555 GRAND STREET
BROOKLYN NEW YORK
Block 2779 Lot 31

REMEDIAL ACTION WORK PLAN

MARCH 2014

Prepared for:
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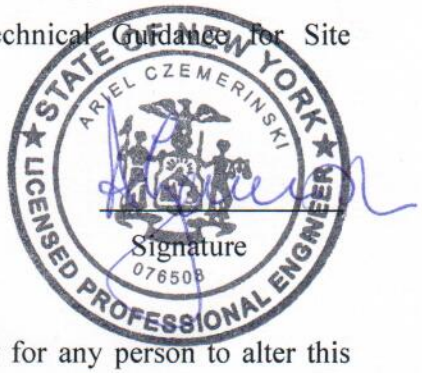
CERTIFICATIONS

I A.Czemerinski certify that I am currently a NYS registered professional engineer and that this Remedial Action Work 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	4/22/2014	
NYS Professional Engineer #	Date	Signature

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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
SMP	Site 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

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

This Remedial Action Work Plan has been prepared by Environmental Business Consultants (EBC) and AMC Engineering (AMC) for a commercial property located 555 Grand Street in the Williamsburg section of Brooklyn (**Figure 1**). The Site has been formally presented for entry into to the New York State Department of Environmental Conservation (NYSDEC) Brownfields Cleanup Program (BCP) through an application submitted in December 2013. The applicant has applied to this program as a Volunteer.

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 lot is currently developed with a three story mixed use (first floor retail, residential upper flows) building which covers 100% of the lot with a basement which covers approximately 75% of the lot.

The property has an elevation of approximately 28 feet above the National Geodetic Vertical Datum (NGVD) feet. The depth to groundwater beneath the site, as determined from field measurements, is approximately 22.5 feet below grade. Based on regional groundwater contour maps, groundwater flow is expected to be east.

Historic records show the subject site as being developed with the current three-story mixed use commercial residential building in 1887. According to historical city directories, the Site has been occupied by 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, Joel Bargain Store and Tru Val Cleaners. The Tru Val Cleaners has been on-site since at least 1999 according to the owners of the Site. In addition, the Site has been occupied by multiple commercial tenants since 1928. Historic sources and owner interviews indicate that Tru Val Cleaners was formerly located at 568 Grand Street from approximately 1960 to 2000.

Chlorinated solvent contamination was observed in soil gas and slightly elevated PCE concentrations equivalent to regional background data were observed in groundwater during the Remedial Investigation.

Summary of the Remedial Investigation

The remedial investigation was performed from July 29, 2013 through February 9, 2014 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), pesticides / PCBs and metals in 6 soil samples from 3 soil boring locations. Supplemental sampling consisted of 20 soil samples from 10 soil boring locations were analyzed for VOCs;
- The installation of three groundwater monitoring wells;
- The collection and analysis of a groundwater samples for volatile and semi-volatile organic compounds, pesticides / PCBs and metals; and,
- The collection of analysis of subslab soil gas, indoor air and outdoor ambient air 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 sampling performed during this RI, identified elevated levels of CVOCs in soil gas above mitigation levels established within the State DOH soil vapor guidance matrix. TCE concentrations in soil gas ranged from 84.8 $\mu g/m^3$ to a high of 623 $\mu g/m^3$. TCE concentrations in indoor and outdoor air were 13.7 $\mu g/m^3$ and 3.92 $\mu g/m^3$, respectively. PCE concentrations in soil

gas ranged from 7,730 µg/m^3 to 228,000 µg/m^3. PCE concentrations in indoor and outdoor air were 6,230 µg/m^3 and 3,930 µg/m^3, respectively. However, it must be noted that the dry cleaner was in operation at the time of sampling. Both PCE and TCE were detected above the NYSDOH threshold requiring action (monitoring or mitigation).

PCE was detected within four of the shallow (0-2 ft) soil samples and three of the deep samples (6-12 ft) retained at the Site, however, these detections were well below Unrestricted Use SCOs.

Groundwater was encountered at a depth of approximately 22.5 feet below grade. Detections of PCE ranged from 1.3 ug/L to 16 ug/L detected in all of the monitoring wells. Ground water samples collected from MW1, MW2 and MW3 on February 4, 2014 and February 9, 2014 were slightly above the NYSDEC GQS. These results are equivalent to regional background data for the area. No other VOCs were detected.

SVOCs including benzo(a)anthracene and benzo(b)fluoranthene were reported above restricted soil cleanup objectives (SCOs) in soil from the 2-4ft interval at boring location B3.

One or more metals including arsenic, copper, lead and mercury were reported above restricted residential SCOs in both the 0-2ft and 2-4ft sampling intervals at all three boring locations. Cadmium and zinc were reported above unrestricted SCOs at boring location B3. Elevated levels of SVOCs and metals that were reported in shallow soil throughout the Site, are characteristic of the historic fill materials present at the Site and throughout the area.

Qualitative Human Health Exposure Assessment

The qualitative exposure assessment identified potential completed routes of exposure to construction workers and remediation workers through inhalation, ingestion and dermal contact during excavation activities. The Health and Safety Plan prepared for the site identifies such exposures and provides instructions for on-site workers to minimize potential exposure. Occupants in the proposed on-site residential buildings may be exposed to VOCs through the vapor intrusion pathway if VOCs in source area soil and slab areas are not remediated, or if preventive measures such as vapor barriers or sub-slab ventilation are not employed.

Potential environmental impacts through the groundwater to surface water discharge were not expected based on the low levels of site related contamination in groundwater and the distance to the nearest surface water receptor.

Summary of the Remedy

The remedy recommended for the site is a Track 4 alternative (Alternative 2) which consists of the installation of a soil vapor extraction (SVE) system beneath the basement slab and the proper handling and disposal of all excavated soil as planned to facilitate installation of the elevator pit and foundation wall concrete slab. The remedy also includes the placement of a vapor barrier within the elevator pit, foundation wall excavations, and utility/plumbing conduits, and the application of an epoxy sealant across the basement slab. The remedy allows for the future conversion of the SVE to an active sub-slab depressurization system following the completion of remedial activity. The remedy will include the following items:

1. Installation of a Soil Vapor Extraction (SVE) system beneath the existing basement foundation;
2. Conversion of the SVE system into an active sub-slab depressurization system upon reaching asymptotic recovery levels;
3. Installation of a vapor barrier within all excavated areas, SVE/SSDS trenches, and utility/plumbing conduits;
4. Installation of an epoxy/polymer sealant across entire existing basement slab;
5. Installation of a composite cover system consisting of the concrete building slab and concrete capped rear yard across the entire Site;
6. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls;
7. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.

All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

In December 2013, Grand Units LLC filed an application with the New York State Department of Environmental Conservation (NYSDEC) to investigate and remediate a 0.058-acre property located at 555 Grand Street in Kings County, New York as a Volunteer in the New York State Brownfield Cleanup Program (BCP). Residential use is proposed for the property. When completed, the Site will be redeveloped with a new multi-family residential apartment building. Refer to the BCP application for additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between July 29, 2013 and August 20, 2013. It provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The NYSDEC and New York State Department of Health (NYSDOH) have not yet determined whether this Site poses a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

1.1 SITE LOCATION AND DESCRIPTION

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 lot is currently developed with a three story mixed use (first floor retail, residential upper flows) building with a basement which covers approximately 100% of the lot.

A boundary map is provided as **Figure 2** and will be attached to the Brownfield Cleanup Agreement as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The 0.058-acre property is fully described in **Attachment A – Metes and Bounds.**

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The Remedial Action to be performed under the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The proposed redevelopment plan and end use is described here to provide the basis for this assessment. However, the Remedial Action contemplated under this RAWP may be implemented independent of the proposed redevelopment plan.

The Site is to be repurposed through renovations and additions to the existing three-story mixed-use building into a six-story residential apartment building. Although the current building includes a one-story addition which covers the rear of the lot, the renovated building will cover 65% of the lot with a full cellar coving 75% of the lot. This leaves a 25 ft by 40 ft rear yard area; approximately half of which will be underlain by the basement level. 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 of the lot for installation of a section of foundation wall concrete slab to level with existing cellar concrete slab and excavation of the 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.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The surrounding land use includes older mixed use commercial (retail) and residential buildings to the east and west along Grand Street, with mixed use and multi-family apartment buildings to the north and south (see **Figure 3**).

The area surrounding the property is highly urbanized and predominantly consists of multi-family residential buildings with mixed-use buildings (residential w/ first floor retail) along main corridors such as Grand Street on which the property fronts, Union Avenue, just west of the Site and Lorimer Street, just east of the Site. The area is marked by late 19th and early 20th century

rowhouses with commercial and industrial properties interspersed throughout the residential sections.

The community and area have seen a resurgence in recent years following the rezoning of former industrial properties to residential use during the Greenpoint-Williamsburg Rezoning Action in 2005. The proposed project is compatible with the surrounding land use and will be in compliance with the current zoning.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The field work portion of the RI was conducted by EBC during several mobilizations to the site: the initial RI mobilization in July 2013 and a supplemental mobilization concluding on February 9, 1014. The field investigation consisted of the environmental sampling, field observations and measurements to determine:

- Local geologic/hydrogeologic conditions
- Definition of source areas
- Potential migration of contaminants from the site to surrounding areas
- Overall characterization of site-related contamination in all media

The field effort included the collection and analysis of soil, groundwater and soil vapor samples. Drilling services were provided by Eastern Environmental Services (Eastern) of Manorville, NY and LVS Inc. Laboratory services were provided by Phoenix Environmental Laboratories of Manchester, CT. A sample matrix showing the number, type and analysis of samples collected during the Remedial Investigation is provided as **Table 2**.

2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED

2.1.1 Borings

A total of 3 soil borings, B1 through B3, were advanced during the initial site mobilization in July 2013. An additional 10 soil borings (14B4, 14B5, 14B6, 14B7, 14B8, 14B9, 14B10, B-10, B-11 and REF) were installed during the period of January 2, 2014 and February 9, 2014.

The following soil boring location soil samples B1, B2, B3, 14B4, 14B5, 14B6, 14B7, 14B8, 14B9 and 14B10) were collected continuously in 2-foot intervals using a manually operated AMS Dual-Purpose Soil Recovery Probe. The AMS sampler uses a "slap hammer" to drive and retrieve core samples. Soil samples were retrieved using the 1.25-inch diameter 2-foot long sampler with disposable acetate liners. At each sampling location, the soil recovery probe was driven to a depth of approximately 4 feet below grade and a sample was retained representing the 0-2 ft and 2-4 ft interval below basement slab grade.

The following soil boring location soil samples; B-10, B-11 and REF were collected with a Geoprobe™ utilizing direct-push technology. As per the DEC, soil samples were collected from a midway depth and above the ground water table (in the case where no PID readings or visual obsservation indicated otherwise).

It should be noted that borings B3 and B11 were installed on the 1st floor portion of the site which is at grade. All other borings were installed below the basement slab. The basememnt of the Site is situated 6.5 feet below grade.

Each soil sample recovered from the soil borings was characterized by an experienced geologist qualified environmental professional (QEP) and field screened for the presence of VOCs using a photo-ionization detector (PID). The geologist's field observations and PID readings were recorded for each boring in a soil boring log. The location of soil borings are shown on **Figure 4**.

2.1.2 Monitoring Wells

EBC collected a groundwater sample from a monitoring well located in the sidewalk in front of the building (MW1) during the second mobilization in August 2013 to evaluate groundwater quality across the Site. Two additional monitoring wells were installed February 2, 2014 (MW2) and February 9, 2014 (MW3).

The monitoring wells were installed to a total depth of 30-35 ft, approximately 5 feet below the water table. A No. 00 Morie filter sand was placed in the borehole to within 2 feet above the top of the screen. A 1-foot hydrated bentonite seal was then placed on top of the filter sand and the remainder of the borehole was backfilled to grade. The locations of MW1, MW2 and MW3 is shown in **Figure 5**.

2.1.3 Samples Collected

A summary of the sampling performed during the RI is provided in **Table 2**.

2.1.3.1 Soil Samples

Soil samples were collected from grade to a depth of 4 ft below basement slab grade using a manually operated AMS Dual-Purpose Soil Recovery Probe. The AMS sampler uses a "slap

hammer" to drive and retrieve core samples. The following soil boring location soil samples; B-10, B-11 and REF were collected with a Geoprobe™ utilizing direct-push technology. As per the DEC, soil samples were collected from a midway depth and above the ground water table (in the case where no PID readings or visual obsservation indicated otherwise). Soil samples were retrieved using the 1.25-inch diameter 2-foot long sampler with disposable acetate liners. Each soil sample recovered from the soil borings was characterized by a qualified environmental professional (QEP) and field screened for the presence of VOCs using a photo-ionization detector (PID). Retained samples were submitted for laboratory analysis of volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, TAL Metals, pesticides and PCBs by EPA Methods 8081/8082.

2.1.3.2 Groundwater Samples

A groundwater sample was obtained from the monitoring well located in the sidewalk in front of the building (MW1) during the second mobilization in August 2013. Additional ground water samples were colleted from MW1, MW2 and MW3 on February 4, 2014 and February 9, 2014.

A peristaltic pump and polyethylene tubing were used to purge and collect samples from the well. The sample was collected directly into pre-cleaned laboratory supplied glassware, stored in a cooler with ice and submitted to Phoenix Environmental Laboratories of Manchester, CT, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301).

The groundwater sample was analyzed for VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals (total and dissolved) and pesticides/PCBs by Method 8081/8082. Supplemental ground water samples collected on February 4, 2014 and February 9, 2014 were analyzed for VOCs only.

2.1.3.3 Soil Gas Samples

To assess the presence of VOCs in soil vapor beneath the site, three sub-slab soil vapor samples (SG1-SG3) were collected at the site during the initial mobilization in July 2013. In addition to the sub-slab samples, one indoor air sample (IA1) and one outdoor air sample (OA1) were collected at this time. Soil vapor, indoor and outdoor sampling locations are shown on **Figure 6**. All samples were collected over a 2 hr sampling period.

Soil vapor samples were collected in accordance with the procedures as described in the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 10/06)*.

2.1.4 Chemical Analytical Work Performed

Each soil and groundwater sample was placed in pre-cleaned laboratory supplied glassware, and placed in a cooler packed with ice for transport to the laboratory. Sample analysis was provided by Phoenix Environmental Laboratories of Manchester, CT, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301).

Soil samples were analyzed for the following parameters: VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals and pesticides/PCBs by Method 8081/8082. The groundwater sample was analyzed for VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals (total, dissolved) and pesticides/PCBs by Method 8081/8082.
Soil gas, indoor and outdoor samples were analyzed for VOCs by EPA method TO-15.

2.1.5 Documentation

Maps showing the locations of the soil borings, monitoring well and soil gas/air sample collection points are provided in **Figures 4**, **5** and **6**. The results of soil, groundwater and soil gas/air samples collected during the RI are summarized in **Tables 3** through **12**. Below is a summary of RI findings.

The results of sampling performed during this RI, identified CVOCs in soil gas which are likely related to an on-site release, which could have included minor surface spills from the storage of spent or new PCE solvent within the basement. The timing and scenario of the release(s) are unknown.

Based upon the concentration distribution of PCE/TCE, the spill(s) likely occurred in the vicinity of SG3 located near the front (south) of the building. This would be consistent with the storage of solvent in the front portion of the basement near the sidewalk access doors to facilitate pickup and delivery of the solvent storage containers.

No other source areas were identified or indicated during this RI. Elevated levels of SVOCs and metals reported in shallow soil are characteristic of the historic fill materials present at the site and throughout the area.

2.2 SIGNIFICANT THREAT

The NYSDEC and NYS DOH has determined that the site does pose a significant treat to human health and the environmental.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

Previous owners and operators of the property are shown in Tables 1 and 2 below. Information regarding ownership of the property was obtained from online property records maintained by the NYC Department of Finance Office of the City Register under its Automated City Register Information System (ACRIS). Information regarding past operators was obtained from historic Sanborn Fire Insurance maps, city phone directories, certificates of occupancy and from an internet search of the property address.

555 Grand Units LLC (the Applicant) is the current owner of the property and has owned the Lot since July 2013. The building is currently vacant but the ground floor was most recently occupied by a dry cleaner (Tru Val cleaners) with two residential tenants in floors two and three. The Site was developed as a mixed used commercial (retail) and residential building in 1920. Commercial tenants in the first floor retail space included Lewizky Louis Dry Goods and Salvin Building Co. (1928), Miracle Dollar Store (1934), S. Levine Small Contractor and Rama Building Corp. (1945) Louis Bagain Department. Store (1949), Mayflower Bargain Stores (1960), Joel Bargain Store (1965-1976), Grand Corp. 1992 and Tru Value Cleaners (2005-2013).

Table 1 - Previous Owners

Dates	Name	Comments	Contact Info
prior to 10/20/69	Tillie Deren	Deed	2932 West 5th Street, Brooklyn, NY 11224
From 10/20/69 to 11/17/78	Joel Kacenelenbogen	Deed	148-50 Hillside Avenue, Jamaica, NY 11435
From 11/17/78 to 8/8/85	560 Grand Street Real Estate, Inc.	Deed	560 Grand Street, Brooklyn, NY 11221
From 8/8/85 to 5/30/90	In Sang Bae	Deed	41-06 34th Avenue, Long Island City, NY 11101

From 5/30/90 to 5/30/90	Carol O'Cleireacan Commissioner of Finance City of New York	Deed Tax Foreclosure	Municipal Building Room 500 1 Centre St, New York, NY 10007
From 5/30/90 to 6/4/92	City of New York	Deed Vacate Order	City Hall, New York, NY 1 Centre St, New York, NY 10007
From 6/4/92 to 9/20/01	In Sang Bae	Deed	325 E. Midland Avenue, Paramus, NJ 07652
From 9/20/01 to 12/17/07	Kyong Im Bae	Deed	666 Westend Avenue, No. 80, New York, NY 10023
From 12/17/07 to 7/29/08	John Sagona	Deed	9435 Sutter Avenue, Ozone Park, NY 11417
From 7/29/08 to 7/23/13	555 Grand Street Holding Corp.	Deed	555 Grand Street, Brooklyn, NY 11221
From 7/23/13 to Present	555 Grand Units LLC	Deed	183 Wilson Street, Suite 132 Brooklyn, NY 11211

Note: 555 Grand Units LLC is in no way affiliated with any of the prior owners the property.

Table 2 - Previous Operators

Dates	Name	Comments	Contact Info
Sometime prior to 1928 to sometime before 1934	Lewitzky Dry Goods, Salvin Building Co.	City Directory	555 Grand Street, Brooklyn, NY 11221
Sometime after 1928 to sometime before 1940	Miracle Dollar Store	City Directory	555 Grand Street, Brooklyn, NY 11221
Sometime after 1940 to sometime before 1949	S. Levine Small Contractor, Rama Building Corp.	City Directory	555 Grand Street, Brooklyn, NY 11221
Sometime after 1945 to sometime before 1960	Louis Bargain Department Stores	City Directory	555 Grand Street, Brooklyn, NY 11221
Sometime after 1949 to sometime before 1965	Mayflower Bargain Stores	City Directory	555 Grand Street, Brooklyn, NY 11221
Sometime after 1960 to sometime before 1992	Joel Bargain Stores	City Directory	555 Grand Street, Brooklyn, NY 11221
Sometime after 1976 to sometime before 1999	Grand Corp.	City Directory NYC Dept. of Buildings	555 Grand Street, Brooklyn, NY 11221
1999 to 2013	Tru Val Cleaners	City Directory NYC Dept. of Buildings	555 Grand Street, Brooklyn, NY 11221

Note: 555 Grand Units LLC is in no way affiliated with Tru Val Cleaners and any of the prior operators / tenants of the property

The following resources were employed in obtaining historical information with respect to ownership:

- NYC ACRIS Database
- Interviews with Current Owners

The following resources were employed in obtaining historical information with respect to operators:

- Interviews with Current / Previous Operators / Owners
- City Directory Listings

- Certificate of Occupancy Records as Maintained by the Department of Buildings
- Internet Address Search

2.3.2 Phase I Reports

June 2013 – Phase I Environmental Site Assessment Report (EBC)

A Phase I Environmental Site Assessment (ESA) report was prepared by Environmental Business Consultants (EBC) in June 2013.

