of public health and the environment. This Field Sampling Plan (FSP) outlines the necessary methods to monitor the installed SSD system. This plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;

- Analytical sampling program requirements;
- Annual inspection and periodic certification.

## 2.0 SUMMARY OF REMEDIAL ACTIONS

### 2.1 Remedial Actions Taken

86 % of the site was excavated to a depth of 11 feet and the elevator pit was excavated to a depth of 16 feet. The remaining 14% of the site was not excavated. One 1,000-gallon waste water UST was removed from the Site.

Following Site excavation, a Sub Slab Depressurization system (SSDS) installed. The SSD system beneath the building slab consists of a six venting zones. These zones provide coverage of approximately 1,800 sf of slab area. This is consistent with USEPA SSD design specifications, which recommend a separate vent loop for every 4,000 sf of slab area. The SSDS will not be discontinued unless prior written approval is granted by the NYSDEC. In the event that monitoring data indicates that the SSD system may no longer be required, a proposal to discontinue the SSD system will be submitted by the remedial party to the NYSDEC and NYSDOH.

## 2.2 Remedial Action Objectives

The Remedial Action Work Plan identified the following Remedial Action Objectives (RAOs):

### 2.2.1 Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

### 2.2.2 Soil Vapor

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at the site.

### 2.2.3 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles from contaminated groundwater

RAOs for Environmental Protection

- Restore groundwater aquifer to pre-disposal/ pre-release conditions, to the extent practicable

## 2.3 Remaining Contamination

### 2.3.1 Soil

The initial excavation plan noted in the approved RAWP was as follows:

The basement level and foundation will require minimal excavation; due to the use of the original structure. Excavation and soil disturbance will occur for the northeast side for installation of a section of foundation wall concrete slab to level with existing cellar concrete slab and excavation of elevator pit. The proposed work on the northeast side will slightly widen the cellar. The elevator pit will be excavated to a depth of 5 feet.

The excavation plan was changed to the following:
86% of the Site (building foot print and ½ of rear yard) was excavated to a depth of 11 feet bsg.

### 2.3.3 Groundwater

PCE concentrations were detected in the groundwater sample from the monitoring wells MW1, MW2 and MW3 collected on February 4, 2014 and February 9, 2014, at concentrations slightly above the GQS. No other VOCs were detected in the groundwater sample.

### 2.3.4 Soil Vapor

Soil vapor sampling performed during the Remedial Investigation noted total petroleum related volatile organic compounds (BTEX) were at generally low concentrations. Elevated levels of the chlorinated VOCs trichloroethylene (TCE) and tetrachloroethylene (PCE) were also detected within sub-slab soil gas, indoor air and outdoor air samples collected at the Site. TCE concentrations in soil gas ranged from 84.8 µg/m3 to 623 µg/m3. TCE concentrations in indoor air and outdoor air were 13.7 6 µg/m3 and 3.92 µg/m3, respectively. PCE concentrations in soil gas ranged from 7,730 µg/m3 to 228,000 µg/m3. PCE concentrations were 6,230 µg/m3 in indoor air and 3,930 µg/m3 in the outdoor air control sample. It should be noted that 86% of the Site was excavated to a depth of 11 feet and the source area has been removed.

## 2.4 Engineering Controls

2.4.1 SSDS

Since contaminated soil vapors are assumed to remain beneath the Site following the Remedial Action, ICs and ECs are required to protect human health and the environment. These ECs and ICs are described in the following sections. Short-term management of these EC/ICs will be performed under the Site Management Plan (SMP) approved by the NYSDEC.

An active sub-slab depressurization (SSD) system and vapor barrier were designed and installed beneath the occupied portions of the new building.

The SSD system beneath the building slab consists of a six venting zones. These zones provide coverage of approximately 1,800 sf of slab area. This is consistent with USEPA SSD design specifications, which recommend a separate vent loop for every 4,000 sf of slab area.