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 to 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 SQR, US AIRS, E Designation, FINDS, NY Drycleaners and EDR US Historic Cleaners site. 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 the site. EBC notes 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 Site and surrounding properties, interviews and review of historical records and regulatory agency databases, EBC noted the following recognized environmental conditions for the 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.

2.3.3 Sanborn Maps

Sanborn Fire Insurance Maps - Sanborn Fire Insurance Maps - Sanborn fire insurance maps for the subject site and surrounding area were reviewed for the years 1887, 1904, 1905, 1916, 1918, 1935, 1942, 1947, 1950, 1951, 1965, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1986, 1987, 1988, 1989, 1991, 1992, 1993, 1995, 1996, 2001, 2002, 2003, 2004, 2005, 2006 and 2007. Copies of Sanborn maps are included as **Attachment B**.

1887

Subject Site:

- The Site appears to be developed with one (1) three story mix use commercial and residential building. The commercial portion is occupied by a store and the address associated with the site is 439 Grand Street.

Adjacent properties:

- The property adjacent to the north appears to be developed with a residential building. Grand Street borders this site to the south, beyond which is developed with mixed use commercial and residential buildings. Mixed use commercial and residential buildings border the site to the east and west.

1904

Subject Site:

- The Site is not visible on this Sanborn map.

Adjacent properties:

- Adjacent properties are not visible on this Sanborn map.

1905-1916

Subject Site:

- The Site appears to be developed with the same mixed use building from the 1887 Sanborn map. The Site is not associated with the address of 555 Grand Street.

Adjacent properties:

- Adjacent properties remain unchanged from the 1887 Sanborn map.

1918-1935

Subject Site:

- The Site is not visible on this Sanborn map.

Adjacent properties:

- Adjacent properties are not visible on this Sanborn map.

1942

Subject Site:

- The Site remains developed with the same structures as the 1916 Sanborn map.

Adjacent properties:

- The surrounding properties remain consistent with the 1916 Sanborn map, with the exception of the property adjacent to the north. This property is now occupied by a garage.

1947-1950

Subject Site:

- The Site is not visible on this Sanborn map.

Adjacent properties:

- Adjacent properties are not visible on this Sanborn map.

1951-1965

Subject Site:

- The Site remains developed with the same structures as the 1942 Sanborn map.

Adjacent Property

- The surrounding properties remain consistent with the 1942 Sanborn map, with the exception of the property adjacent to the north. This property is now occupied by an auto repair facility.

1977

Subject Site:

- The Site is not visible on this Sanborn map.

Adjacent Property

- The surrounding properties are not visible on this Sanborn map.

1978-1983

Subject Site:

- The Site remains developed with the same structures as the 1965 Sanborn map.

Adjacent Property

- The surrounding properties remain consistent with the 1965 Sanborn map, with the exception of the property adjacent to the north. This property is now occupied by an auto repair facility.

1984

Subject Site:

- The Site is not visible on this Sanborn map.

Adjacent Property

- The surrounding properties are not visible on this Sanborn map.

1986-2007

Subject Site:

- The Site remains developed with the same structures as the 1983 Sanborn map.

Adjacent Property

- The surrounding properties remain consistent with the 1983 Sanborn map.

According to historical Sanborn maps, the site was developed with the current building in 1887.

2.4 GEOLOGICAL CONDITIONS

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. Groundwater is present under water table conditions at a depth of approximately 22.5 feet below the surface and is expected to flow east.

According to the USGS topographic map for the area (Brooklyn Quadrangle), the elevation of the property 28 feet above the National Geodetic Vertical Datum (NGVD). The area topography gradually slopes to the northwest.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

CVOC contamination at the Site consists mainly of PCE in soil gas though TCE was also reported at elevated levels. The recent historical use of the site as a dry cleaner and the high PCE detections in soil gas is evidence that the CVOC contamination at the site is related to an on-site

release. Based on recent observations made when the dry cleaner was in operation, it is evident that spent solvent was stored on-site in 10-gallon containers. Although the spent solvent was stored on the first floor next to the dry cleaning machine, new solvent or spent solvent may have been stored in the basement in the past. Access to the basement is through double steel doors in the sidewalk making it a convenient space for the pickup and delivery of stored supplies.

The most likely release scenario would include small surface spills from the storage of new or spent solvent in the basement. The spill(s) may have been just large enough to penetrate the concrete slab, without significantly impacting soil beneath the slab beyond a few inches. The solvent in the concrete would off-gas to indoor air with concentrations declining over time as the solvent in the concrete was depleted. Solvent at the base of the concrete would be trapped beneath the slab resulting in high PCE concentrations in sub-slab vapors as observed. Based on the concentration distribution, the spill(s) likely occurred in the vicinity of SG3 located near the front (south) of the building. This would be consistent with the storage of solvent in the front portion of the basement near the sidewalk access doors to facilitate pickup and delivery of the 10-galon storage containers.

No other source areas were identified or indicated during this RI. Elevated levels of SVOCs and metals reported in shallow soil beneath the basement slab are characteristic of the historic fill materials present at the site and throughout the area. Slightly elevated levels of PCE in groundwater were detected above standards, however these are equivalent with regional background data for the area.

2.5.2 Description of Areas of Concern

The primary area of concern is CVOC impacted soil gas beneath the existing building slab. PCE was detected within two of the four shallow (0-2 ft) soil samples and three deep samples (6-12 ft) retained at the Site, however, neither PCE nor TCE were detected within any of the soil samples at a concentration above Unrestricted Use SCOs.

No other source areas were identified or indicated during this RI. Elevated levels of SVOCs and metals reported in shallow soil throughout the site are generally characteristic of the historic fill materials present at the Site and throughout the area. Slightly elevated levels of PCE in groundwater were detected above standards, however are equivalent with regional background data for the area.

Contaminated media documented at the site includes soil and soil gas which was found to be contaminated with VOCs during the RI.

2.5.3 Soil/Fill Contamination

SVOCs including benz(a)anthracene and benzo(b)fluoranthene were reported above restricted soil cleanup objectives (SCOs) in the 2-4ft sampling interval at boring location B3.

One or more metals including arsenic, copper, lead and mercury were reported above restricted residential SCOs in both the 0-2 foot and 2-4 foot sampling intervals at all three boring locations. Cadmium and zinc were also reported above unrestricted SCOs at boring location B3. The elevated levels of SVOCs and metals reported in shallow soil throughout the site is consistent with historic fill materials present throughout the area.

2.5.3.1 Summary of Soil/Fill Data

Soil sample results from the RI are summarized in **Tables 3-6**. Further information on soil sample collection, handling and analysis can be found in the RI Report (EBC 11/13).

2.5.3.2 Comparison of Soil/Fill with SCGs

Table 13 shows soil sample results above Track 1 Unrestricted SCOs for all overburden soil at the Site. Sample results above Track 1 Unrestricted SCOs for all overburden soil are posted on **Figure 7**.

2.5.4 On-Site and Off-Site Groundwater Contamination

The groundwater sample obtained from the monitoring wells located on site indicate low levels of PCE, at a concentration slightly above NYSDE Groundwater Quality Standards. No other VOCs were detected in the groundwater sample. Several metals were reported above standards

including, aluminum, iron, manganese and sodium. The concentrations and parameters reported are consistent with general background conditions documented in the area.

2.5.4.1 Summary of Groundwater Data

The results of groundwater sample collected during the RI are summarized in **Tables 7-11**. Further information on groundwater sample collection, handling and analysis can be found in the RI Report (EBC 11/13).

2.5.4.2 Comparison of Groundwater with SCGs

Sample results above GA groundwater standards in the monitoring well prior to the remedy are shown in **Table 14**. A spider map which shows the groundwater sampling location and summarizes results above GA groundwater standards prior to the remedy are shown in **Figure 8**.

2.5.5 On-Site and Off-Site Soil Vapor Contamination

Total petroleum related volatile organic compounds were generally low and consistent with background levels. High concentrations of the chlorinated VOCs tetrachloroethylene (PCE) and elevated concentrations of trichloroethene (TCE) were detected within all three sub-slab soil gas samples collected as well as the indoor and outdoor air samples at the Site. TCE concentrations in soil gas ranged from 84.8 $\mu g/m^3$ to a high of 623 $\mu g/m^3$. TCE concentrations in indoor and outdoor air were 13.7 $\mu g/m^3$ and 3.92 $\mu g/m^3$, respectively. PCE concentrations in soil gas ranged from 7,730 $\mu g/m^3$ to 228,000 $\mu g/m^3$. PCE concentrations in indoor and outdoor air were 6,230 $\mu g/m^3$ and 3,930 $\mu g/m^3$, respectively. Both PCE and TCE were detected above the NYSDOH threshold requiring action (monitoring or mitigation).

Figure 9 shows posted soil gas results from the RI.

2.5.5.1 Summary of Soil Vapor Data

A table of soil vapor data collected prior to the remedy is shown in **Table 12**. Further information on soil gas sample collection, handling and analysis can be found in the RI Report (EBC 11/13).

2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.6.1 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment under the BCP is to identify potential receptors to the contaminants of concern (COC) that are present at, or migrating from, the site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur. An exposure pathway has five elements; a contaminant source, release and transport mechanisms, point of exposure, route of exposure and a receptor population.

The potential exposure pathways identified below, represent both current and future exposure scenarios.

Contaminant Source

The source of CVOCs detected in soil gas at the site is indicative of surface spills of PCE dry cleaning solvent within the basement of the building which either wicked through the concrete or migrated through cracks or other voids in the concrete floor.

Contaminant Release and Transport Mechanism

CVOCs present within the concrete and in shallow soils beneath the slab are volatilizing to soil gas and to indoor air, as reported in analytical results from sub-slab soil gas samples SG1, SG2, SG3 and indoor air sample IA1.

Point of Exposure, Route of Exposure and Potentially Exposed Populations

Potential On-Site Exposures: Remediation workers and construction workers engaged in the excavation of impacted and non-impacted soil at the site may be exposed to CVOCs through several routes. Workers excavating impacted soil may be exposed to CVOCs through inhalation, ingestion and dermal contact. Workers excavating non-impacted soil may be exposed to CVOCs in soil vapor through inhalation. A site specific Health and Safety Plan has been developed to identify and minimize the potential hazards to on-site workers.

Under a future scenario, residents within the renovated building may be exposed to vapor intrusion if remediation of the source area is not completed, and also if mitigation measures are not implemented to protect against contaminated soil vapor intrusion. This potential route of exposure will be reduced in response to the degree and success of source area remediation.

Potential Off-Site Exposures: The entire area is serviced by the New York City Water System which distributes water from the Croton Reservoir system. Since there are no public or private potable supply wells in the area, exposure from contact with tap water is not a concern. Off-site exposure is therefore limited to vapor intrusion from CVOCs in soil gas migrating from the site. Potential off-site exposure related to CVOC vapor intrusion is a concern. The potentially exposed population in this case would include residents and commercial workers in adjacent buildings.

2.6.2 Fish & Wildlife Remedial Impact Analysis

Since CVOCs in groundwater may be migrating beneath the site at low concentrations in a northwesterly direction, the groundwater to surface water discharge pathway was evaluated. The East River is located approximately 5,500 feet west (sidegradient of the Site). Based upon the concentrations of CVOC contaminants in groundwater beneath the Site and the distance and position of the Site relative to the East River, there are no expected impacts to surface water environments from contaminants migrating beneath the Site.

2.7 REMEDIAL ACTION OBJECTIVES

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

2.7.1 Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Prevent impacts to biota due to ingestion/direct contact with contaminated soil that would cause toxicity or bioaccumulation through the terrestrial food chain.

2.7.3 Soil Vapor

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

3.0 ALTERNATIVES ANALYSIS

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

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance; and
- Land use.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. This analysis was prepared in accordance with 6 NYCRR Part 375-1.8(f) and Part 375-3.8(f) and Section 4.3(c) of NYSDEC DER-10. As required, a minimum of two remedial alternatives (including a Track 1 scenario) are evaluated, as follows:

- Alternative 1 - Track 1, remediation of all soils above bedrock to unrestricted use criteria. Due to elevated levels of some metals in the native soils at the Site in the 2 to 4 foot interval it is expected that a Track 1 alternative will require excavation of the entire site to a minimum depth of 4 feet across the site. This would require building demolition or some other drastic measure to allow full excavation of the Site while supporting the existing building. This alternative does not allow the use of long-term institutional

/engineering controls to address impacted media or prevent exposures which may be required beneath the proposed building.

- Alternative 2 - Track 4, would include the installation of a soil vapor extraction (SVE) system which would be converted into an active sub-slab depressurization system (SSDS) once VOC recovery reaches asymptotic levels. A vapor barrier would also be installed within the elevator shaft pit, foundation wall excavations and utility/plumbing conduits, and an epoxy sealant would be applied across the basement slab. The Track 4 alternative will allow the use of site specific SCOs for remaining fill materials as a result of the minimal excavation due to the use of the original structure. This will result in some SVOCs and metals above restricted residential SCOs remaining in soil. Alternative 4 would include an engineered cap consisting of the building basement slab or a surface concrete cap for those areas not covered by the building. This alternative also includes a contingency for groundwater remediation through chemical oxidant injections if significant levels of CVOC contamination related to the Site, are identified.

3.1 REMEDIAL ALTERNATIVE 1

The following sections provide an evaluation of Alternative 1 based on the nine evaluation criteria as previously discussed.

3.1.1 Overall Protection of Human Health and the Environment

Alternative 1 would be protective of human health and the environment by eliminating the CVOC concentrations present in all subsurface affected soils at the site and by eliminating constituents in soil related to historic fill. The potential for human and environmental exposure to these constituents on-site would be eliminated by excavation of all historic fill soils with parameters in excess of unrestricted criteria, disposing of excavated materials off-site and backfilling as needed with certified clean fill, virgin mined materials or recycled concrete materials from a NYSDEC permitted recycling facility.

During remedial and construction activity workers and area residents may be exposed to impacted soil and vapors. Worker exposure to soil and vapors will be minimized through implementation of a Health and Safety Plan. Exposures to area residents from dust and/or vapors

will be minimized through the use of engineering controls and through implementation of a Community Air Monitoring Plan (CAMP).

3.1.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 1 would achieve compliance with the remedial goals, SCGs and RAOs for soil through source removal to Track 1 unrestricted cleanup levels. SCGs for groundwater may not be achieved as impacted groundwater is related to background water quality in the vicinity of the Site. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.1.3 Long-Term Effectiveness and Permanence

Alternative 1 achieves long term effectiveness and permanence by permanently removing and/or remediating all soils affected by Site contaminants or historic fill materials. Under this Alternative, risk from soil and soil gas impacts is eliminated. Alternative 1 will continue to meet RAOs for soil in the future, providing a permanent long-term solution for the Site.

3.1.4 Reduction in Toxicity, Mobility or Volume Through Treatment

Alternative 1 would permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by meeting unrestricted objectives. The removal/remediation of on-site soil would also reduce the toxicity, mobility, and volume of contaminants within on-site soil vapor.

3.1.5 Short-Term Effectiveness

The potential for short-term adverse impacts and risks to the workers, the community, and the environment during the implementation of Alternative 1 is minimal.

Short-term exposure to on-site workers during excavation and loading activities will be addressed with a HASP and mitigated through the use of personal protective equipment, monitoring and engineering controls. Potential short-term exposure to the surrounding community will be addressed through the use of odor and dust-suppression techniques and through the implementation of a CAMP which will require air monitoring activities during all excavation and soil disturbance activities.

Other potential impacts to the community such as construction-related noise, vibrations and traffic, would be controlled and regulated under the terms of the NYS Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-site disposal facilities, would minimize the potential for impacted soil to be dispersed beyond the Site boundary. A truck traffic plan has also been prepared to minimize disturbance to the local roads and community.

3.1.6 Implementability

The techniques, materials and equipment to implement Alternative 1 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites. However, since the redevelopment plan for this project calls for renovation of the existing structure, this Alternative, which requires demolition of the existing building or other drastic measures to facilitate excavation to meet Unrestricted Use SCOs, is not a feasible option.

3.1.7 Cost

Costs associated with Alternative 1 are estimated at approximately $1,452,223. This cost estimate includes the following elements and assumptions:

- Demolition of existing structure;
- Replacement of existing structure;
- Excavation to a depth of 4 feet across the entire site to removal all historic fill material to meet Track 1 Unrestricted Use SCOs;
- Disposal of approximately 556 cy of historic fill soil as non-hazardous;
- Installation of a vapor barrier beneath the new structure;
- HASP and CAMP monitoring for the duration of the remedial activities.

3.1.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current R7A residential with a C2-4 commerical overlay. Following remediation, the Site will meet unrestricted use objectives

which will exceed the objectives for its planned multi-tenant residential use. A groundwater use restriction will be required to prevent future exposure to affected groundwater.

3.1.9 Community Acceptance

No questions regarding the Site have been raised regarding remedial options to date. This RAWP will be subject to a 45-day public comment period to determine if the community has comments on the presented remedial alternatives and selected remedy. If no comments are received regarding Alternative 1, it will be considered to be acceptable to the community. However, as the redevelopment plan for this project calls for renovation of the existing structure, this Alternative, which includes demolition of the existing building to facilitate excavation to meet Unrestricted Use SCOs, is not a feasible option.

3.2 REMEDIAL ALTERNATIVE 2

The following sections provide an evaluation of Alternative 2 based on the nine evaluation criteria as previously discussed.

3.2.1 Overall Protection of Human Health and the Environment

Alternative 2 will be protective of human health and the environment by eliminating the CVOC concentrations present in shallow subsurface soil and soil gas at the Site via installation of an SVE system which will later be converted into an active SSDS system, vapor barrier and epoxy sealant and by eliminating constituents related to historic fill above restricted residential criteria to depths ranging from 5 feet to 9 feet in accordance with the planned construction of the Site. The potential for human and environmental exposure to these constituents on-site will be eliminated by excavation of soils to a minimum depth of 5 feet below grade for the elevator pit and 9 feet below grade for installation of the foundation wall concrete slab on the northeast portion of the property, disposing of excavated materials off-site and backfilling as needed with certified clean fill, virgin mined materials or recycled concrete materials from a NYSDEC permitted recycling facility.

Potential post-remediation exposures to on-site residents from soil vapors would be addressed through the use of a vapor barrier, SVE system and SSDS beneath the footprint of the building,

and application of an epoxy sealant across the basement slab. Groundwater use will be restricted at the Site until groundwater quality recovers.

During remedial and construction activity, workers and area residents may be exposed to impacted soil and vapors. Worker exposure to soil and vapors will be minimized through implementation of a HASP. Exposures to area residents from dust and or vapors will be minimized through the use of engineering controls and through implementation of a CAMP.

3.2.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 2 will achieve compliance with the remedial goals, SCGs and RAOs for soil through source removal to restricted residential and site specific cleanup levels. SCGs for groundwater may not be achieved as impacted groundwater has been shown to be background water quality in the vicinity of the Site. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.2.3 Long-term Effectiveness and Permanence

Alternative 2 achieves long term effectiveness and permanence by permanently removing and/or remediating all soils affected by Site contaminants above restricted residential and site-specific cleanup levels to a minimum depth of 5 feet for the elevator pit and 9 feet for the installation of the foundation wall concrete slab on the northeast portion of the property. Under this Alternative, risk from soil and soil gas impacts is eliminated for on-site residents. Alternative 2 will continue to meet RAOs for soil in the future, providing a permanent long-term solution for the Site.

3.2.4 Reduction in Toxicity, Mobility or Volume through Treatment

Alternative 2 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by meeting restricted residential and site specific cleanup levels to a minimum depth of 5 feet for the elevator pit and 9 feet for the installation of the foundation wall concrete slab on the northeast portion of the property. The removal/remediation of on-site soil and operation of the SVE and SSD system will also reduce the toxicity, mobility, and volume of contaminants within on-site soil vapor.

3.2.5 Short-term Effectiveness

The potential for short-term adverse impacts and risks to the workers, the community, and the environment during the implementation of Alternative 2 is minimal. Short-term exposure to on-site workers during excavation and loading activities will be addressed with a HASP and mitigated through the use of personal protective equipment, monitoring and engineering controls. Potential short-term exposure to the surrounding community will be addressed through the use of odor and dust-suppression techniques and through the implementation of a CAMP which will require air monitoring activities during all excavation and soil disturbance activities.

Other potential impacts to the community such as construction-related noise, vibrations and traffic will be controlled and regulated under the terms of the NYS Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-site disposal facilities will minimize the potential for impacted soil to be dispersed beyond the Site boundary. A truck traffic plan will also be prepared to minimize disturbance to the local roads and community.

3.2.6 Implementability

The techniques, materials and equipment to implement Alternative 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites. Excavation to a maximum depth of 9 feet will not require dewatering.

3.2.7 Cost

Costs associated with Alternative 2 are estimated at approximately $201,850. This cost estimate includes the following elements and assumptions:

- Limited excavation for the elevator pit and foundation wall on the northeast portion of the property;
- Disposal of approximately 100 cy of historic fill soil as non-hazardous;
- Installation and operation of a Soil Vapor Extraction system and Sub Slab Depressurization System (SSDS) beneath renovated building;

- Installation of a vapor barrier beneath all excavated areas;
- Installation of an epoxy sealant across basement foundation;
- HASP and CAMP monitoring for the duration of the remedial activities;
- Final Engineering Report, Site Management Plan, Environmental Easement and Final Closure costs.

3.2.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current R7A residential with a C2-4 commerical overlay. Following remediation, the Site will meet unrestricted use objectives which will exceed the objectives for its planned multi-tenant residential use. A groundwater use restriction will be required to prevent future exposure to affected groundwater.

3.2.9 Community Acceptance

No questions regarding the Site have been raised regarding remedial options to date. This RAWP will be subject to a 45-day public comment period to determine if the community has any comments on the presented remedial alternatives and selected remedy. If no comments are received, Alternative 2 will be considered to be acceptable to the community.

4.0 DESCRIPTION OF REMEDIAL ACTION PLAN

4.1 EVALUATION OF REMEDIAL ALTERNATIVES

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

- Protection of human health and the environment;
- Compliance with standards, criteria, and guidelines (SCGs);
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community Acceptance; and
- Land use.

4.2 STANDARDS, CRITERIA AND GUIDANCE (SCG)

A criterion for remedy selection is evaluation for conformance with SCGs that are applicable, relevant and appropriate. Principal SCGs that are applicable, relevant and appropriate for evaluating the alternatives for remediation of this BCP site include the following:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 10 NYCRR Part 67 – Lead
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)

- 6 NYCRR Part 375 - 6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1, 375-3 and 375-6 (December 2006)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS ("SPDES Regulations")
- 6 NYCRR Part 375-6 Soil Cleanup Objectives
- New York State Groundwater Quality Standards – 6 NYCRR Part 703;
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1;
- NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation - May 2010;
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004;
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan
- NYS Waste Transporter Permits – 6 NYCRR Part 364;
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364.
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- DER-10, Technical Guidance for Site Investigation and Remediation, May 2010
- DER-23 / Citizen Participation Handbook for Remedial Programs, January 2010
- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)

Additional regulations and guidance are applicable, relevant, and appropriate to the remedial alternatives and will be complied in connection with implementation of the remedial program; however, the list above is intended to represent the principal SCGs which should be considered in evaluating the remedial alternatives for the BCP site.

Conformance with the appropriate standards for remediation of contaminated soil is an important criterion in evaluating the remedial alternatives for the BCP site. Presently, in New York State 6 NYCRR Part 375 establishes the primary SCGs associated with remediation of contaminated soil at sites which are in the BCP. If proposing remediation pursuant to a Track other than Track 1 (Unrestricted Use), 6 NYCRR Part 375 requires evaluation of at least one remedial alternative pursuant to Track I (Unrestricted Use) and one other alternative developed by the applicant for the proposed use of the BCP site. The remedial alternatives presented in Section 3.0 of this work plan have been prepared in conformance with this requirement.

4.3 SELECTION OF THE PREFERRED REMEDY

The remedy recommended for the site is a Track 4 alternative (Alternative 2) which consists of the installation of a soil vapor extraction (SVE) system which would be converted into an active sub-slab depressurization system (SSDS) once VOC recovery reaches asymptotic levels. A vapor barrier would also be installed within the elevator shaft pit, foundation wall excavations and utility/plumbing conduits, and an epoxy sealant would be applied across the basement slab. The Track 4 alternative will allow the use of site specific SCOs for remaining fill materials as a result of the minimal excavation due to the use of the original structure. This will result in some SVOCs and metals above restricted residential SCOs remaining in soil. Alternative 4 would include an engineered cap consisting of the building basement slab or a surface concrete cap for those areas not covered by the building. This alternative also includes a contingency for groundwater remediation through chemical oxidant injections if significant levels of CVOC contamination related to the Site, are identified.

Overall Protection of Public Health and the Environment

The recommended remedial action achieves protection of the public health and the environment by eliminating soil/fill material in the limited excavation areas and remediating residual soil gas contamination below the existing basement slab which will eliminate the potential for vapor intrusion in the new building and prevent the potential for migration of soil vapor offsite. The recommended action further achieves protection of the public health and the environment by eliminating the potential for human and environmental exposure to surficial soils related to historic fill by excavation of the soils with parameters in excess of restricted residential and site

specific cleanup levels in the limited excavation areas, disposing of excavated materials off-site backfilling as needed with certified clean fill and installation of an engineered cap across the entire Site, which includes the basement foundation slab and rear yard concrete cap. Although affected groundwater would not directly affect human health, groundwater use will be restricted at the Site until groundwater quality recovers.

During remedial and construction activity workers and area residents may be exposed to impacted soil and vapors. Worker exposure to soil and vapors will be minimized through implementation of a Health and Safety Plan. Exposures to area residents from dust and/or vapors will be minimized through the use of engineering controls and through implementation of a Community Air Monitoring Plan (CAMP).

The remedy will meet all of the RAOs established for soil and soil gas at the site.

Compliance with Standards, Criteria and Guidance

The recommended remedial action meets the objectives of the RAOs by removing the potential for human and environmental exposures to chemical constituents above SCGs in soil and soil gas. The proposed action will effectively remove the source area and limited historic fill soils.

Long-term Effectiveness and Permanence

The remedial action achieves long term effectiveness and permanence by permanently removing and/or remediating all soils affected by Site contaminants and removing a portion of historic fill material. Groundwater is not affected by Site related contaminants. Current groundwater quality at the site is representative of general background water quality throughout the area. Under this remedy, risk from soil and soil vapor impacts is eliminated. The selected remedy will continue to meet RAOs for soil and soil gas in the future, providing a permanent long-term solution for the Site.

Reduction of Toxicity, Mobility and Volume

The recommended action will reduce the toxicity, mobility and volume of the chemical constituents by removing the source area of contamination and removing a limited amount of historic fill material. The removal/remediation of on-site soil will also reduce the toxicity, mobility, and volume of contaminants within on-site soil vapor.

Short-term Effectiveness

The potential for short-term adverse impacts and risks to the workers, the community, and the environment during the implementation of Alternative 2 is minimal.

Short-term exposure to on-site workers during excavation and loading activities will be addressed with a HASP and mitigated through the use of personal protective equipment, monitoring and engineering controls. Potential short-term exposure to the surrounding community will be addressed through the use of odor and dust-suppression techniques and through the implementation of a CAMP which will require air monitoring activities during all excavation and soil disturbance activities.

Other potential impacts to the community such as construction-related noise, vibrations and traffic, will be controlled and regulated under the terms of the NYS Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-site disposal facilities, will minimize the potential for impacted soil to be dispersed beyond the Site boundary. A truck traffic plan will also be prepared to minimize disturbance to the local roads and community.

Implementability

The techniques, materials and equipment to implement Alternative 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites. No issues related to the design, availability or implementation of the selected remedy are anticipated.

Cost

Costs associated with Alternative 2 are estimated at approximately $201,850. This cost estimate includes the following elements and assumptions:

- Limited excavation for the elevator pit and foundation wall on the northeast portion of the property;
- Disposal of approximately 100 cy of historic fill soil as non-hazardous;

- Installation and operation of a Soil Vapor Excavation (SVE) and Sub Slab Depressurization System (SSDS) beneath renovated building;
- Installation of a vapor barrier beneath all excavated areas;
- Installation of an epoxy sealant across basement foundation;
- HASP and CAMP monitoring for the duration of the remedial activities;
- Final Engineering Report, Site Management Plan, Environmental Easement and Final Closure costs.

Community Acceptance

Public participation plays a large role in the BCP process. A fact sheet will be prepared and sent out to all interested parties as identified in the site contact list. A draft version of this document will be placed in a local repository (NYSDEC Region 2 office and the Leonard Street Branch of the Brooklyn Public Library,) and made available for public review and comment for a period of 45 days. The RAWP is subject to a 45-day public comment period to determine if the community has comments on the selected remedy.

Compatibility with Land Use

The proposed remedy will not prevent or otherwise interfere with the intended and planned future use of the site. The proposed redevelopment of the Site is compatible with its current R7A residential zoning with C2-4 commercial overlay. Following remediation, the Site will meet restricted residential use objectives which will meet the objectives for its planned multi-tenant residential use. A groundwater use restriction may be required to prevent future exposure to affected groundwater.

4.3.1 Preferred Remedy Land Use Factor Evaluation

As required by Article 27, Title 14 of the Environmental Conservation Law 27-1415, the following land use factor evaluation examines whether the preferred alternative is acceptable based on the 14 criteria presented in the following subsections.

Zoning

The proposed redevelopment project, which includes the construction of a new residential apartment building is in compliance with the R7A/C2-4 residential zoning. Therefore the project

will be constructed as-of-right regardless of the remedy implemented. The preferred remedy will comply with current zoning.

Applicable Comprehensive Community Master Plans or Land Use Plans

The proposed redevelopment project and selected remedy are consistent with comprehensive master and land use plans, specifically the Greenpoint-Williamsburg rezoning action. This area-wide comprehensive re-zoning, completed by the New York City Department of City Planning and adopted by the City Council in May 2005, re-zoned the property from M1-2 commercial to R7A/C2-4 residential use. The preferred remedy will comply with applicable land use plans.

Surrounding Property Uses

The area surrounding the property is highly urbanized and predominantly consists of multi-family residential buildings with mixed-use buildings (residential w/first floor retail) along main corridors such as Grand Street on which the property fronts, Union Avenue just west of the Site and Lorimer Street just east of the Site. The area is marked by late 19th and early 20th century rowhouses with commercial and industrial properties interspersed throughout the residential sections.

The community and area have seen a resurgence in recent years following the rezoning of former industrial properties to residential use during the Greenpoint-Willamsburg Rezoning Action. The proposed project is compatible with the surrounding land use and will be in compliance with the current zoning.

Citizen Participation

Citizen participation for implementation of the preferred alternative will be performed in accordance with DER 23 and NYCRR Part 375-1.10 and Part 375-3.10. A Citizen Participation Plan will be prepared and available for public review at the identified document repositories (NYSDEC Region 2 Office, Leonard Street Branch of the Brooklyn Public Library).

Environmental Justice Concerns

The Site is located within a potential environmental justice area. The NYSDEC defines a potential environmental justice area as a "minority or low-income community that may bear a disproportionate share of the negative environmental consequences resulting from industrial,

municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies".

Environmental justice means the fair treatment and meaningful involvement of all people regardless of race, color, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Land use designations

The proposed remedy is consistent with land-use designations.

Population growth patterns

Population growth patterns support the proposed use for the Site. The preferred remedy will not negatively affect on population growth patterns.

Accessibility to existing infrastructure

The Site is accessible to existing infrastructure. The close proximity of the Site to the Brooklyn-Queens Expressway and the Long Island Expressway will assist soil transportation and contractor access to the Site. The Site is also accessible to mass transit and is within walking distance to bus and subway stops on Union Avenue. The preferred remedy will not alter accessibility to existing infrastructure.

Proximity to cultural resources

The proposed remedy will not negatively impact cultural resources

Proximity to natural resources

The proposed remedy will improve the local environment and will not negatively impact affect natural resources.

Off-Site groundwater impacts

The proposed remedy will improve off-site groundwater impacts by removing a potential source of groundwater contamination at the site. If groundwater contamination related to the Site is present, a contingency is included which will utilize chemical oxidant injections to remediate groundwater.

Proximity to floodplains

No portion of the Site is located within a designated flood zone area. The nearest moderate risk flood zone is located 1,050 feet to the northwest and the nearest high risk flood zone is located 1,550 feet to the northwest.

Geography and geology of the Site

The selected remedy will excavate limited soil from the Site to depths ranging from 5 feet to 9 feet. The selected alternative and development of the site have considered the geography and geology of the Site.

Current Institutional Controls

The Site was assigned an E-designation for hazardous materials as part of the rezoning action completed by the City. The compliance with the E-designation for hazardous materials will require the approval of the NYC Office of Environmental Remediation (NYCOER) of this RAWP. NYCOER must approve this RAWP in the form of a Notice to Proceed (NTP) letter before building permits will be released by the NYC Department of Buildings (DOB). Documentation in the form of a Final Engineering Report (FER) for site remediation must be approved by NYCOER in the form of a Notice of Satisfaction (NOS) before the NYCDOB will issue permanent Certificates of Occupancy for the new buildings.

4.4 SUMMARY OF SELECTED REMEDIAL ACTIONS

The remedy recommended for the site is a Track 4 alternative (Alternative 2) which consists of which consists of the installation of a soil vapor extraction (SVE) system which would be converted into an active sub-slab depressurization system (SSDS) once VOC recovery reaches asymptotic levels. A vapor barrier would also be installed within the elevator shaft pit, foundation wall excavations and utility/plumbing conduits, and an epoxy sealant would be

applied across the basement slab. The Track 4 alternative will allow the use of site specific SCOs for remaining fill materials as a result of the minimal excavation due to the use of the original structure. This will result in some SVOCs and metals above restricted residential SCOs remaining in soil. Alternative 4 would include an engineered cap consisting of the building basement slab or a surface concrete cap for those areas not covered by the building. This alternative also includes a contingency for groundwater remediation through chemical oxidant injections if significant levels of CVOC contamination related to the Site, are identified. The remedy will include the following items:

1. Installation of a Soil Vapor Extraction (SVE) system beneath the existing basement foundation;
2. Conversion of the SVE system into an active sub-slab depressurization system upon reaching asymptotic recovery levels;
3. Installation of a vapor barrier within all excavated areas, SVE/SSDS trenches, and utility/plumbing conduits;
4. Installation of an epoxy/polymer sealant across entire existing basement slab;
5. Installation of a composite cover system consisting of the concrete building slab and concrete capped rear yard across the entire Site;
6. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls;
7. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.
8. A contingency for the remediation of groundwater with chemical oxidant injections should significant levels of CVOC contamination related to the Site be confirmed through supplemental testing.

All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

5.0 REMEDIAL ACTION PROGRAM

The objective of this section of the Remedial Action Work Plan, is to present a scope of work which will be approved by NYSDEC and when completely implemented will ready the BCP site for development under the Contemplated Use, which is restricted residential use, consistent with the requirements of the Brownfield Cleanup Program. Additionally, following completion of the remedial activities, it is an objective of this remedy that Clean Zones will be prepared beneath buildings, courtyards, and utility corridors so that construction can be implemented without the need for OSHA Hazardous Waste Operations and Emergency Response ("HAZWOPER") training for construction workers.

5.1 GOVERNING DOCUMENTS

Governing documents and procedures included in the Remedial Work Plan include a Site-specific Health and Safety Plan (HASP), a Community Air Monitoring Plan (CAMP), a Citizen Participation Plan, a Soil Management Plan (SoMP) analytical quality assurance/quality control (QA/QC), fluid management procedures, and contractors' site operations and quality control procedures. Highlights of these documents and procedures are provided in the following sections.

5.1.1 Health & Safety Plan (HASP)

Contractors and subcontractors will have the option of adopting this HASP or developing their own site-specific document. If a contractor or subcontractor chooses to prepare their own HASP, the Project Remedial Engineer will insure that it meets the minimum requirements as detailed in the site HASP prepared by EBC and must be made submitted to and approved by the NYSDEC.

Activities performed under the HASP will comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926. Modifications to the HASP may be made with the approval of the Project Remedial Engineer (RE), Site Safety Manager (SSM) and/or Project Manager (PM).

All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

The Health and Safety Plan (HASP) and requirements defined in this Remedial Action Work Plan pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion.

The Site Safety Coordinator will be Mr. Kevin Waters. A resume will be provided to NYSDEC prior to the start of remedial construction. Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses. A copy of the Site Specific Health and Safety Plan is provided in **Attachment C.**

5.1.2 Quality Assurance Project Plan (QAPP)

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

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or a cold-pak(s) to maintain a temperature of $4^{o}C$.

Dedicated disposable sampling materials will be used for both soil and groundwater samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Decontamination of non-dedicated sampling equipment will consist of the following:

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

Prepare field blanks by poring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory. Laboratory reports will be upgradeable to ASP category B deliverables for use in the preparation of a data usability report (DUSR). The QAPP for the Site is provided in **Attachment D**.

5.1.3 Construction Quality Assurance Plan (CQAP)

All construction work related to the remedy (i.e. soil excavation) will be monitored by EBC field personnel under the direct supervision of the Remedial Engineer. Monitoring during soil excavation will be performed to protect the health of site workers and the surrounding community. A Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) have been specifically developed for this project. These plans specify the monitoring procedures, action levels, and contingency measures that are required to protect public health.

All intrusive and soil disturbance activities will be monitored by a qualified environmental professional (QEP) under the direct supervision of the Remedial Engineer who will record observations in the site field book and complete a photographic log of the daily activities. The QEP will provide daily updates to the Project Manager and Remedial Engineer who will both make periodic visits to the site as needed to assure construction quality.

5.1.4 Soil/Materials Management Plan (SoMP)

An SMP was prepared for excavation, handling, storage, transport and disposal of all soils/materials that are disturbed/excavated at the Site. The SMP includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with

all applicable Federal, State and local laws and regulations. The SMP developed for this site is presented in **Section 4.5** of this RAWP.

5.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

Erosion and sediment controls will be performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. Typical measures that will be utilized at various stages of the project to limit the potential for erosion and migration of soil include the use of hay bales, temporary stabilized construction entrances/exits, placement of silt fencing and/or hay bales around soil stockpiles, and dust control measures.

5.1.6 Community Air Monitoring Plan (CAMP)

The CAMP provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities.

The action levels specified require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

The primary concerns for this site are vapors, nuisance odors and dust particulates. A CAMP was previously prepared for implementation of the RAWP and is provided in **Attachment E**.

5.1.7 Contractors Site Operations Plan (SOP)

The Remedial Engineer has reviewed all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirms that they are in compliance with this RAWP. The Remedial Engineer is responsible to ensure that all later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. All remedial documents will be submitted to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

5.1.8 Citizen Participation Plan (CPP)

A certification of mailing will be sent by the Volunteer to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing. The Citizen Participation Plan for this project is provided in **Attachment F**.