The horizontal vent lines are constructed with a central line of solid 4-inch PVC pipe, which runs north to south on Site, three horizontal vent line legs of 4 inch PVC 10-slot well screen on the east side of the Site and three horizontal vent line legs of 4 inch PVC 10-slot well screen on the west side of the Site. Ball valves and 4x4 tees or four way connections join the horizontal vent line legs to the solid central line. A manhole cover was placed over the ball valve connection points and the ball valves were used to balance the system. The SSDS lines were installed in a 6 inch layer of filter sand, topped with a 1' of ¾ inch RCA and below the vapor barrier. The 4 inch PVC lines connect to a 2-inch schedule 40 PVC pipe which connects to a 1.5 hp Regenerative Blower manufactured by Rotron. A 2-inch schedule 40 PVC pipe connects the 1.5 hp Regenerative Blower to the SSDS discharge line which consists of a solid 2 inch PVC riser pipe that extends to the roof. It should be noted that the decision document states that extracted air treatment air is required. Based on the change of excavation and removal of source; extracted air treatment was not installed for the system. A sample of exhaust was collected as per the DEC request on September 5, 2019. One 8-hr TO15 sample was collated and analyzed. Total VOCs were noted at 172.67 µg/m3, PCE was noted at 13.7 µg/m3, TCE was noted

at 0.75 µg/m3, carbon tetrachloride was noted at 0.46 µg/m3 and 1,1,1,-trichloroethane was non detect. A second exhaust sample will be collected the week of October 7th 2019. The system is hardwired to an electric source. The exhaust from the blower is located a minimum of 10 feet from windows and ventilation inlets. The SSD system utilizes a manometer (Dwyer, 0-60 inches of water manometer) and an alarm (Radonaway alarm) installed on the cellar floor of the building to ensure proper operation of the blower.

A 20-mil vapor barrier was installed over the SSD system prior to pouring the building's concrete slab. The vapor barrier consists of Raven Industries' VaporBlock Plus 20, which is a seven-layer co-extruded 20 mil vapor barrier made from polyethylene and EVOH resins. The vapor barrier extends over the entire slab at the Site. Vapor barrier seams, penetrations, and repairs were sealed either by the tape method, according to the manufacturer's recommendations and instructions.

2.4.2 Cover System

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of a 12 inch layer of ¾ inch RCA gravel, 20 mil vapor barrier and a 6-inch concrete slab within the footprint of the building and 1.5 feet of gravel capped with pavers in the rear yard.

# 3.0 MONITORING PLAN AND SAMPLING PLAN

## 3.1 Treatment System Monitoring and Sampling

### 3.1.1 SSDS Monitoring

Monitoring of the SSD system will be performed on an annual basis as identified in **Table 3** – SSDS Monitoring Requirements and Schedule (see below). Modification to the frequency or sampling requirements will require approval from the NYSDEC. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the SSD system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. SSD system components to be monitored include, but are not limited to, the components included in **Table 3** below.

**Table 1 – Remedial System Monitoring Requirements and Schedule**

| SSD System Component | Monitoring Parameter | Operating Range | Monitoring Schedule |
|---|---|---|---|
| Regenerative Blower | On or Off | - | Annual |
| Magnehelic Meter | Vacuum at Riser | >0.10"W.C. | Annual |
| Alarm | On or Off | - | Annual |

A complete list of components to be inspected is provided in the Inspection Checklist, provided in **Attachment A**. If any equipment readings are not within their specified operation range, any equipment is observed to be malfunctioning or the system is not performing within specifications; maintenance and repair, as per the Operation and Maintenance Plan (**Attachment F**), is required immediately.

### 3.1.2 Post Remediation Medial Monitoring and Sampling

Two ambient indoor air samples shall be collected from the cellar area; 2 weeks after the shutdown of the SSDS system. Sampling locations, required analytical parameters and schedule are provided in Table 2 – Post Remedial System Sampling Requirements and Schedule below and on Figure 1. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

**Table 2– Post Remediation Sampling Requirements and Schedule**

| **Sampling Location** | **Analytical Parameters** | **Schedule** |
|---|---|---|
| | VOC (EPA Method TO-15) | |
| Two Indoor Air Samples | X | 2 weeks after shut down of SSDS |

3.1.3 Sampling Procedure

Indoor ambient air quality samples are required to be collected 2 weeks after the shutdown of the SSDS. Six liter summa canisters will be installed onsite during this sampling event to collect ambient air for 8 hours.