Document repositories have been established at the following locations and contain all applicable project documents:

Brooklyn Public Library
Leonard Street Branch
81 Devoe Street
Brooklyn, NY 11211
(718) 486-3365

Hours:

Mon 10:00 AM - 6:00 PM
Tue 1:00 PM - 8:00 PM
Wed 10:00 AM - 6:00 PM
Thu 10:00 AM - 6:00 PM
Fri 10:00 AM - 6:00 PM
Sat 10:00 AM - 5:00 PM
Sun closed

5.2 GENERAL REMEDIAL ACTION INFORMATION

5.2.1 Project Organization

The Project Manager for the Remedial Activity will be Ms. Chawinie Miller. Overall responsibility for the BCP project will be Mr. Charles B. Sosik, P.G., P.HG. The Remedial

Engineer for this project is Mr. Ariel Czemerinski, P.E.. Resumes of key personnel involved in the Remedial Action are included in **Attachment G**.

5.2.2 Remedial Engineer

The Remedial Engineer for this project will be Mr. Ariel Czemerinski, P.E. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the Site. The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this Remedial Action Work Plan and will certify compliance in the Final Remediation Report. The Remedial Engineer will provide the certifications listed in Section 10.1 in the Final Engineering Report.

5.2.3 Remedial Action Schedule

The remedial action will begin with mobilization of equipment and material to the Site which will begin approximately 2 weeks following RAWP approval and within 10 days of the distribution of the Construction Fact Sheet. Mobilization will be followed by excavation and disposal of historic fill materials within designated excavation areas and is expected to continue for 2 weeks as part of the construction excavation and foundation installation. Installation of the SSDS and vapor barrier will be completed following all excavation activities and is anticipated to continue for 3 weeks followed by epoxy sealant application.

5.2.4 Work Hours

The hours for operation of remedial construction will conform to the New York City Department of Buildings construction code requirements or according to specific variances issued by that agency. DEC will be notified by the Applicant of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

5.2.5 Site Security

A construction fence will be erected along the front of the property as required by the NYC Department of Buildings. The fence will be maintained as required and secured at the end of each work day.

5.2.6 Traffic Control

Due to the small size of the property, trucks will back into the Site through gates to be installed in a construction fence along Grand Street. The Volunteer's construction management personnel will direct the arrival or departure of construction vehicles, and provide flag services as needed to maintain safe travel exiting and entering the Site from Grand Street. Traffic related to on-going remedial activity will require the limited staging of 10-wheel dump trucks along Grand Street during soil excavation activity. The soil disposal transport route will be as follows: ENTERING SITE - from the Brooklyn Queens Expressway take the Metropolitan Avenue (Exit 32) and head north on Rodney Street to Metropolitan Avenue. Turn right, heading east on Metropolitan Avenue 2 blocks to Lorimer Street. Turn right heading south on Lorimer Street 4 blocks to Grand Street. Turn Right on Grand Street and the Site entrance on the right. EXITING SITE – Turn right out of Site entrance and continue west on Grand Street to Union Avenue. Turn right on Union Avenue and continue north to Metropolitan Avenue Avenue. Turn left onto Metropolitan Avenue heading west to Marcy Avenue. Turn left on Marcy Avenue and bear left onto the Brooklyn Queens Expressway on-ramp. A map showing the truck routes is included as **Figure 10**.

5.2.7 Worker Training and Monitoring

All field personnel involved in remedial activities will participate in training, if required, under 29 CFR 1910.120, including 24 and 40-hour hazardous waste operator training and annual 8-hour refresher training. The Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and be required to sign an HASP acknowledgment.

All on-site personnel engaged in remedial or sampling activities 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.

5.2.8 Agency Approvals

The Applicant has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, obtained prior to the start of remedial construction.

The planned end use for the Site is in conformance with the current zoning for the property as determined by New York City Department of Planning. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work is attached in **Table 15**. This list includes a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the Final Remediation Report.

All planned remedial or construction work in regulated wetlands and adjacent areas will be specifically approved by the NYSDEC Division of Natural Resources to ensure that it meets the requirements for substantive compliance with those regulations prior to the start of construction. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

5.2.9 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the New York State Brownfield Cleanup Program. The sign will meet the detailed specifications provided by the NYSDEC Project Manager and contained in **Attachment H**.

5.2.10 Pre-Construction Meeting with NYSDEC

A pre-construction meeting with the Project Manager, Remedial Engineer, Construction Manager, Owner's Representative and the NYSDEC will take place prior to the start of major construction activities.

5.2.11 Emergency Contact Information

An emergency contact sheet with names and phone numbers is included in **Table 16**. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

5.2.12 Remedial Action Costs

The total estimated cost of the Remedial Action is $ 201,850. A summary of estimated costs for all remedial activity is attached as **Attachment I**. This will be revised based on actual costs and submitted as an Appendix to the Final Remediation Report.

5.3 SITE PREPARATION

5.3.1 Mobilization

Mobilization will include the delivery of construction equipment and materials to the site. All construction personnel will receive site orientation and training in accordance with the site specific HASP, CAMP and established policies and procedures to be followed during the

implementation of the RAWP. The remediation contractor, construction manager and all associated subcontractors will each receive a copy of the RAWP and the site specific HASP and will be briefed on their contents.

5.3.2 Erosion and Sedimentation Controls

Soil erosion and sediment control measures for management of storm water will not be necessary since the project consists of the renovation of an existing building with no soil exposure on-site.

5.3.3 Stabilized Construction Entrance(s)

Since the project consists of the renovation of an existing building trucks will not be accessing the Site and a stabilized construction entrance will not be needed. The loading of trucks or roll-off containers will be performed in the street in front of the building.

5.3.4 Utility Marker and Easements Layout

The Applicant and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. The Applicant and its contractors must obtain any local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site has been investigated by the Remedial Engineer. It has been determined that no risk or impediment to the planned work under this Remedial Action Work Plan is posed by utilities or easements on the Site.

5.3.5 Sheeting and Shoring

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities including excavation is the sole responsibility of the Applicant and its contractors. The Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan. The Applicant and its contractors must obtain any local, State or Federal permits or approvals that may be required to perform work under this Plan. Further, the

Applicant and its contractors are solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

5.3.6 Equipment and Material Staging

All equipment and work materials will be staged on-Site in areas as designated by the General Contractor, and / or Construction Site Superintendant.

5.3.7 Decontamination Area

Since the project consists of the renovation of an existing building trucks will not be accessing the Site and a decontamination area will not be needed. The loading of trucks or roll-off containers will be performed in the street in front of the building. The street will be kept clean by sweeping as needed.

5.3.8 Site Fencing

An 8-foot high temporary construction fence will be installed along the front of the Site with entrance gates located on Grand Street. This fence will be properly secured at the end of the day and supplemented, as needed, by installing orange safety fencing around open excavations to ensure on-site worker safety.

5.3.9 Demobilization

Demobilization will consist of the restoration of material staging areas and the disposal of materials and/or general refuse in accordance with acceptable rules and regulations. Materials used in remedial activities will be removed and disposed properly. All equipment will be decontaminated prior to leaving the Site.

5.4 REPORTING

All daily and monthly Reports will be included in the Final Engineering Report.

5.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day in which remedial activity takes place. Daily reports will include:

- An update of progress made during the reporting day;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions;
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

5.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within two weeks following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

5.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality.

Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's Project Manager (1 copy). CD's will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Remedial Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

5.4.4 Complaint Management Plan

Complaints from the public regarding nuisance or other Site conditions including noise, odor, truck traffic etc., will be recorded in the Site field book and reported to the NYSDEC in the daily status report.

5.4.5 Deviations from the Remedial Action Work Plan

Minor deviations from the RAWP will be identified in the daily update report and will be noted in the Final Engineering Report. When deviations are reported a brief discussion will be provided which will state the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy.

Major changes to the scope of work must be discussed with the NYSDEC and the NYSDOH prior to implementation. If the changes are considered to be significant enough, an addendum to the RAWP Work Plan will be prepared and submitted to NYSDEC / NYSDOH for review.

6.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Excavation work includes the removal historic fill materials present within excavation areas for the elevator pit and foundation wall concrete slab on the northeast side of the property, at depths ranging from 5 feet to 9 feet below grade. Soil excavation will be performed using conventional equipment such as track-mounted excavators, backhoes and loaders.

All excavation work will be performed in accordance with the Site-specific HASP and CAMP. If an underground storage tank (UST) is discovered during excavation the NYSDEC Project Manager will be immediately notified and the UST removed and closed in accordance with DER-10, NYSDEC PBS regulations and NYC Fire Department regulations. It is anticipated that the excavation of historic fill materials and /or native soils will be performed by the excavation contractor for the construction project.

Dewatering is not anticipated for the excavation of contaminated areas or for foundation installation.

6.1 AST - UST REMOVAL METHODS

One aboveground storage tank (AST) is present on the Site. The AST and any underground storage tanks (USTs), if encountered during excavation activities at the Site, will be removed in accordance with the procedures described under the NYSDEC Memorandum for the Permanent Abandonment of Petroleum Storage Tanks and Section 5.5 of Draft DER-10 as follows:

- Remove all product to its lowest draw-off point
- Drain and flush piping into the tank
- Vacuum out the tank bottom consisting of water product and sludge
- Dig down to the top of the tank and expose the upper half of the tank
- Remove the fill tube and disconnect the fill, gauge, product and vent lines and pumps. Cap and plug open ends of lines
- Temporarily plug all tank openings, complete the excavation, remove the tank and place it in a secure location

- Render the tank safe and check the tank atmosphere to ensure that petroleum vapors have been satisfactorily purged from the tank
- Clean tank or remove to a storage yard for cleaning
- If the tank is to be moved it must be transported by licensed waste transported. Plug and cap all holes prior to transport leaving a 1/8 inch vent hole located at the top of the tank during transport
- After cleaning the tank must be made acceptable for disposal at a scrap yard cleaning the tank interior with a high pressure rinse and cutting the tank in several pieces.

During the tank and pipe line removal the following field observations should be made and recorded:

- A description and photographic documentation of the tank and pipe line condition (pitting, holes, staining, leak points, evidence of repairs, etc.)
- Examination of the excavation floor and sidewalls for physical evidence of contamination (odor, staining, sheen, etc.)
- Periodic field screening (through bucket return) of the floor and sidewalls of the excavation with a calibrated photoionization detector (PID).

6.2 SOIL CLEANUP OBJECTIVES

The Soil Cleanup Objectives for this Site are listed in **Table 1**. **Table 13** summarizes all soil samples that exceed the SCOs proposed for this Remedial Action. A spider map that shows all soil samples that exceed the SCOs proposed for this Remedial Action are shown in **Figure 7**.

6.3 REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)

Post excavation soil samples will be collected from the site to verify that remedial goals have been achieved. Construction excavation samples will be taken following the excavation of all fill materials and additional soil as needed to achieve final grade. Site-wide samples will be analyzed for those parameters that exceeded restricted residential SCOs in fill materials during the RI (SVOCs and metals). Approximate endpoint sampling locations are depicted in **Figure 11**.

6.3.1 End-Point Sampling Frequency

Endpoint sampling frequency will be in accordance with DER-10 section 5.4 which recommends the collection of one bottom sample per 900 sf of bottom area and one sidewall sample per 30 liner feet. Sidewall samples will not be collected where sheeting or shoring is present. Approximate endpoint sampling locations are depicted in **Figure 11**.

6.3.2 Methodology

Collected samples be placed in glass jars supplied by the analytical laboratory and stored in a cooler with ice to maintain a temperature of 4 degrees C. Samples will either be picked up at the Site by a laboratory dispatched courier at the end of the day or transported back to the EBC office where they will be picked up the following day by the laboratory courier. All samples will be analyzed by a NYSDOH ELAP certified environmental laboratory

All Verification samples will be analyzed for SVOCs according to EPA method 8270BN and TAL metals.

6.3.3 Reporting of Results

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.

6.3.4 QA/QC

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

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-pak(s) to maintain a temperature of $4^{o}C$.

Dedicated disposable sampling materials will be used for both soil samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Field blanks will be prepared by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory.

6.3.5 DUSR

The DUSR provides a thorough evaluation of analytical data without third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use. Verification and/or performance monitoring samples collected under this RAWP will be reviewed and evaluated in accordance with the Guidance for the Development of Data Usability Summary Reports as presented in Appendix 2B of DER-10. The completed DUSR for verification/performance samples collected during implementation of this RAWP will be included in the final Engineering Report.

6.3.6 Reporting of End-Point Data in FER

All endpoint data collected as part of this remedial action will be summarized and presented in the Final Engineering Report. The summary tables will include comparison of results to restricted residential SCOs to verify attainment of Track 4. Laboratory reports and the DUSR will be included as an appendix in the FER.

6.4 ESTIMATED MATERIAL REMOVAL QUANTITIES

Historic fill materials were documented throughout the site varying in thickness from 2 to 4 feet. It is expected that approximately 100 cubic yards (150 tons) of historic fill/soil classified as non-hazardous will be excavated from the site for off-site disposal from the elevator pit and foundation wall excavations.

6.5 SOIL/MATERIALS MANAGEMENT PLAN

6.5.1 Excavation of Historic Fill Materials

Historic fill has been identified throughout the site. The depth varies from 2 feet to approximately 4 ft below grade. The fill material contains several SVOCs and metals above restricted residential objectives. Historic fill will be segregated from non-contaminated native soils and disposed of off-site at a permitted disposal facility. Excavated historic fill materials will be secured and temporarily stored on-site until arrangements can be made for off-site disposal. As an alternative, pre-characterization samples may be collected to allow the soil to be loaded directly on to trucks for transport to the disposal facility. It is anticipated that historic fill materials will be classified as a non-hazardous material. It is anticipated that the excavation of historic fill materials will be performed by the excavation contractor for the construction project.

6.5.2 Excavation of Native Soils

Native soils are present directly below the fill materials and will possibly require some limited excavation for the elevator shaft and for foundation components during renovation of the existing structure. It is expected that native soils will not be contaminated. However, if evidence of contamination is discovered beneath the existing building's foundation following demolition, or during the excavation, the contamination will be removed to the extent possible and segregated from clean native soils for proper disposal. Clean native soils will be stockpiled on-site and characterized for reuse on-site in areas over excavated to remove historic fill. Any excess soil will be disposed of off-site as a beneficial re-use material upon approval by the NYSDEC Region 2's Division of Materials Management. Clean native soils utilized on-site will be subject to a testing program to verify that they meet restricted residential SCOs prior to use.

It is anticipated that the excavation of native soil materials will be performed by the excavation contractor for the construction project.

6.5.3 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be

performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. This information will be provided on maps in the Final Engineering Report.

Screening will be performed by qualified environmental professionals. Resumes will be provided for all personnel responsible for field screening (i.e. those representing the Remedial Engineer) of invasive work for unknown contaminant sources during remediation and development work.

6.5.4 Stockpile Methods

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 NYSDEC.

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. Hay bales will be used as needed near catch basins, surface waters and other discharge points. Water will be available on-site at suitable supply and pressure for use in dust control.

6.5.5 Materials Excavation and Load Out

The Remedial Engineer or a qualified environmental professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material. The Volunteer and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

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).

Where effective, the equipment will be "dry" decontaminated using a broom and/or brushes. If significant amounts of soil or other contaminants remain after the dry decontamination, the equipment will also be pressure washed before leaving the Site. The QEP will be responsible for ensuring that all outbound trucks are dry-brushed or washed on the truck wash/equipment pad before leaving the Site until the remedial construction is complete. Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking. The QEP will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this Remedial Action Work Plan.

Each area and structure to be remediated will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the structure.

Development-related grading cuts and fills will not be performed without NYSDEC approval and will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited. All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be located and shown on maps to be reported in the Final Engineering Report.

6.5.6 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.

ENTERING SITE - from the Brooklyn Queens Expressway take the Metropolitan Avenue (Exit 32) and head north on Rodney Street to Metropolitan Avenue. Turn right, heading east on Metropolitan Avenue 2 blocks to Lorimer Street. Turn right heading south on Lorimer Street 4 blocks to Grand Street. Turn Right on Grand Street and the Site entrance on the right. EXITING SITE – Turn right out of Site and continue west on Grand Street to Union Avenue. Turn right on Union Avenue and continue north to Metropolitan Avenue. Turn left onto Metropolitan Avenue heading west to Marcy Avenue. Turn left on Marcy Avenue and bear left onto the Brooklyn Queens Expressway on-ramp. A map showing the truck routes is included as **Figure 10**.

These are the most appropriate routes to and from the Site and take 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. Material transported by trucks exiting the Site will be secured with tight-fitting covers. If loads contain wet material capable of producing free liquid, truck liners will be used. All trucks will be inspected, dry-brushed and / or, as needed, before leaving the site.

6.5.7 Materials Disposal Off-Site

Multiple disposal facility designations may be employed for the materials removed from the Site. Once final arrangements have been made the disposal location(s) will be reported to the NYSDEC Project Manager.

The total quantity of material expected to be disposed off-Site is 100 cubic yards of historic fill/soil.

All historic fill material excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval. It is anticipated that historic fill will be disposed of as a non-hazardous material. Final classification of excavated materials will be dependant upon the results of waste characterization sampling. Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

Non-hazardous historic fill taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Materials Management (DMM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on-Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone

number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

Clean native soil removed from the site for development purposes (i.e. foundation, footings, etc.) will be handled as unregulated or beneficial use disposal. This soil will undergo a testing program to confirm that it meets Track 1 unrestricted SCOs prior to unregulated disposal or reuse on-site. Confirmation testing of clean soils will be in Accordance with NYSDEC CP-51 Guidance 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		

Uncontaminated native soil confirmed by the above testing program and removed from the site, will be disposed of as unregulated C&D material or sent to a beneficial re-use facility. The final destination of soils whether classified as contaminated or uncontaminated must be approved by the NYSDEC.

Concrete demolition material generated on the Site from building slabs and other structures will be segregated, sized and shipped to a concrete recycling facility upon approval by the NYSDEC's Division of Materials Management for Region 2. Concrete crushing or processing on-Site is prohibited.

Additionally, it is common to encounter scrap metals and large boulders (greater than one foot in diameter) during excavation which may not be accepted by either the licensed disposal facility or

the C&D facility. These materials will be segregated and subsequently recycled at local facilities. Uncontaminated metal objects will be taken to a local scrap metal facility.

Bricks and other C&D material are also not accepted by most soil disposal facilities if present at greater then 5% by volume. This material, if encountered, will be sent to a C&D landfill or other C&D processing facility if approved by the DEC. C&D material of this type is most often encountered on sites in which former basement structures have been filled in with material from demolishing a former building. There was no evidence of former basement areas identified during previous investigations performed at the Site.

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter from the Remedial Engineer or BCP Applicant to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report. Documentation for materials disposed of at recycling facilities (such as metal, concrete, asphalt) and as non-regulated C&D will include transport tickets for each load stating the origin of the material, the destination of the material and the quantity transported.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation

associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

6.5.8 Materials Reuse On-Site

Re-use of on-Site clean native soil will only be allowed if the material is found to meet restricted residential criteria through the verification testing program detailed in Section 5.4.5 above. The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

Chemical criteria for on-Site reuse of material has been approved by NYSDEC. This criteria is the Track 2 Restricted Residential SCOs as presented in **Table 1**. The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos. Concrete crushing or processing on-Site is prohibited. Contaminated on-Site material, including historic fill removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

6.5.9 Fluids Management

As the depth to groundwater at the site is approximately 22.5 feet below grade depth, dewatering operations will not be employed during construction. However, if dewatering from the accumulation of precipitation or surface runoff becomes necessary, dewatering fluids will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site. Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

6.5.10 Backfill from Off-Site Sources

Off-site fill material may be needed to stabilize the entrance - exit areas of the Site, for temporary driveways for loading trucks and as an underlayment to structural components of the new buildings including slabs and footings. Recycled Concrete Aggregate (RCA) derived from recognizable and uncontaminated concrete and supplied by facilities permitted by, and in full compliance with Part 360-16 and DSNY regulations, is an acceptable form of backfill material. The Remedial Engineer is responsible for ensuring that the facility is compliant with the registration and permitting requirements of 6 NYCRR Part 360 and DSNY regulations at the time the RCA is acquired. RCA imported from compliant facilities does not require additional testing unless required by NYS DEC and DSNY under its terms of operations for the facility. Documentation of part 360-16 and DSNY compliance must be provided to the Remedial Engineer before the RCA is transported to the Site.

Fill material may also consist of virgin mined sand, gravel or stone products. Materials from a virgin mined source may be imported to the Site without testing provided that that the material meets the specifications of the geotechnical engineer, Remedial Engineer, and Redevelopment Construction Documents and that the source of the material is approved by the Remediation Engineer and the NYSDEC Project Manager.

The source approval process will require a review of the following information:

- The origin of the material;
- The address of the facility which mines/processes the material;
- A letter from the facility stating that the material to be delivered to the site is a virgin mined material and that it has not been co-mingled with other materials during processing or stockpiling.

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site. Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

Under no circumstances will fill materials be imported to the site without prior approval from the NYSDEC Project Manager. If sufficient documentation is not obtained, fill materials will be tested at a frequency consistent with that as specified in Table 4 of NYSDEC CP-51 Soil Cleanup Guidance Policy. 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.

6.5.11 Stormwater Pollution Prevention

Soil erosion and sediment control measures for management of storm water will not be necessary since the project consists of the renovation of an existing building with no soil exposure on-site.

6.5.12 Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc. Chemical analytical work will be limited to STARS parameters where tanks are identified. Analyses will not be otherwise limited without NYSDEC approval.

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. These findings will be also included in daily and periodic electronic media reports.

6.5.13 Community Air Monitoring Plan

The Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at construction sites.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air. The primary concerns for this site are odors associated with groundwater purging and sampling.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report. The CAMP developed for this site is included in **Attachment F** or this Work Plan.

6.5.14 Odor, Dust and Nuisance Control Plan

The Final Engineering Report will include the following certification by the Remedial Engineer: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."

6.5.14.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site and on-Site. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Applicant's Remediation Engineer, who is responsible for certifying the Final Engineering Report.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

6.5.14.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-Site work, will include, at a minimum, the items listed below:

- Dust suppression will be achieved though spraying water directly onto off-road areas including excavations and stockpiles.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water application.

6.5.14.3 Nuisance Control Plan

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 has been developed and utilized by the contractor for all remedial work and conforms, to NYCDEP noise control standards.

7.0 REMEDIAL ACTION: SOIL VAPOR EXTRACTION

7.1 SOIL VAPOR EXTRACTION SYSTEM

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 are likely related to isolated and shallow areas of CVOC contaminated soil.

Remediation of the CVOC vapors will be achieved through the 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 is anticipated:

- Three horizontal extraction line system;
- Extraction lines constructed of 20 feet of 4-inch diameter 10-slot pvc well screen;
- 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;
- 1.5 to 2 hp regenerative blower with particulate filter;
- Discharge treatment with vapor-phase granular activated carbon (TIGG Econsorb or equivalent GAC Vapor Phase Carbon Canisters)

The anticipated layout of the SVE system is shown in **Figure 12**. The final design and specifications of the system will be made in consultation with the NYSDEC and NYSDOH following the completion of an SVE pilot test. The pilot test will be performed following the installation of the subslab vent line piping and will consist of connecting the vent lines to a test blower and isolating each lateral line in turn while negative pressure readings are taken at selected locations beneath the concrete slab with a digital manometer. A reading of 0.2 inches of water will be taken as the limit of influence. This procedure will be completed for each lateral line in turn. The results will be used to size the blower (vacuum, CFM) for the full system, taking into consideration calculations for friction loss in the main line, elbows, Tees and valves.

An EBC field inspector under the direct supervision of a professional engineer will inspect and photograph the installation of the SVE system at several critical stages before during and after the installation is complete, to assure compliance with design specifications. Detailed specifications of the SVE system will be submitted to the NYSDEC upon completion of pilot testing.

7.1.1 Criteria for Termination

The SVE system will not be discontinued without written approval by the NYSDEC and NYSDOH. A proposal for conversion of the SVE system into an active SSDS through replacement of the regenerative blower with a radon type fan and removal of the vapor phase carbon treatment may be submitted by the property owner based on confirmatory data that justifies such a request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

8.0 REMEDIAL ACTION CONTIGENCY: CHEMICAL OXIDANT INJECTION PROGRAM

This RAWP includes a contingency for the injection of a chemical oxidant solution to address CVOC affected groundwater if present and found to be related to the Site.

The proposed area of injection would be upgradient of, or within, the area of contamination. Injections at these locations will deliver oxidant to the water table, allowing it to move northwest with groundwater flow treating any CVOC impacted water which may be present. The injection areas are located along the south side of the building, within the sidewalk, allowing injections to proceed during building construction as necessary.

The final design and specifications of the chemical oxidant injection program will be made in consultation with the NYSDEC and NYSDOH following the collection of supplemental soil samples.

8.1 INJECTION WELL INSTALLATION

Approximately 3 injection points will be installed upgradient of the property as shown on **Figure 13**. Injection points will be constructed of 1-inch PVC with a 10 ft 0.020-inch slot screened section installed 8 ft below the water table, and 2 ft above the water table. A No. 2 morie gravel back will be placed around the screen to a depth of approximately 1 ft above the screen followed by a 1 ft hydrated bentonite pellet seal. The injection wells will be finished with a compression plug and an 8-inch bolt down manhole to protect the well.

Injection wells will be registered with the USEPA by filing form 7520-6 with the USEPA Region 2 office.

8.2 OXIDANT INJECTION EVENTS

The oxidant selected for this project is sodium permanganate. Sodium permanganate is a robust oxidant for CVOCs and has a long residence time (anion lifetime) in the subsurface.

Sodium permanganate will be delivered to the site as a 40% solution which would then be mixed with water during the injection event to form a 12% injection solution. The initial injection will consist of approximately 100 gallons of permanganate solution per injection point. The need for subsequent injections and the number and location of injection points to be utilized for subsequent injections will be determined following the collection and analysis of performance monitoring samples.

8.3 REMEDIAL PERFORMANCE EVALUATION (GROUNDWATER SAMPLING)

Groundwater performance monitoring samples will be collected on a quarterly basis from selected locations within and downgradient of the treatment zones to assess the performance of the remedy. The monitoring well network consists of three wells including three upgradient wells located along in the sidewalk on the south of the property line.

8.3.1 Monitoring Well Construction

All monitoring wells will be constructed of 1-inch pvc with a 15-foot 0.010 screened section set with approximately 5 feet above and 10 feet below the water table. A No. 00 morie gravel pack will be placed around the screen to a depth of approximately 1 foot above the screen followed by a 1 foot hydrated bentonite pellet seal. The wells will be completed at the surface with a locking compression-style cap and a 5-inch bolt down manhole cover.

8.3.2 Performance Sampling Frequency

Groundwater samples will be collected from the ten monitoring wells on a quarterly basis. Changes in the sampling frequency or number and location of wells included in the program will not be made without written approval from NYSDEC.

8.3.3 Methodology

Groundwater performance monitoring samples will be collected on a quarterly basis from selected locations within and downgradient of the treatment zones. Sample analysis will include the following:

- VOCs by method 8260
- Permanganate by color

Collected samples be placed in glass vials supplied by the analytical laboratory and stored in a cooler with ice to maintain a temperature of 4 degrees C. Samples will either be picked up at the Site by a laboratory dispatched courier at the end of the day or transported back to the EBC office where they will be picked up the following day by the laboratory courier. All samples will be analyzed by a NYSDOH ELAP certified environmental laboratory

8.3.4 Reporting of Results

Sample analysis for VOCs 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. Field parameter testing including persulfate and pH will be reported in results only format in the quarterly sampling report.

8.3.5 QA/QC

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

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-pak(s) to maintain a temperature of $4^{o}C$.

Dedicated disposable sampling materials will be used for both soil samples (if collected) and groundwater samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Field blanks will be prepared by

pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

Trip blanks will accompany samples each time they are transported to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory.

8.3.6 DUSR

The DUSR provides a thorough evaluation of analytical data without third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use. Verification and/or performance monitoring samples collected under this RAWP will be reviewed and evaluated in accordance with the Guidance for the Development of Data Usability Summary Reports as presented in Appendix 2B of DER-10. The completed DUSR for verification/performance samples collected during implementation of this RAWP will be included in the final Engineering Report.

9.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since contaminated soil is expected to exist beneath the Site after the remedy is complete, an Institutional Control (IC) is required to protect human health and the environment. The ICs, Environmental Easement and Site Management Plan, are described hereafter. Long-term management of the IC will be executed under a deed restriction recorded with the NYC Department of Finance, Office of the City Register.

Environmental Controls (ECs) will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have the following EC systems:

1. An active sub-slab depressurization system, which will initially serve as a soil vapor extraction system, and vapor barrier beneath all excavated areas of the renovated building.
2. An impervious cap consisting of 4-inch thick concrete building slab and 4-inch thick concrete rear yard cap.

The FER will report residual contamination on the Site in tabular and map form.

10.0 ENGINEERING CONTROLS

10.1 SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

Upon receipt of written approval from the NYSDEC and NYSDOH, the SVE system will be converted into an active SSDS. Vapor phase carbon treatment will be removed and the regenerative blower will be replaced with a radon-type fan. The active SSDS and vapor barrier were designed for the entire basement level building slab which is to be used for accessory space for residential apartments.

The SSDS beneath the building slab will consist of three horizontal lines set approximately 25 feet apart. Each extraction line will consist of 20 feet of 4-inch 10 slot pvc well screen. Each extraction line will define a separate zone which will cover 625 sf of slab area. This significantly exceeds USEPA sub-slab depressurization design specifications which recommend a separate vent line for every 4,000 sf of slab area.

Each individual extraction line will originate from a main trench line on either the east or west side of the building, and extend 20 feet beneath the slab. Fill material around the extraction line will consist of virgin-mined 3/4 inch gravel. The exhaust stack will be comprised of 2-inch solid pvc pipe and will terminate at the roof, a minimum of 10 feet from windows and ventilation inlets and a minimum of 3 feet above the roof line.

A high density polyethylene vapor barrier liner (HPDE) will be installed within the SVE/SSDS trenches, elevator shaft pit, foundation wall excavation, and utility/plumbing conduits prior to pouring the replacement slab. The vapor barrier will consist of Raven Industries' VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins, or equivalent. The specifications for installation will be provided to the construction management company and the foundation contractor or installer of the liner. The specifications state that all vapor barrier seams, penetrations, and repairs will be sealed either by the tape method or weld method, according to the manufacturer’s recommendations and instructions. Product specifications for the vapor barrier are included in **Appendix J**.

An EBC field inspector under the direct supervision of a professional engineer will inspect and photograph the vapor barrier at several critical stages before during and after the installation is complete, to assure compliance with design specifications. Detailed specifications of the SSDS system will be submitted to the NYSDEC upon completion of pilot testing for the SVE system, preliminary specifications are included in **Appendix J**.

Upon completion of concrete slab restoration activities, all foundation cracks/voids, utility inlets, drains, etc. within the cellar level of the building will be sealed using an industry standard commercial grade 50-year rated caulking sealant as a standard construction practice. After the SSDS is installed and the concrete slab is properly restored, the entire cellar foundation will be coated with an industry standard epoxy - polymer sealant. Product specifications of the sealant are provided in **Attachment J**.

10.1.1 Criteria for Termination

The active SSDS will not be discontinued without written approval by the NYSDEC and NYSDOH. A proposal to discontinue use of the SSDS may be submitted by the property owner based on confirmatory data that justifies such a request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

11.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls (ECs) will be incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an Environmental Easement and an SMP.

A Site-Specific Environmental Easement will be recorded with Kings County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs.

The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

11.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-Site after the Remedial Action is complete. If the Site will have residual contamination after completion of all Remedial Actions than an Environmental Easement is required. If an Environmental Easement is needed following completion of the remedy an Environmental Easement approved by NYSDEC will be filed and recorded with the City of New York. The Environmental Easement (if needed) will be submitted as part of the Final Remediation Report.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement must be recorded with the City of New York before the Certificate of Completion can be issued by NYSDEC. These Institutional Controls are requirements or restrictions placed on

the Site that are listed in, and required by, the Environmental Easement. Institutional Controls can, generally, be subdivided between controls that support Engineering Controls, and those that place general restrictions on Site usage or other requirements. Institutional Controls in both of these groups are closely integrated with the Site Management Plan (SMP), which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls which will be needed to support Engineering Controls are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- A soil vapor mitigation system consisting of a sub slab depressurization system under the occupied area of the buildings must be inspected, certified, operated and maintained as required by the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in the SMP;
- 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;
- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and soil vapor probes, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these ICs for the Site is mandated by the Environmental Easement and will be implemented under the SMP. The Controlled Property (Site) may also have a series of ICs in the form of Site restrictions and requirements. The Site restrictions that may apply to the Controlled Property are:

- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;

- The Controlled Property may be used for restricted residential use provided that the EC/ICs included in this SMP are employed.

- 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.

11.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) for the Remedial Action. The Site Management Plan is submitted as part of the FER but will be written in a manner that allows its removal and use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated [month, year], and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

No exclusions for handling of residual contaminated soils will be provided in the Site Management Plan (SMP). All handling of residual contaminated material will be subject to provisions contained in the SMP.

12.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) and Certificate Of Completion (COC) will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The Final Engineering Report will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the Final Engineering Report review.

The Final Engineering Report will include written and photographic documentation of all remedial work performed under this remedy. The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows exceedances from SCOs defined for the Site and a map that shows the location and summarizes exceedances for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

12.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Engineer [name] who is a Professional Engineer registered in New York State This certification will be appropriately signed and stamped. The certification will include the following statements:

I _____certify that I am currently a NYS registered professional engineer and that this Final Engineering Report 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

	_____	_____
NYS Professional Engineer #	Date	Signature

13.0 SCHEDULE

The remedial action will begin with mobilization of equipment and material to the Site which will begin approximately 2 weeks following RAWP approval and within 10 days of the distribution of the Construction Fact Sheet. Equipment will be mobilized to site and is expected to continue for 2 weeks. Building renovations will be conducted next and are anticipated continue for 4 weeks. A pilot test program and finalizing the SVE component design will continue for approximately 2 weeks. Installation of the SVE and vapor barrier will be completed following all excavation activities and is anticipated to continue for 3 weeks. The schedule of tasks completed under this RAWP is as follows:

Conduct pre-construction meeting with NYSDEC	Within 2 weeks of RAWP approval
Mobilize equipment to the site	Within 2 weeks following pre-construction meeting
Begin building renovation	2 weeks following mobilization
Pilot Test Program and finalize SVE component design	4 weeks following building renovation
Begin installation of SVE system and vapor barrier	2 weeks following pilot test program and finalizing SVE plan

TABLES

TABLE 1
Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
METALS							
Arsenic	7440-38 -2	16[f]	16[f]	16[f]	16[f]	13[f]	16[f]
Barium	7440-39 -3	350[f]	400	400	10,000 [d]	433	820
Beryllium	7440-41 -7	14	72	590	2,700	10	47
Cadmium	7440-43 -9	2.5[f]	4.3	9.3	60	4	7.5
Chromium, hexavalent [h]	18540-29-9	22	110	400	800	1[e]	19
Chromium, trivalent[h]	16065-83-1	36	180	1,500	6,800	41	NS
Copper	7440-50 -8	270	270	270	10,000 [d]	50	1,720
Total Cyanide [h]		27	27	27	10,000 [d]	NS	40
Lead	7439-92 -1	400	400	1,000	3,900	63[f]	450
Manganese	7439-96 -5	2,000[f]	2,000[f]	10,000 [d]	10,000 [d]	1600[f]	2,000[f]
Total Mercury		0.81[j]	0.81[j]	2.8[j]	5.7[j]	0.18[f]	0.73
Nickel	7440-02 -0	140	310	310	10,000 [d]	30	130
Selenium	7782-49 -2	36	180	1,500	6,800	3.9[f]	4[f]
Silver	7440-22 -4	36	180	1,500	6,800	2	8.3
Zinc	7440-66 -6	2200	10,000 [d]	10,000 [d]	10,000 [d]	109[f]	2,480
PESTICIDES / PCBs							
2,4,5-TP Acid (Silvex)	93-72-1	58	100[a]	500[b]	1,000[c]	NS	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 [e]	17
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 [e]	136
4,4'-DDD	72-54-8	2.6	13	92	180	0.0033 [e]	14
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04[g]	0.02
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	5103-71 -9	0.91	4.2	24	47	1.3	2.9
delta-BHC	319-86-8	100[a]	100[a]	500[b]	1,000[c]	0.04[g]	0.25
Dibenzofuran	132-64-9	14	59	350	1,000[c]	NS	210
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	959-98-8	4.8[i]	24[i]	200[i]	920[i]	NS	102
Endosulfan II	33213-65-9	4.8[i]	24[i]	200[i]	920[i]	NS	102
Endosulfan sulfate	1031-07 -8	4.8[i]	24[i]	200[i]	920[i]	NS	1,000[c]
Endrin	72-20-8	2.2	11	89	410	0.014	0.06
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	1336-36 -3	1	1	1	25	1	3.2
SEMI-VOLATILES							
Acenaphthene	83-32-9	100[a]	100[a]	500[b]	1,000[c]	20	98
Acenapthylene	208-96-8	100[a]	100[a]	500[b]	1,000[c]	NS	107
Anthracene	120-12-7	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Benz(a)anthracene	56-55-3	1[f]	1[f]	5.6	11	NS	1[f]
Benzo(a)pyrene	50-32-8	1[f]	1[f]	1[f]	1.1	2.6	22
Benzo(b) fluoranthene	205-99-2	1[f]	1[f]	5.6	11	NS	1.7
Benzo(g,h,i) perylene	191-24-2	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Benzo(k) fluoranthene	207-08-9	1	3.9	56	110	NS	1.7
Chrysene	218-01-9	1[f]	3.9	56	110	NS	1[f]
Dibenz(a,h) anthracene	53-70-3	0.33[e]	0.33[e]	0.56	1.1	NS	1,000[c]
Fluoranthene	206-44-0	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Fluorene	86-73-7	100[a]	100[a]	500[b]	1,000[c]	30	386
Indeno(1,2,3-cd) pyrene	193-39-5	0.5[f]	0.5[f]	5.6	11	NS	8.2
m-Cresol	108-39-4	100[a]	100[a]	500[b]	1,000[c]	NS	0.33[e]
Naphthalene	91-20-3	100[a]	100[a]	500[b]	1,000[c]	NS	12
o-Cresol	95-48-7	100[a]	100[a]	500[b]	1,000[c]	NS	0.33[e]
p-Cresol	106-44-5	34	100[a]	500[b]	1,000[c]	NS	0.33[e]
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8[e]	0.8[e]
Phenanthrene	85-01-8	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]
Phenol	108-95-2	100[a]	100[a]	500[b]	1,000[c]	30	0.33[e]
Pyrene	129-00-0	100[a]	100[a]	500[b]	1,000[c]	NS	1,000[c]

TABLE 1
Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
VOLATILES							
1,1,1-Trichloroethane	71-55-6	100[a]	100[a]	500[b]	1,000[c]	NS	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27
1,1-Dichloroethene	75-35-4	100[a]	100[a]	500[b]	1,000[c]	NS	0.33
1,2-Dichlorobenzene	95-50-1	100[a]	100[a]	500[b]	1,000[c]	NS	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02[f]
cis-1,2-Dichloroethene	156-59-2	59	100[a]	500[b]	1,000[c]	NS	0.25
trans-1,2-Dichloroethene	156-60-5	100[a]	100[a]	500[b]	1,000[c]	NS	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1[e]	0.1[e]
Acetone	67-64-1	100[a]	100[b]	500[b]	1,000[c]	2.2	0.05
Benzene	71-43-2	2.9	4.8	44	89	70	0.06
Butylbenzene	104-51-8	100[a]	100[a]	500[b]	1,000[c]	NS	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76
Chlorobenzene	108-90-7	100[a]	100[a]	500[b]	1,000[c]	40	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1
Hexachlorobenzene	118-74-1	0.33[e]	1.2	6	12	NS	3.2
Methyl ethyl ketone	78-93-3	100[a]	100[a]	500[b]	1,000[c]	100[a]	0.12
Methyl tert-butyl ether	1634-04 -4	62	100[a]	500[b]	1,000[c]	NS	0.93
Methylene chloride	75-09-2	51	100[a]	500[b]	1,000[c]	12	0.05
n-Propylbenzene	103-65-1	100[a]	100[a]	500[b]	1,000[c]	NS	3.9
sec-Butylbenzene	135-98-8	100[a]	100[a]	500[b]	1,000[c]	NS	11
tert-Butylbenzene	98-06-6	100[a]	100[a]	500[b]	1,000[c]	NS	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3
Toluene	108-88-3	100[a]	100[a]	500[b]	1,000[c]	36	0.7
Trichloroethene	79-01-6	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6
1,3,5-Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	1330-20 -7	100[a]	100[a]	500[b]	1,000[c]	0.26	1.6