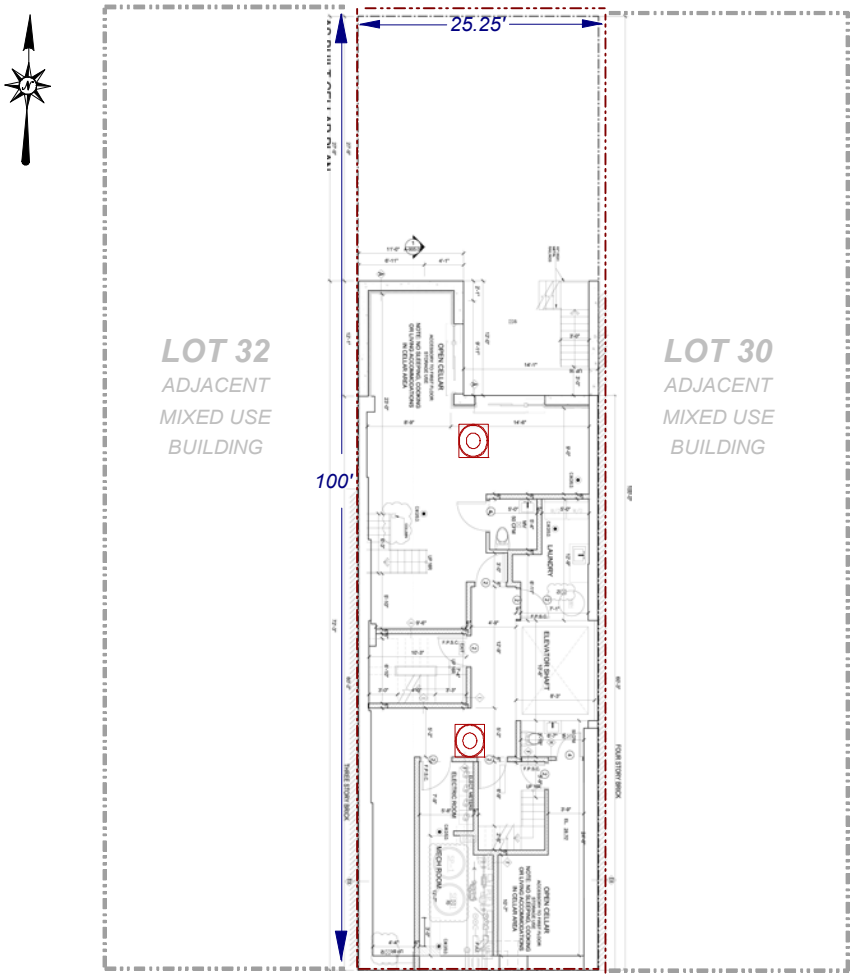
The summa canister will be placed at a height of 3-4 feet above the floor to be within the breathing zone. The ambient air samples will be collected in 6-Liter summa canisters fitted with 8 hour laboratory calibrated regulators. The sample identification, date, start time, start vacuum, end time and end vacuum must be recorded on the tags attached to each canister and on the chain of custody. All samples will be submitted to Phoenix Environmental Laboratories (Phoenix) of 587 East Middle Turnpike, Manchester, CT 06040, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301). Transport to the laboratory will be through a Phoenix courier under strict chain-of custody documentation. The samples are undergo laboratory analysis of VOCs by EPA Method TO-15. See Appendix B for a sample chain of custody.

## 3.2 Standard Protocol

All sampling activities will be recorded in a field book and will be documented with photos. Other observations (e.g., well integrity, etc.) will be noted on the sampling log.

The sampling log will serve as the inspection form for the monitoring network. The field sampler is expected to report on the entire site and take immediate action if necessary.

# *FIGURES*




KEY:

Property Boundary

Indoor Air Sample Locations

SCALE:

0 10 20

1 Inch = 20 feet

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

555 GRAND STREET
BROOKLYN, NY

**FIGURE 1** Sampling Locations

# ***APPENDIX A***

# Inspection Forms

# SITE INSPECTION CHECKLIST

**Site Inspection Checklist**
**555 Grand Street**
**Brooklyn, NY**

Date: _____ Time: _____

Inspector Name/Organization: _____

**Physical Inspection of Fan**

| **Fan 1 :** | **yes** | **no** | Fan Model No. Manufacturer: |
|---|---|---|---|
| Operational? | _____ | _____ | _____ |
| Observed Leaks at Seals? | _____ | _____ | |
| Air Flow at Exhaust Stack? | _____ | _____ | Other Comments / Observations |
| Vacuum Reading: _____ | | | _____ |

Repairs Needed and / or Maintenance at this time?

_____

_____

_____

_____

Signature: _____ Date: _____

**Site Inspection Checklist - Cover System**
**555 Grand Street**
**Brooklyn, NY**

Date: _____ Time: _____

Inspector Name/Organization: _____

**Visual Inspection of Concrete Slabs**

**555 Grand Street** Inspect concrete slab for cracks, perforations and patching

Describe General Condition of Slab _____

Describe any Cracks or New Penetrations _____

Describe any Patching _____

**Exterior Impervious Cap Areas (Rear Courtyard)** Inspect for cracks, perforations and patching

Describe General Condition of Impervious Cap _____

Describe any Cracks or New Penetrations _____

Describe any Patching _____

Repairs Needed and / or Maintenance at this time?

_____

Signature: _____ Date: _____

# ***APPENDIX B***

# Sample Chain of Custody

# CHAIN OF CUSTODY RECORD AIR ANALYSES

PHOENIX
Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: info@phoenixlabs.com Fax (860) 645-0823
**Client Services (860) 645-1102**



**Data Delivery:**
☐ Fax #: _____
☐ Email: _____

| | | |
|---|---|---|
| **Report to:** | **Invoice to:** | **Project Name:** |
| **Address:** | **Address:** | **Location:** |
| **Project Mgr:** | **P.O. #** | **State:** |
| **Phone #** | **Quote #** | **Sampled by:** |

| Phoenix ID # | Client Sample ID | Canister ID # | Canister Size (L) | Outgoing Canister Pressure (" Hg) | Incoming Canister Pressure ("Hg) | Flow Regulator ID # | Flow Controller Setting (mL/min) | Sampling Start Time | Sampling End Time | Sample Start Date | Canister Pressure at Start (" Hg) | Canister Pressure at End ("Hg) | Ambient/Indoor Air | Soil Gas | Grab ( G ) Composite ( C ) | | TO-14 | TO-15 | | | | Is Canister Returned Unused? Y/N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *LAB USE ONLY* | | | | | | | | | | | MATRIX | | | | ANALYSES | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | |

| Relinquished by: | Accepted by: | Date: | Time: |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

**Criteria Requested:** **Deliverable:**
RCP ☐
MCP ☐
**State where samples collected:** _____

**Data Format:**
Excel ☐ Equis ☐
PDF ☐ Other: ☐
GISKey ☐

**SPECIAL INSTRUCTIONS, QC REQUIREMENTS, REGULATORY INFORMATION:**

*I attest that all media released by Phoenix Environmental Laboratories, Inc. have been received in good working condition and agree to the terms and conditions as listed on the back of this document:*

Signature: _____Date: _____

# ***ATTACHMENT K***
# Quality Assurance Project Plan

# QUALITY ASSURANCE PROJECT PLAN
# 555 Grand Street, Brooklyn, NY

---

**Prepared on behalf of:**

**555 Grand Units, LLC**
**183 Wilson Street, Suite 132**
**Brooklyn, NY 11211**

**Prepared by:**


***Environmental Business Consultants***
1808 Middle Country Road
Ridge, NY 11961

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## QUALITY ASSURANCE PROJECT PLAN
555 Grand Street, Brooklyn, NY



***TABLES***

# 1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared in accordance with DER-10 to detail procedures to be followed during the course of the sampling and analytical portion of the project, as required by the approved work plan.

To ensure the successful completion of the project each individual responsible for a given component of the project must be aware of the quality assurance objectives of his / her particular work and of the overall project. The EBC Project Director, Charles Sosik will be directly responsible to the client for the overall project conduct and quality assurance/quality control (QA/QC) for the project. The Project Director will be responsible for overseeing all technical and administrative aspects of the project and for directing QA/QC activities. As Project Director Mr. Sosik will also serve as the Quality Assurance Officer (QAO) and in this role may conduct:

- conduct periodic field and sampling audits;
- interface with the analytical laboratory to resolve problems; and
- interface with the data validator and/or the preparer of the DUSR to resolve problems.

Chawinie Reilly will serve as the Project Manager and will be responsible for implementation of the Remedial Investigation and coordination with field sampling crews and subcontractors. Reporting directly to the Project Manager will be the Field Operations Officer, Tom Gallo; who will serve as the on-Site qualified environmental professional who will record observations, direct the drilling crew and be responsible for the collection and handling of all samples.