All soil cleanup objectives (SCOs) are in parts per million (ppm). NS=Not specified. See Technical Support Document (TSD). Footnotes

a The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.

b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

c The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.

d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.

e For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

TABLE 2
555 Grand Street,
Brooklyn, New York
Soil Analytical Results
Volatile Organic Compounds

COMPOUND	NYSDEC Part 375-6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375-6 Restricted Residential Soil Cleanup Objectives*	B1		B2		B3				14B4		14B5		14B6		14B7		14B8		14B9		14B10		B-10		B-11		REF	
			(0-2')	(2-4')	(0-2')	(2-4')	(0-2')	Duplicate (0-2')		(2-4')	(0-2')	(2-4')	(0-2')	(2-4')	(0-2')	(2-4')	(0-2')	(2-4')	(0-2')	(2-4')	(0-2')	(2-4')	(0-2')	(2-4')	(12')	(24')	(0-2')	(2-4')	(0')	(18')
			ug/Kg		ug/Kg		ug/Kg				ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg		ug/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachloroethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,1,1-Trichloroethane	680	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,1,2,2-Tetrachloroethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,1,2-Trichloroethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,1-Dichloroethane	270	26,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,1-Dichloroethene	330	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2-Dichloropropane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2,3-Trichlorobenzene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2,4-Trichlorobenzene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2,4-Trimethylbenzene	3,600	52,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2-Dibromo-3-chloropropane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2-Dibromoethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2-Dichlorobenzene	1,100	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2-Dichloroethane	20	3,100	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,2-Dichloropropane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,3,5-Trimethylbenzene	8,400	52,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,3-Dichlorobenzene	2,400	4,900	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,3-Dichloropropane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
1,4-Dichlorobenzene	1,800	13,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
2,2-Dichloropropane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
2-Chlorotoluene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
2-Hexanone (Methyl Butyl Ketone)			<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
2-Isopropyltoluene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
4-Chlorotoluene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
4-Methyl-2-Pentanone			<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
Acetone	50	100,000	110	10	110	10	110	10	110	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	6.7	10	6.6	10	<10	10
Acrylonitrile			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Benzene	60	4,800	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Bromobenzene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Bromochloromethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Bromodichloromethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Bromoform			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Bromomethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Carbon Disulfide			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Carbon tetrachloride	760	2,400	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Chlorobenzene	1,100	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Chloroform	370	49,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Chloromethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
cis-1,2-Dichloroethene	250	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
cis-1,3-Dichloropropene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Dibromochloromethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Dibromomethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Dichlorodifluoromethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Ethylbenzene	1,000	41,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Hexachlorobutadiene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Isopropylbenzene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
m&p-Xylenes	260	100,000	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4	<2.4	2.4
Methyl Ethyl Ketone (2-Butanone)	120	100,000	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10
Methyl t-butyl ether (MTBE)	930	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Methylene chloride	50	100,000	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5	<5	5
Naphthalene	12,000	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	6.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
n-Butylbenzene	12,000	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
n-Propylbenzene	3,900	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
o-Xylene	260	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
p-Isopropyltoluene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
sec-Butylbenzene	11,000	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Styrene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
tert-Butylbenzene	5,900	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Tetrachloroethene	1,300	19,000	400	1.2	7.0	1.2	<1.2	1.2	6.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	6.4	1.2	2.9	1.2	1.6	1.2
Tetrahydrofuran (THF)			<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	<10	10	8.2	10	<10	10	<10	10
Toluene	700	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Total Xylenes			<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6	<3.6	3.6
trans-1,2-Dichloroethene	190	100,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
trans-1,3-Dichloropropene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
trans-1,4-dichloro-2-butene			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Trichloroethene	470	21,000	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Trichlorofluoromethane			<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Vinyl Chloride	20	900	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2	<1.2	1.2
Total BTEX Concentration			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total VOCs Concentration			510	0.0	7.0	0.0	110	0.0	12.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2967	32.3	8.9	0.0	1.6	0.0

Notes:

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

ND - Not detected

RL - Reporting Limit

Bold/highlighted: Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted: Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 3
555 Grand Street,
Brooklyn, New York
Soil Analytical Results
Semi-Volatile Organic Compounds

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	B1				B2				B3					
			(0-2') µg/Kg		(2-4') µg/Kg		(0-2') µg/Kg		(2-4') µg/Kg		(0-2') µg/Kg		Duplicate (0-2') µg/Kg		(2-4') µg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,2,4,5-Tetrachlorobenzene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
1,2,4-Trichlorobenzene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
1,2-Dichlorobenzene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
1,2-Diphenylhydrazine			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
1,3-Dichlorobenzene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
1,4-Dichlorobenzene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2,4,5-Trichlorophenol			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2,4,6-Trichlorophenol			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2,4-Dichlorophenol			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2,4-Dimethylphenol			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2,4-Dinitrophenol			ND	580	ND	570	ND	580	ND	580	ND	570	ND	580	ND	590
2,4-Dinitrotoluene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2,6-Dinitrotoluene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2-Chloronaphthalene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2-Chlorophenol			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2-Methylnaphthalene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2-Methylphenol (o-cresol)	330	100,000	ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
2-Nitroaniline			ND	580	ND	570	ND	580	ND	580	ND	570	ND	580	ND	590
2-Nitrophenol			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
3&4-Methylphenol (m&p-cresol)			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
3,3'-Dichlorobenzidine			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
3-Nitroaniline			ND	580	ND	570	ND	580	ND	580	ND	570	ND	580	ND	590
4,6-Dinitro-2-methylphenol			ND	1,100	ND	1,000	ND	1,100	ND	1000	ND	1000	ND	1,000	ND	1,100
4-Bromophenyl phenyl ether			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
4-Chloro-3-methylphenol			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
4-Chloroaniline			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
4-Chlorophenyl phenyl ether			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
4-Nitroaniline			ND	580	ND	570	ND	580	ND	580	ND	570	ND	580	ND	590
4-Nitrophenol			ND	1,100	ND	1,000	ND	1,100	ND	1000	ND	1000	ND	1,000	ND	1,100
Acenaphthene	20,000	100,000	ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	**380**	260
Acenaphthylene	100,000	100,000	ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Acetophenone			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Aniline			ND	1,100	ND	1,000	ND	1,100	ND	1000	ND	1000	ND	1,000	ND	1,100
Anthracene	100,000	100,000	ND	260	ND	250	ND	250	ND	250	**440**	250	**470**	250	**780**	260
Benz(a)anthracene	1,000	1,000	ND	260	ND	250	ND	250	ND	250	**780**	250	**790**	250	**1,300**	260
Benzidine			ND	440	ND	420	ND	440	ND	430	ND	420	ND	430	ND	440
Benzo(a)pyrene	1,000	1,000	ND	260	ND	250	ND	250	ND	250	**570**	250	**560**	250	**930**	260
Benzo(b)fluoranthene	1,000	1,000	ND	260	ND	250	ND	250	ND	250	**860**	250	**790**	250	**1,300**	260
Benzo(ghi)perylene	100,000	100,000	ND	260	ND	250	ND	250	ND	250	**260**	250	ND	250	**370**	260
Benzo(k)fluoranthene	800	3,900	ND	260	ND	250	ND	250	ND	250	ND	250	**290**	250	**410**	260
Benzoic acid			ND	1,100	ND	1,000	ND	1,100	ND	1000	ND	1000	ND	1,000	ND	1,100
Benzyl butyl phthalate			ND	260	ND	250	ND	250	ND	250	**820**	250	**1,000**	250	**450**	260
Bis(2-chloroethoxy)methane			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Bis(2-chloroethyl)ether			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
Bis(2-chloroisopropyl)ether			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Bis(2-ethylhexyl)phthalate			ND	260	ND	250	ND	250	ND	250	**270**	250	**260**	250	ND	260
Carbazole			ND	550	ND	530	ND	540	ND	540	ND	530	ND	540	**630**	550
Chrysene	1,000	3,900	ND	260	ND	250	ND	250	ND	250	**790**	250	**770**	250	**1,300**	260
Dibenz(a,h)anthracene	330	330	ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Dibenzofuran	7,000	59,000	ND	260	ND	250	ND	250	ND	250	**310**	250	**330**	250	**570**	260
Diethyl phthalate			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Dimethylphthalate			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Di-n-butylphthalate			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Di-n-octylphthalate			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Fluoranthene	100,000	100,000	**400**	260	ND	250	ND	250	**450**	250	**1,900**	250	**1,800**	250	**3,300**	260
Fluorene	30,000	100,000	ND	260	ND	250	ND	250	ND	250	**270**	250	**300**	250	**500**	260
Hexachlorobenzene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Hexachlorobutadiene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Hexachlorocyclopentadiene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Hexachloroethane			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Indeno(1,2,3-cd)pyrene	500	500	ND	260	ND	250	ND	250	ND	250	**260**	250	ND	250	**380**	260
Isophorone			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Naphthalene	12,000	100,000	ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	**380**	260
Nitrobenzene			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
N-Nitrosodimethylamine			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
N-Nitrosodi-n-propylamine			ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
N-Nitrosodiphenylamine			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
Pentachloronitrobenzene			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
Pentachlorophenol	800	6,700	ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370
Phenanthrene	100,000	100,000	**260**	260	ND	250	ND	250	**300**	250	**2,100**	250	**2,100**	250	**3,800**	260
Phenol	330	100,000	ND	260	ND	250	ND	250	ND	250	ND	250	ND	250	ND	260
Pyrene	100,000	100,000	**490**	260	ND	250	ND	250	**560**	250	**1,500**	250	**1,500**	250	**2,800**	260
Pyridine			ND	360	ND	350	ND	360	ND	360	ND	350	ND	360	ND	370

Notes:

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

ND - Not-detected

RL - Reporting Limit

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

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

TABLE 4
555 Grand Street,
Brooklyn, New York
Soil Analytical Results
Pesticides PCBs

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	B1				B2				B3					
			(0-2') µg/Kg		(2-4') µg/Kg		(0-2') µg/Kg		(2-4') µg/Kg		(0-2') µg/Kg		Duplicate (0-2') µg/Kg		(2-4') µg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
4,4' -DDD	3.3	13,000	ND	2.2	ND	2.1	ND	2.1	ND	2.1	ND	2.1	ND*	140	ND	2.2
4,4' -DDE	3.3	8,900	ND	2.2	ND	2.1	ND	2.1	ND	2.1	ND	2.1	ND*	34	ND	2.2
4,4' -DDT	3.3	7,900	ND	2.2	ND	2.1	ND	2.1	ND	2.1	ND	2.1	ND*	34	ND	2.2
a-BHC	20	480	ND	3.5	ND	3.4	ND	3.4	ND	3.4	ND	3.4	ND*	17	ND	3.5
Alachlor			ND	3.5	ND	3.4	ND	3.4	ND	3.4	ND	3.4	ND*	17	ND	3.5
Aldrin	5	97	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1	ND*	5.4	ND	1.1
b-BHC	36	360	ND	3.5	ND	3.4	ND	3.4	ND	3.4	ND	3.4	ND*	17	ND	3.5
Chlordane			ND	11	ND	11	ND	11	ND	11	ND	10	ND*	54	ND	11
d-BHC	40	100,000	ND	3.5	ND	3.4	ND	3.4	ND	3.4	ND	3.4	ND*	17	ND	3.5
Dieldrin	5	200	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1	ND*	5.4	ND	1.1
Endosulfan I	2,400	24,000	ND	3.5	ND	3.4	ND	3.4	ND	3.4	ND	3.4	ND*	17	ND	3.5
Endosulfan II	2,400	24,000	ND	7	ND	6.8	ND	6.9	ND	6.9	ND	6.7	ND*	34	ND	7.1
Endosulfan sulfate	2,400	24,000	ND	7	ND	6.8	ND	6.9	ND	6.9	ND	6.7	ND*	34	ND	7.1
Endrin	14	11,000	ND	7	ND	6.8	ND	6.9	ND	6.9	ND	6.7	ND*	34	ND	7.1
Endrin aldehyde			ND	7	ND	6.8	ND	6.9	ND	6.9	ND	6.7	ND*	34	ND	7.1
Endrin ketone			ND	7	ND	6.8	ND	6.9	ND	6.9	ND	6.7	ND*	34	ND	7.1
g-BHC	100	280	ND	1.1	ND	1.1	ND	1.1	ND	1.1	ND	1	ND*	5.4	ND	1.1
Heptachlor	42	420	ND	2.2	ND	2.1	ND	2.1	ND	2.1	ND	2.1	ND*	11	ND	2.2
Heptachlor epoxide			ND	3.5	ND	3.4	ND	3.4	ND	3.4	ND	3.4	ND*	17	ND	3.5
Methoxychlor			ND	35	ND	34	ND	34	ND	34	ND	34	ND*	170	ND	35
Toxaphene			ND	35	ND	34	ND	34	ND	34	ND	34	ND*	170	ND	35
PCB-1016	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1221	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1232	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1242	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1248	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1254	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1260	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1262	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74
PCB-1268	100	1,000	ND	73	ND	71	ND	71	ND	72	ND	70	ND	72	ND	74

Notes:

* Due to matrix interference from non target compounds in the sample an elevated RL was reported.

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

ND - Non-Detect

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

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

TABLE 5
555 Grand Street,
Brooklyn, New York
Soil Analytical Results
Metals

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	B1				B2				B3					
			(0-2') mg/Kg		(2-4') mg/Kg		(0-2') mg/Kg		(2-4') mg/Kg		(0-2') mg/Kg		Duplicate (0-2') mg/Kg		(2-4') mg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Aluminum			7,890	52	8,260	53	8,050	59	8,450	54	10,900	49	11,800	52	12,300	55
Antimony			7.9	3.5	BRL	3.5	BRL	3.9	10.8	3.6	BRL	3.2	BRL	3.4	BRL	3.7
Arsenic	13	16	6.6	0.7	29.3	0.7	18	0.8	6.7	0.7	8	0.6	9.9	0.7	10.7	0.7
Barium	350	400	63.9	0.35	107	0.35	94.6	0.39	64.9	0.36	220	0.32	205	0.34	207	0.37
Beryllium	7.2	72	0.47	0.28	0.52	0.28	0.57	0.31	0.46	0.29	0.47	0.26	0.5	0.27	0.56	0.29
Cadmium	2.5	4.3	0.82	0.35	0.64	0.35	0.9	0.39	0.77	0.36	3.13	0.32	1.47	0.34	1.5	0.37
Calcium			29,500	52	24,600	53	23,900	59	28,300	54	31,400	49	39,200	52	21,800	55
Chromium	30	180	19.5	0.35	23	0.35	22.2	0.39	22.7	0.36	25.9	0.32	24.9	0.34	26.2	0.37
Cobalt			6.14	0.35	6.03	0.35	7.05	0.39	5.53	0.36	7.78	0.32	8.17	0.34	7.69	0.37
Copper	50	270	321	3.5	23.2	0.35	206	3.9	790	3.6	94.2	0.32	107	0.34	107	0.37
Iron			18,800	52	21,100	53	26,300	59	19,300	54	68,600	49	39,400	52	41,400	55
Lead	63	400	452	3.5	32.2	0.35	122	0.39	333	3.6	386	3.2	341	3.4	442	3.7
Magnesium			2,160	5.2	6,830	53	5,180	5.9	2,520	5.4	3,590	4.9	4,210	5.2	3,460	5.5
Manganese	1,600	2,000	243	3.5	592	3.5	666	3.9	253	3.6	572	3.2	556	3.4	500	3.7
Mercury	0.18	0.81	BRL	0.08	1.79	0.08	0.87	0.07	BRL	0.09	1.51	0.07	1.77	0.08	2.72	0.07
Nickel	30	310	29.1	0.35	13.8	0.35	19.8	0.39	17	0.36	23.7	0.32	22	0.34	20.4	0.37
Potassium			1,090	5.2	1,810	5.3	1,530	5.9	1,130	5.4	1,430	4.9	1,570	5.2	1,400	5.5
Selenium	3.9	180	BRL	1.4	BRL	1.4	BRL	1.6	BRL	1.4	BRL	1.3	BRL	1.4	BRL	1.5
Silver	2	180	BRL	2	BRL	0.35	BRL	0.39	BRL	1	BRL	0.32	BRL	0.34	BRL	0.37
Sodium			233	5.2	302	5.3	243	5.9	234	5.4	567	4.9	588	5.2	471	5.5
Thallium			BRL	0.6	BRL	0.6	BRL	0.6	BRL	0.6	BRL	0.5	BRL	0.5	BRL	0.6
Vanadium			26.4	0.35	30.1	0.35	30.9	0.39	29.7	0.36	26.1	0.32	28.1	0.34	35	0.37
Zinc	109	10,000	105	0.35	40.4	0.35	62.7	0.39	95.5	0.36	222	3.2	168	3.4	173	3.7

Notes:

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

BRL - Below Reporting Limit

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

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

TABLE 6
555 Grand Street,
Brooklyn, New York
Groundwater Analytical Results
Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 µg/L		MW1 2/4/2014 µg/L		MW2 2/4/2014 µg/L		MW3 2/9/2014 µg/L	
		Result	RL						
1,1,1,2-Tetrachlorothane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,1,1-Trichloroethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,1,2,2-Tetrachloroethane	5	ND	0.5	< 0.50	0.5	< 0.50	0.5	< 0.50	0.5
1,1,2-Trichloroethane	1	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,1-Dichloroethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,1-Dichloroethene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,1-Dichloropropene		ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2,3-Trichlorobenzene		ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2,3-Trichloropropane	0.04	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2,4-Trichlorobenzene		ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2,4-Trimethylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2-Dibromo-3-chloropropane	0.04	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2-Dichlorobenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2-Dichloroethane	0.6	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,2-Dichloropropane	0.94	ND	0.6	< 0.60	0.6	< 0.60	0.6	< 0.60	0.6
1,2-Dibromoethane		ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,3,5-Trimethylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,3-Dichlorobenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,3-Dichloropropane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
1,4-Dichlorobenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
2,2-Dichloropropane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
2-Chlorotoluene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
2-Hexanone (Methyl Butyl Ketone)		ND	5	< 5.0	5	< 5.0	5	< 5.0	5
2-Isopropyltoluene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
4-Chlorotoluene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
4-Methyl-2-Pentanone		ND	5	< 5.0	5	< 5.0	5	< 5.0	5
Acetone		ND	25	< 25	25	< 25	25	< 25	25
Acrylonitrile	5	ND	5	< 5.0	5	< 5.0	5	< 5.0	5
Benzene	1	ND	0.7	< 0.70	0.7	< 0.70	0.7	< 0.70	0.7
Bromobenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Bromochloromethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Bromodichloromethane		ND	0.5	< 0.50	0.5	< 0.50	0.5	< 0.50	0.5
Bromoform		ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Bromomethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Carbon Disulfide	60	ND	5	< 5.0	5	< 5.0	5	< 5.0	5
Carbon tetrachloride	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Chlorobenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Chloroethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Chloroform	7	ND	1	**1**	1	**1.2**	1	< 1.0	1
Chloromethane	60	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
cis-1,2-Dichloroethene	5	ND	1	**1.2**	1	< 1.0	1	< 1.0	1
cis-1,3-Dichloropropene		ND	0.5	< 0.40	0.4	< 0.40	0.4	< 0.40	0.4
Dibromochloromethane		ND	0.5	< 0.50	0.5	< 0.50	0.5	< 0.50	0.5
Dibromomethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Dichlorodifluoromethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Ethylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Hexachlorobutadiene	0.5	ND	0.4	< 0.40	0.4	< 0.40	0.4	< 0.40	0.4
Isopropylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
m&p-Xylenes	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Methyl Ethyl Ketone (2-Butanone)		ND	5	< 5.0	5	< 5.0	5	< 5.0	5
Methyl t-butyl ether (MTBE)	10	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Methylene chloride	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Naphthalene	10	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
n-Butylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
n-Propylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
o-Xylene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
p-Isopropyltoluene		ND	1	< 1.0	1	< 1.0	1	< 1.0	1
sec-Butylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Styrene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
tert-Butylbenzene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Tetrachloroethene	5	**1.3**	1	**5.1**	1	**12**	1	**16**	1
Tetrahydrofuran (THF)		ND	2.5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5
Toluene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Total Xylenes	5	ND	1	< 2.0	2	< 2.0	2	< 2.0	2
trans-1,2-Dichloroethene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
trans-1,3-Dichloropropene	0.4	ND	0.5	< 0.40	0.4	< 0.40	0.4	< 0.40	0.4
trans-1,4-dichloro-2-butene	5	ND	5	< 5.0	5	< 5.0	5	< 5.0	5
Trichloroethene	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Trichlorofluoromethane	5	ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Trichlorotrifluoroethane		ND	1	< 1.0	1	< 1.0	1	< 1.0	1
Vinyl Chloride	2	ND	1	< 1.0	1	< 1.0	1	< 1.0	1