## 1.1 Organization

Project QA will be maintained under the direction of the Project Manager, in accordance with this QAPP. QC for specific tasks will be the responsibility of the individuals and organizations listed below, under the direction and coordination of the Project Manager

.

| GENERAL RESPONSIBILITY | SCOPE OF WORK | RESPONSIBILITY OF QUALITY CONTROL |
|---|---|---|
| Field Operations | Supervision of Field Crew, sample collection and handling | Tom Gallo, EBC |
| Project Manager | Implementation of the SMP | Chawinie Reilly, EBC |
| Laboratory Analysis | Analysis of soil samples by NYSDEC ASP methods Laboratory | NYSDOH-Certified Laboratory |
| Data review | Review for completeness and compliance | 3rd party validation |



EBC Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Phone 631.504.6000
Fax 631.924.2870

# 2.0 QUALITY ASSURANCE PROJECT PLAN OBJECTIVES

## 2.1 Overview

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative Statements that specify the quality of the data required to support decisions; DQOs, as described in this section, are based on the end uses of the data as described in the work plan.

In this plan, Quality Assurance and Quality Control are defined as follows:

- Quality Assurance - The overall integrated program for assuring reliability of monitoring and measurement data.

- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

## 2.2 QA / QC Requirements for Analytical Laboratory

Samples will be analyzed by a New York State Department of Health (NYSDOH) certified laboratory. Data generated from the laboratory will be used to evaluate contaminants such as metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and pesticides / PCBs in both historic fills and native soils and in groundwater and other volatile organic compounds (VOCs) in soil, soil gas. The QA requirements for all subcontracted analytical laboratory work performed on this project are described below. QA elements to be evaluated include accuracy, precision, sensitivity, representativeness, and completeness. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet required quantification limits as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 07/2005. The analytical results meeting the required quantification limits will provide data sensitive enough to meet the data quality objectives of this remedial program as described in the work plan. Reporting of the data must be clear, concise, and comprehensive. The QC elements that are important to this project are completeness of field data, sample custody, sample holding times, sample preservation, sample storage, instrument calibration and blank contamination.

### *2.2.1 Instrument Calibration*

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of NYSDEC ASP 07/2005).

### *2.2.2 Continuing Instrument Calibration*

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

### *2.2.3 Method Blanks*



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Method blank or preparation blank is prepared from an analyte·free matrix which includes the same reagents, internal standards and surrogate standards as me related samples. II is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12 hr period during the analysis of samples for volatiles. An acceptable method blank will contain less than two (2) times the CRQL of methylene chloride, acetone and 2-butanone. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10 percent of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

*2.2.4 Trip Blanks.*

Trip blanks consist of a single set of sample containers filled at the laboratory with deionized. laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same way as the samples collected that day. Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure.) A complete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

*2.2.5 Surrogate Spike Analysis*

For organic analyses, all samples and blanks will be spiked with surrogate compounds before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the NY5DEC ASP protocols for samples falling within the quantification limits without dilution.

*2.2.6 Matrix Spike / Matrix Spike Duplicate / Matrix Spike Blank (MS/MSDIMSB) Analysis*

MS, MSD and MSB analyses will be performed to evaluate the matrix effect of the sample upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS / MSD / MSB samples will be analyzed for each group of samples of a similar matrix at a rate of 5% (one for every 20 field samples). The RPD will be calculated from the difference between the MS and MSD. Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

## 2.3 Accuracy

Accuracy is defined as the nearness of a real or the mean (x) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery and is expressed as percent recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike percent recovery (% REC) is calculated by the following equation:

$$\%REC = \frac{SSR - SR}{SA} \times 100$$

Where:
SSR = spike sample results
SR = sample results
SA = spike added from spiking mix



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## 2.4 Precision

Precision is defined as the measurement of agreement of a set of replicate results among themselves without a Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses.

Analytical precision is expressed in terms of RPD. The RPD is calculated using the following formula:

$$RPD = \frac{D^1 - D^2}{(D^1 - D^2)/2} \times 100$$

Where:
RPD = relative percent difference
$D^1$ = first sample value
$D^2$ = second sample value (duplicate)

## 2.5 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve quantification levels low enough to meet the required detection limits specified by NYSDEC ASP and to meet all site-specific standards, criteria and guidance values (SGCs) established for this project.

## 2.6 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. The representativeness of samples is assured by adherence to sampling procedures described in the Remedial Investigation Work Plan.

## 2.7 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70 and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format which, at a minimum, will include the following components:

1. All sample chain-of-custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analytes in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.
7. QC check sample and standard recovery results
8. Blank results (field, trip, and method).
9. Internal standard area and RT summary.



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## 2.8 Laboratory Custody Procedures

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin; each label will contain an identifying number. Each number will have a suffix that identifies the site and where the sample was taken. Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample, and sample identification will be entered into the field logbook. A chain-of-custody form, initiated at the analytical laboratory will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first received blank space. After each sample is collected and appropriately identified, entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures



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# 3.0 ANALYTICAL PROCEDURES

## 3.1 Laboratory Analysis

Samples will be analyzed by the NYSDOH ELAP laboratory for one or more of the following parameters: VOCs in air by USEPA Method TO15.

If any modifications or additions to the standard procedures are anticipated. and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented. Prior approval by EBC's PM will be necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of five (5).



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# 4.0 DATA REDUCTION, REVIEW, AND REPORTING

## 4.1 Overview

The process of data reduction, review, and reporting ensures the assessments or a conclusion based on the final data accurately reflects actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports, and work plans are proofed and checked for technical and numerical errors prior to final submission.

## 4.2 Data Reduction

Standard methods and references will be used as guidelines for data handling, reduction, validation, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Analytical results shall be presented on standard NYSDEC ASP-B forms or equivalents, and include the dates the samples were received and analyzed, and the actual methodology used. Note that if waste characterization samples are analyzed they will be in results only format and will not be evaluated in the DUSR.

Laboratory QA/QC information required by the method protocols will be compiled, including the application of data QA/QC qualifiers as appropriate. In addition, laboratory worksheets, laboratory notebooks, chains-of-custody, instrument logs, standards records, calibration records, and maintenance records, as applicable, will be provided in the laboratory data packages to determine the validity of data. Specifics on internal laboratory data reduction protocols are identified in the laboratory's SOPs.

Following receipt of the laboratory analytical results by EBC, the data results will be compiled and presented in an appropriate tabular form. Where appropriate, the impacts of QA/QC qualifiers resulting from laboratory or external validation reviews will be assessed in terms of data usability.

## 4.3 Laboratory Data Reporting

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the NYSDEC ASP (7/2005), Category B data deliverable requirements as applicable to the method utilized. All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format. Note that waste characterization samples if analyzed will be in results only format and will not be evaluated in the DUSR.



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## 5.0 CORRECTIVE ACTION

Review and implementation of systems and procedures may result in recommendations for corrective action. Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the EBC PM, who in turn shall contact the Quality Assurance/Data Quality Manager or his designee (if applicable).

Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. These procedures for review and implementation of a change are as follows:

- Define the problem.
- Investigate the cause of the problem.
- Develop a corrective action to eliminate the problem, in consultation with the personnel who defined the problem and who will implement the change.
- Complete the required form describing the change and its rationale (see below for form requirements).
- Obtain all required written approvals.
- Implement the corrective action.
- Verify that the change has eliminated the problem.

During the field investigation, all changes to the sampling program will be documented in field logs/sheets and the EBC PM advised.

If any problems occur with the laboratory or analyses, the laboratory must immediately notify the PM, who will consult with other project staff. All approved corrective actions shall be controlled and documented.

All corrective action documentation shall include an explanation of the problem and a proposed solution which will be maintained in the project file or associated logs. Each report must be approved by the necessary personnel (e.g., the PM) before implementation of the change occurs. The PM shall be responsible for controlling, tracking, implementing and distributing identified changes.



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**TABLE 1**
**SUMMARY OF**
**SAMPLING PROGRAM RATIONALE AND ANALYSIS**

| Matrix | Location | Approximate Number of Samples | Frequency | Rationale for Sampling | Laboratory Analysis | Duplicates | Matrix Spikes | Spike Duplicates | Trip Blanks |
|---|---|---|---|---|---|---|---|---|---|
| Air | Within Cellar Area | 2 | n/a | Verification that SSDS is no longer needed | VOCs by TO15 | n/a | n/a | n/a | a/s |

## TABLE 2
## SAMPLE COLLECTION AND ANALYSIS PROTOCOLS

| Sample Type | Matrix | Sampling Device | Parameter | Sample Container | Sample Preservation | Analytical Method# | CRQL / MDLH | Holding Time |
|---|---|---|---|---|---|---|---|---|
| Air | Soil Vapor | Suma Canister | VOCs | 6 liters | None | TO15 | Compound specific (1-5 mg/L) | None |

*Notes*:
All holding times listed are from Verified Time of Sample Receipt (VTSR) unless noted otherwise. * Holding time listed is from time of sample collection.
The number in parentheses in the "Sample Container" column denotes the number of containers needed.
Triple volume required when collected MS/MSD samples
The number of trip blanks are estimated.
CRQL / MDL = Contract Required Quantitation Limit / Method Detection Limit
NA = Not available or not applicable.