Notes:
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 7
555 Grand Street,
Brooklyn, New York
Groundwater Analytical Result
Semi-Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 µg/L	
		Result	RL
1,2,4,5-Tetrachlorobenzene		ND	1.8
1,2,4-Trichlorobenzene		ND	5.6
1,2-Dichlorobenzene		ND	5.6
1,2-Diphenylhdrazine		ND	5.6
1,3-Dichlorobenzene		ND	5.6
1,4-Dichlorobenzene		ND	5.6
2,4,5-Trichlorophenol	3	ND	11
2,4,6-Trichlorophenol	3	ND	11
2,4-Dichlorophenol		ND	11
2,4-Dimethylphenol		ND	11
2,4-Dinitrophenol		ND	56
2,4-Dinitrotoluene	5	ND	5.6
2,6-Dinitrotoluene	5	ND	5.6
2-Chloronaphthalene	10	ND	5.6
2-Chlorophenol		ND	11
2-Methylnaphthalene		ND	5.6
2-Methylphenol (o-cresol)		ND	11
2-Nitroaniline	5	ND	56
2-Nitrophenol		ND	11
3&4-Methylphenol (m&p-cresol)		ND	11
3,3'-Dichlorobenzidine	5	ND	56
3-Nitroaniline	5	ND	56
4,6-Dinitro-2-methylphenol		ND	56
4-Bromophenyl phenyl ether		ND	5.6
4-Chloro-3-methylphenol		ND	22
4-Chloroaniline	5	ND	22
4-Chlorophenyl phenyl ether		ND	5.6
4-Nitroaniline	5	ND	22
4-Nitrophenol		ND	56
Acenaphthene	20	ND	0.056
Acenaphthylene		ND	0.056
Acetophenone		ND	5.6
Aniline		ND	11
Anthracene	50	ND	5.6
Benzo(a)anthracene	0.002	ND	0.044
Benzidine	5	ND	56
Benzo(a)pyrene		ND	0.056
Benzo(b)fluoranthene	0.002	ND	0.056
Benzo(g,h,i)perylene		ND	3.3
Benzo(k)fluoranthene	0.002	ND	0.056
Benzoic Acid		ND	56
Benzyl Butyl phthalate		ND	5.6
Bis(2-chloroethoxy)methane	5	ND	5.6
Bis(2-chloroethyl)ether	1	ND	5.6
Bis(2-chloroisopropyl)ether		ND	5.6
Bis(2-ethylhexyl)phthalate	5	ND	1.8
Carbazole		ND	5.6
Chrysene	0.002	ND	0.056
Dibenzo(a,h)anthracene		ND	0.011
Dibenzofuran		ND	5.6
Diethylphthalate	50	ND	5.6
Dimethylphthalate	50	ND	5.6
Di-n-butylphthalate	50	ND	5.6
Di-n-octylphthalate	50	ND	5.6
Fluoranthene	50	ND	5.6
Hexachlorobenzene	0.04	ND	0.067
Fluorene	50	ND	5.6
Hexachlorobutadiene	0.5	ND	5.6
Hexachlorocyclopentadiene	5	ND	5.6
Hexachloroethane	5	ND	2.7
Indeno(1,2,3-cd)pyrene	0.002	ND	0.056
Isophorone	50	ND	5.6
Naphthalene	10	ND	5.6
Nitrobenzene	0.4	ND	5.6
N-Nitrosodimethylamine		ND	5.6
N-Nitrosodi-n-propylamine		ND	5.6
N-Nitrosodiphenylamine	50	ND	5.6
Pentachloronitrobenzene		ND	0.11
Pentachlorophenol		ND	0.89
Phenanthrene	50	ND	0.056
Phenol		ND	5.6
Pyrene	50	ND	5
Pyridine		ND	0.56

Notes:
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 8
555 Grand Street,
Brooklyn, New York
Groundwater Analytical Results
Pesticides/PCBs

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 µg/L	
		Result	RL
PCB-1016	**0.09**	ND	0.053
PCB-1221	**0.09**	ND	0.053
PCB-1232	**0.09**	ND	0.053
PCB-1242	**0.09**	ND	0.053
PCB-1248	**0.09**	ND	0.053
PCB-1254	**0.09**	ND	0.053
PCB-1260	**0.09**	ND	0.053
PCB-1262	**0.09**	ND	0.053
PCB-1268	**0.09**	ND	0.053
4,4-DDD	**0.3**	ND	0.01
4,4-DDE	**0.2**	ND	0.01
4,4-DDT	**0.11**	ND	0.01
a-BHC	**0.94**	ND	0.01
Alachlor		ND	0.075
Aldrin		ND	0.002
b-BHC	**0.04**	ND	0.005
Chlordane	**0.05**	ND*	0.12
d-BHC	**0.04**	ND	0.025
Dieldrin	**0.004**	ND	0.002
Endosulfan I		ND	0.05
Endosulfan II		ND	0.05
Endosulfan Sulfate		ND	0.05
Endrin		ND	0.01
Endrin aldehyde	**5**	ND	0.05
Endrin ketone		ND	0.05
gamma-BHC	**0.05**	ND	0.025
Heptachlor	**0.04**	ND	0.01
Heptachlor epoxide	**0.03**	ND	0.01
Methoxychlor	**35**	ND	0.1
Toxaphene		ND	0.25

Notes:

ND - Non-detect

ND* - Due to matrix interference from non target compounds in the sample an elevated RL was repo

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 9
555 Grand Street,
Brooklyn, New York
Groundwater Analytical Results
TAL Metals

Compound	NYSDEC Groundwater Quality Standards mg/L	MW1 mg/L	
		Result	RL
Aluminum	**0.1**	**0.542**	0.01
Antimony	**0.003**	BRL	0.005
Arsenic	**0.025**	BRL	0.004
Barium	**1**	**0.065**	0.002
Beryllium	**0.003**	BRL	0.001
Cadmium	**0.005**	BRL	0.001
Calcium	**NS**	**57.7**	0.01
Chromium	**0.05**	**0.002**	0.001
Cobalt	**NS**	**0.004**	0.002
Copper	**0.2**	BRL	0.005
Iron	**0.5**	**0.872**	0.01
Lead	**0.025**	BRL	0.002
Magnesium	**35**	**17.6**	0.01
Manganese	**0.3**	**1.93**	0.001
Mercury	**0.0007**	BRL	0.0002
Nickel	**0.1**	**0.009**	0.001
Potassium	**NS**	**5.3**	0.1
Selenium	**0.01**	BRL	0.01
Silver	**0.05**	BRL	0.001
Sodium	**2**	**80.1**	1
Thallium	**0.0005**	BRL	0.002
Vanadium	**NS**	BRL	0.002
Zinc	**2**	**0.039**	0.002

Notes:

BRL - Below Reporting Limit

NS - No Standard

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 10
555 Grand Street,
Brooklyn, New York
Groundwater Analytical Results
TAL Filtered Metals

Compound	NYSDEC Groundwater Quality Standards mg/L	MW1 mg/L	
		Result	RL
Aluminum	**0.1**	**0.09**	0.01
Antimony	**0.003**	BRL	0.005
Arsenic	**0.025**	BRL	0.004
Barium	**1**	**0.063**	0.002
Beryllium	**0.003**	BRL	0.001
Cadmium	**0.005**	BRL	0.001
Calcium	**NS**	**59**	0.01
Chromium	**0.05**	BRL	0.001
Cobalt	**NS**	**0.004**	0.001
Copper	**0.2**	BRL	0.005
Iron	**0.5**	BRL	0.011
Lead	**0.025**	BRL	0.002
Magnesium	**35**	**18**	0.01
Manganese	**0.3**	**1.95**	0.001
Mercury	**0.0007**	BRL	0.0002
Nickel	**0.1**	**0.01**	0.001
Potassium	**NS**	**5.2**	0.1
Selenium	**0.01**	BRL	0.011
Silver	**0.05**	BRL	0.001
Sodium	**2**	**74**	1.1
Thallium	**0.0005**	BRL	0.002
Vanadium	**NS**	BRL	0.002
Zinc	**2**	**0.036**	0.002

Notes:

BRL - Below Reporting Limit

NS - No Standard

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 11
555 Grand Street,
Brooklyn, New York
Soil Gas - Volatile Organic Compounds

COMPOUNDS	NYSDOH Maximum Sub-Slab Value (µg/m³) [a]	NYSDOH Soil Outdoor Background Levels (µg/m³) [b]	SG-1 (µg/m3)		SG-2 (µg/m3)		SG-3 (µg/m3)		IA-1 (µg/m3)		OA-1 (µg/m3)	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1,2-Tetrachloroethane			ND	1	ND	1	ND	1	ND	1	ND	1
1,1,1-Trichloroethane	100	<2.0 - 2.8	ND	1	ND	1	ND	1	ND	1	ND	1
1,1,2,2-Tetrachloroethane		<1.5	ND	1	ND	1	ND	1	ND	1	ND	1
1,1,2-Trichloroethane		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1
1,1-Dichloroethane		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1
1,1-Dichloroethene		<1.0	ND	1	**1.62**	1	ND	1	ND	1	ND	1
1,2,4-Trichlorobenzene		NA	ND	1	ND	1	ND	1	ND	1	ND	1
1,2,4-Trimethylbenzene		<1.0	**23.3**	1	**13.3**	1	**22.9**	1	**15.1**	1	**7.71**	1
1,2-Dibromoethane		<1.5	ND	1	ND	1	ND	1	ND	1	ND	1
1,2-Dichlorobenzene		<2.0	ND	1	ND	1	ND	1	ND	1	ND	1
1,2-Dichloroethane		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1
1,2-Dichloropropane			ND	1	ND	1	ND	1	ND	1	ND	1
1,2-Dichlorotetrafluoroethane			ND	1	ND	1	ND	1	ND	1	ND	1
1,3,5-Trimethylbenzene		<1.0	**5.4**	1	**3.34**	1	**5.75**	1	**3.88**	1	**1.87**	1
1,3-Butadiene		NA	ND	1	ND	1	ND	1	ND	1	ND	1
1,3-Dichlorobenzene		<2.0	ND	1	ND	1	ND	1	ND	1	ND	1
1,4-Dichlorobenzene		NA	ND	1	ND	1	ND	1	ND	1	ND	1
1,4-Dioxane			ND	1	ND	1	ND	1	ND	1	ND	1
2-Hexanone			ND	1	ND	1	ND	1	ND	1	ND	1
4-Ethyltoluene		NA	**3.19**	1	**1.87**	1	**4.52**	1	**3.19**	1	**1.62**	1
4-Isopropyltoluene			**2.63**	1	**1.59**	1	**1.81**	1	**1.7**	1	ND	1
4-Methyl-2-pentanone			**19.7**	1	**13.4**	1	**25.2**	1	**12**	1	**17.9**	1
Acetone		NA	**20**	1	**16**	1	**71**	1	**36**	1	**3,890**	1
Acrylonitrile			ND	1	ND	1	ND	1	ND	1	ND	1
Benzene		<1.6 - 4.7	**1.47**	1	**4.85**	1	**12**	1	**2.14**	1	**1.37**	1
Benzyl Chloride		NA	ND	1	ND	1	ND	1	ND	1	ND	1
Bromodichloromethane		<5.0	ND	1	ND	1	ND	1	ND	1	ND	1
Bromoform		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1
Bromomethane		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1
Carbon Disulfide		NA	**1.03**	1	**1.52**	1	**3.58**	1	ND	1	**2.83**	1
Carbon Tetrachloride	5	<3.1	**1.13**	0.25	**0.754**	0.25	**0.566**	0.25	**0.503**	0.25	**0.503**	0.25
Chlorobenzene		<2.0	ND	1	ND	1	ND	1	ND	1	ND	1
Chloroethane		NA	ND	1	ND	1	ND	1	ND	1	ND	1
Chloroform		<2.4	**128**	1	**250**	1	**31.9**	1	**5.02**	1	**1.85**	1
Chloromethane		<1.0 - 1.4	ND	1	ND	1	ND	1	ND	1	**110**	1
cis-1,2-Dichloroethene		<1.0	**618**	1	**792**	1	**24.9**	1	**10.8**	1	**3.92**	1
cis-1,3-Dichloropropene		NA	ND	1	ND	1	ND	1	ND	1	ND	1
Cyclohexane		NA	**8.08**	1	**5.33**	1	**7.67**	1	**6.3**	1	**8.91**	1
Dibromochloromethane		<5.0	ND	1	ND	1	ND	1	ND	1	ND	1
Dichlorodifluromethane		NA	**2.32**	1	**1.98**	1	**2.37**	1	**2.67**	1	**2.12**	1
Ethanol			**392**	1	**220**	1	**188**	1	**220**	1	**476**	1
Ethyl Acetate		NA	**5.54**	1	**3.85**	1	**3.49**	1	**5.4**	1	**7.42**	1
Ethylbenzene		<4.3	**1.17**	1	**1.43**	1	**1.39**	1	**ND**	1	**0.998**	1
Heptane		NA	**ND**	1	**1.1**	1	**1.31**	1	**1.02**	1	**1.6**	1
Hexachlorobutadiene		NA	ND	1	ND	1	ND	1	ND	1	ND	1
Hexane		<1.5	**3.38**	1	**2.68**	1	**7.5**	1	**3.66**	1	ND	1
Isopropylalcohol		NA	**12.1**	1	**9.95**	1	**6.61**	1	**8.01**	1	**23**	1
Isopropylbenzene			ND	1	ND	1	ND	1	ND	1	**ND**	1
Xylene (m&p)		<4.3	**3.6**	1	**3.9**	1	**3.86**	1	**2.69**	1	**3.04**	1
Methyl Ethyl Ketone			**5.54**	1	**5.16**	1	**8.66**	1	**3.45**	1	**33**	1
MTBE		NA	ND	1	ND	1	ND	1	ND	1	ND	1
Methylene Chloride		<3.4	**5.03**	1	**5.1**	1	**7.57**	1	**6.7**	1	**2.74**	1
n-Butylbenzene			**4.66**	1	**2.25**	1	**2.69**	1	**2.91**	1	**1.15**	1
Xylene (o)		<4.3	**1.78**	1	**1.82**	1	ND	1	**1.26**	1	**1.3**	1
Propylene		NA	**1.31**	1	**3.08**	1	**7.38**	1	**4.44**	1	**40.8**	1
sec-Butylbenzene			**4.28**	1	**2.03**	1	**2.19**	1	**2.58**	1	**1.04**	1
Styrene		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1
Tetrachloroethene	100		**7,730**	0.25	**10,800**	0.25	**228,000**	0.25	**6,230**	0.25	**3,930**	0.25
Tetrahydrofuran		NA	**7.31**	1	**9.67**	1	**10.1**	1	ND	1	**13.1**	1
Toluene		1.0 - 6.1	**6.48**	1	**6.93**	1	**8.66**	1	**4.78**	1	**5.31**	1
trans-1,2-Dichloroethene		NA	**4.16**	1	**5.55**	1	**1.23**	1	ND	1	ND	1
trans-1,3-Dichloropropene		NA	ND	1	ND	1	ND	1	ND	1	ND	1
Trichloroethene	5	<1.7	**84.8**	0.25	**380**	0.25	**623**	0.25	**13.7**	0.25	**3.92**	0.25
Trichlorofluoromethane		NA	**1.35**	1	**1.35**	1	**1.46**	1	**1.29**	1	**1.29**	1
Trichlorotrifluoroethane			ND	1	ND	1	ND	1	ND	1	ND	1
Vinyl Chloride		<1.0	**0.996**	0.25	**9.02**	0.25	ND	0.25	ND	0.25	ND	0.25

Notes:
NA No guidance value or standard available
(a) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October 2006. New York State Department of Health.
(b) NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, February 2005, Summary of Background Levels for Selected Compounds (NYSDOH Database, Outdoor values)
Value detected above NYSDOH Air Guidance Value of 5 µg/m3, which according to Soil Vapor/Indoor Air Matrix 1 would require at a minimum, mitigation.

TABLE 11
555 Grand Street,
Brooklyn, New York
Soil Gas - Volatile Organic Compounds

Value detected above NYSDOH Air Guidance Value of 100 µg/m3, which according to Soil Vapor/Indoor Air Matrix 2 would require at a minimum, mitigation.

TABLE 13
555 Grand Street,
Brooklyn, NY
Parameters Detected Above Track 1 Soil Cleanup Objectives

COMPOUND	Range in Exceedances	Frequency of Detection	B1		B2		B3		
			(0-2')	(2-4')	(0-2')	(2-4')	(0-2')	(0-2') Duplicate	(2-4')
Sample Results in µg/kg									
Acetone	61-73	3					**79**	**73**	**61**
Sample Results in µg/kg									
Benzo(a)anthracene	1,300	1							**1,300**
Benzo(b)fluoranthene	1,300	1							**1,300**
Chrysene	1,300	1							**1,300**
Sample Results in µg/kg									
Arsenic	18-29.3	2		**29.3**	**18**				
Cadmium	3.13	1					**3.13**		
Copper	107-790	6	**321**		**206**	**790**	**94.2**	**107**	**107**
Lead	122-452	6	**452**		**122**	**333**	**386**	**341**	**442**
Mercury	0.87-2.72	5		**1.79**	**0.87**		**1.51**	**1.77**	**2.72**
Zinc	168-222	3					**222**	**168**	**173**

TABLE 14
555 Grand Street
Brooklyn, NY
Parameters Detected Above Ambient Water Quality Standards

Metals (dissolved)

COMPOUND	Range in Detections	MW1
Sample Results in (mg/L)		
Manganese	**1.95**	**1.95**
Sodium	**74**	**74**

Metals (total)

COMPOUND	Range in Detections	MW1
Sample Results in (mg/L)		
Aluminum	**0.542**	**0.542**
Iron	**0.872**	**0.872**
Manganese	**1.93**	**1.93**
Sodium	**80.1**	**80.1**

VOCs

COMPOUND	Range in Detections	MW1	MW2	MW3
Sample Results in (mg/L)				
PCE	**5.1-16**	**5.1**	**12**	**16**

TABLE 15

Project Permit Listing

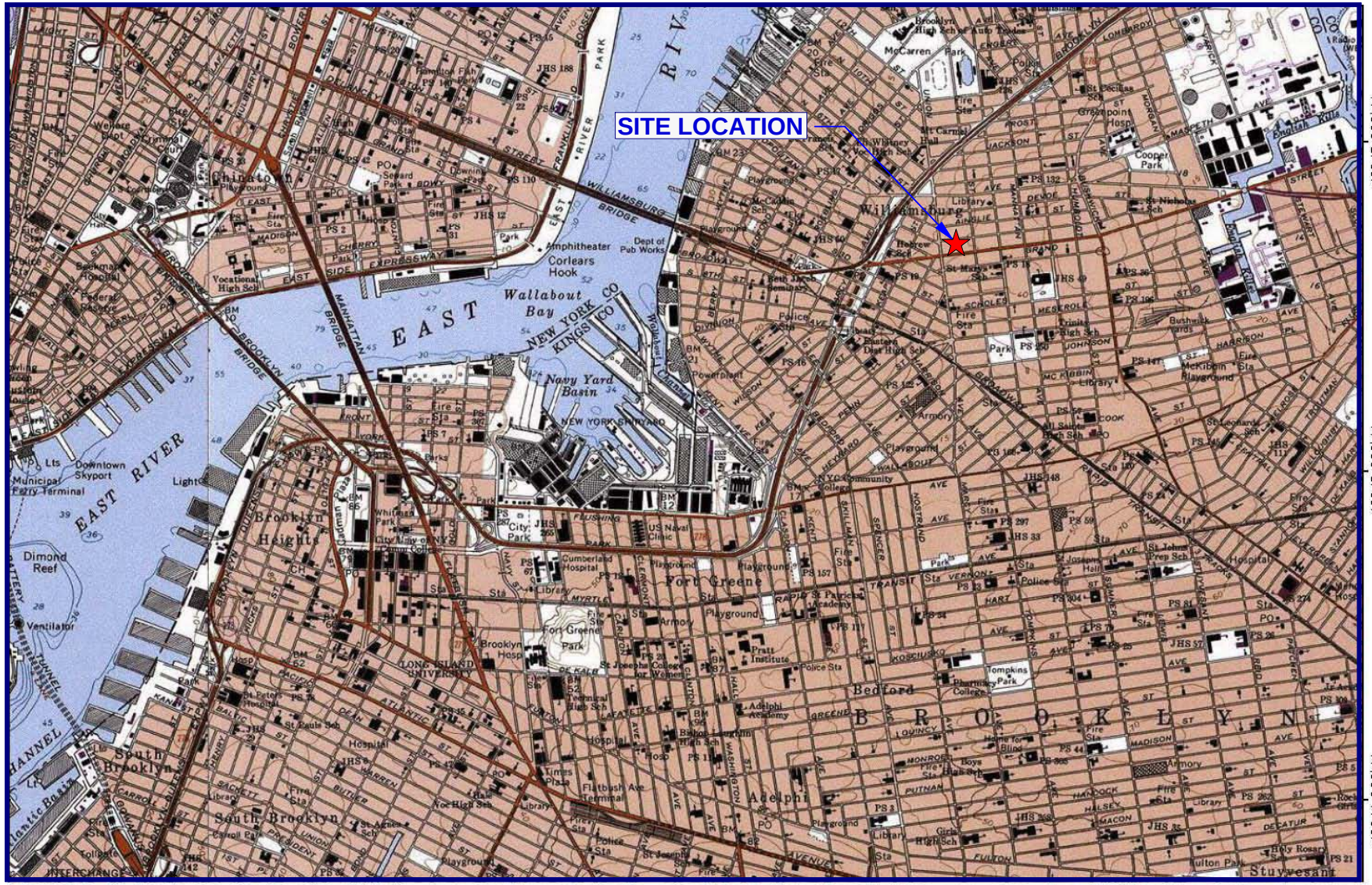
To Be Updated as Project Progresses

Permit	*Permit Number*	*Originating Agency*	*Pursuant to*	*Issued*	*Expires*	*Contact Phone*
No Permits Issued as of March 2014						

Table 16
555 Grand Street,
Brooklyn, NY
Emergency Contact List

General Emergencies	911
NYC Police	911
NYC Fire Department	911
Woodhull Medical Center	(718) 963-8000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(518) 402-9768
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
EBC Project Manager	1-631-504-6000
EBC BCP Program Manager	1-631-504-6000
EBC Site Safety Officer	1-631-504-6000
Remedial Engineer	1-516-987-1662
Construction Manager	TBD

FIGURES



USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

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555 GRAND STREET
BROOKLYN, NY

FIGURE 1 SITE LOCATION MAP

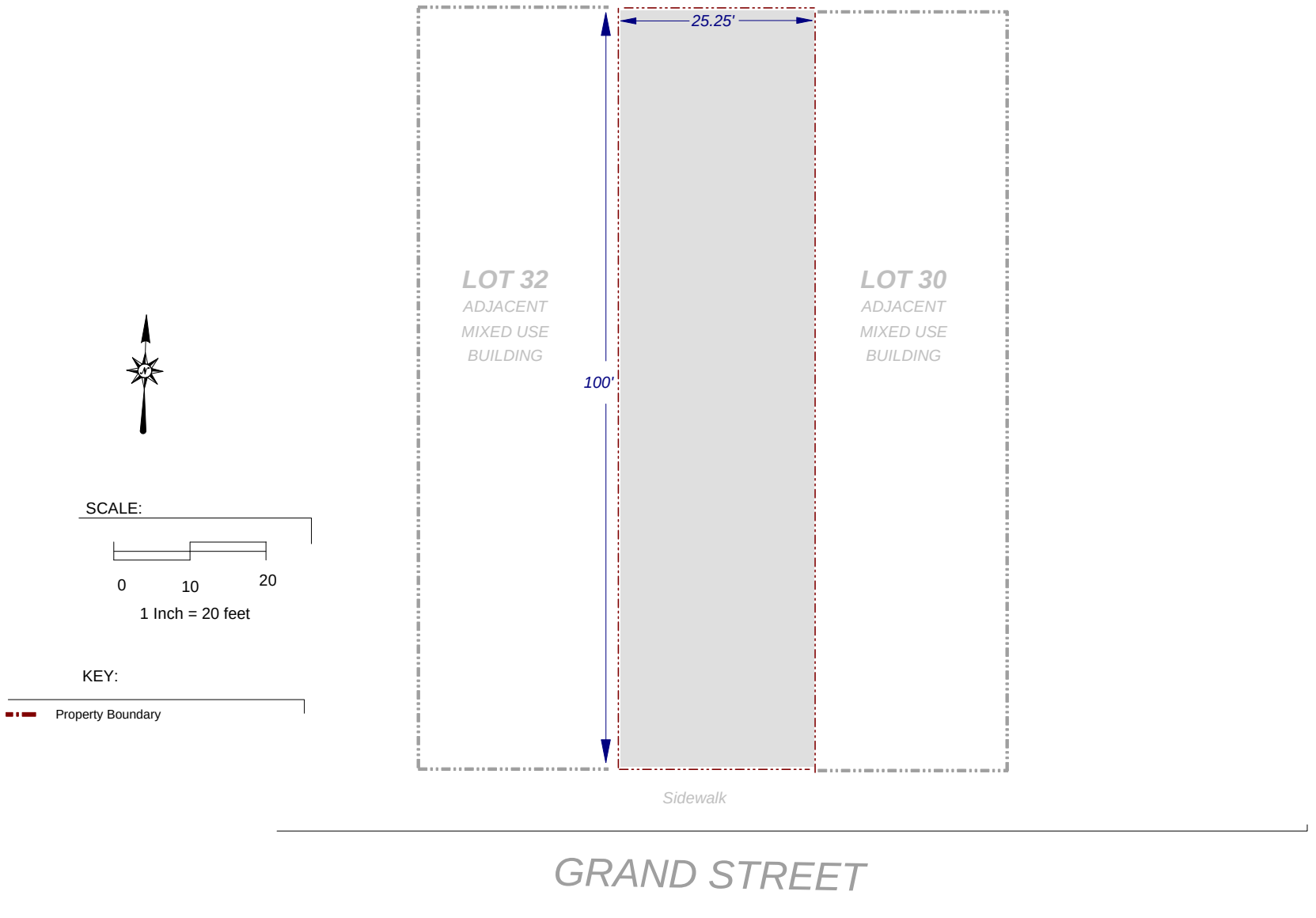

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FIGURE 2 SITE BOUNDARY MAP

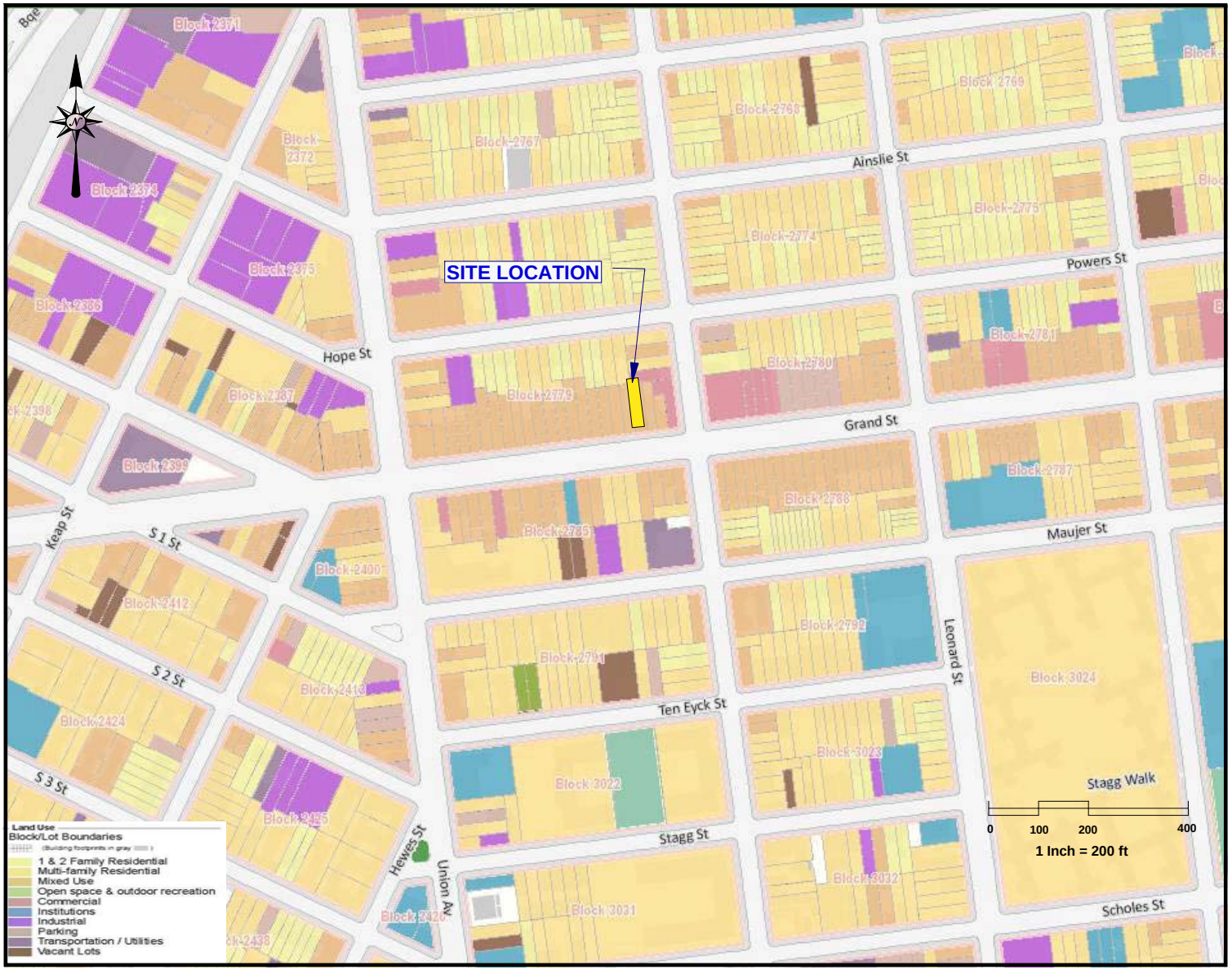

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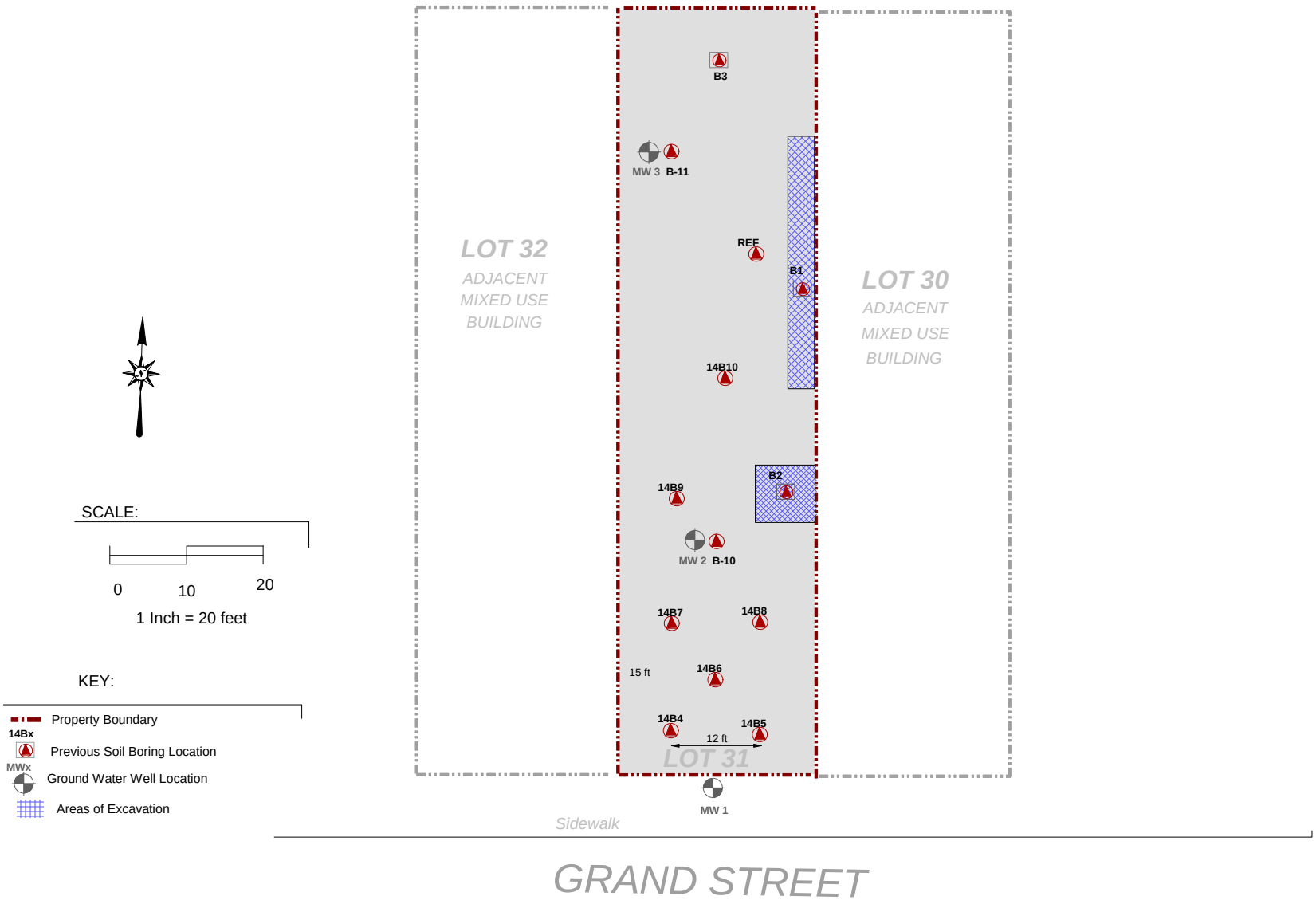
Figure No.
3

Site Name: 555 Grand Street
Site Address: 555 Grand Street, Brooklyn, NY
Drawing Title: SURROUNDING LAND USE



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BROOKLYN, NY

FIGURE 4 SOIL BORING LOCATIONS

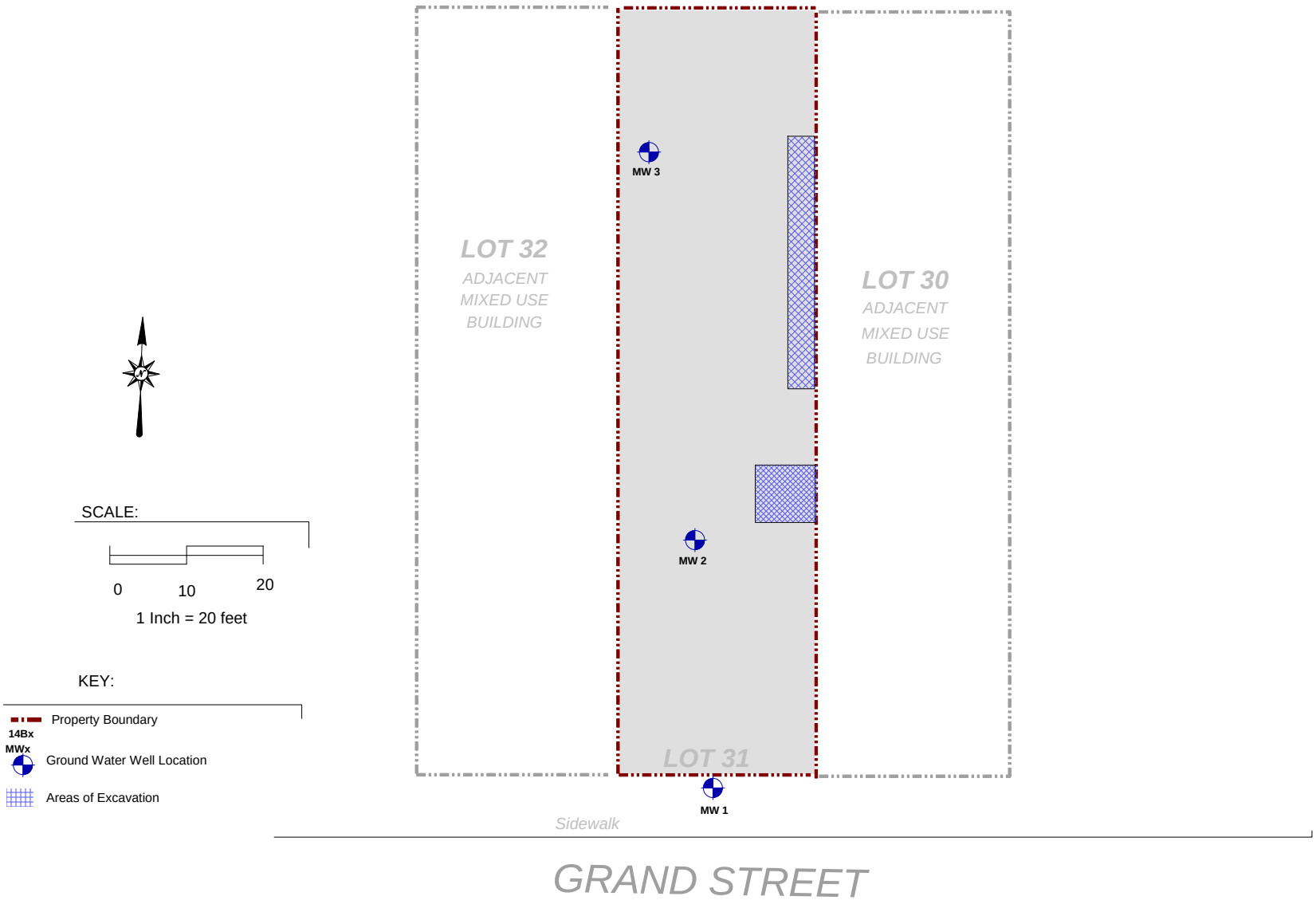

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FIGURE 5 GROUNDWATER SAMPLE LOCATIONS

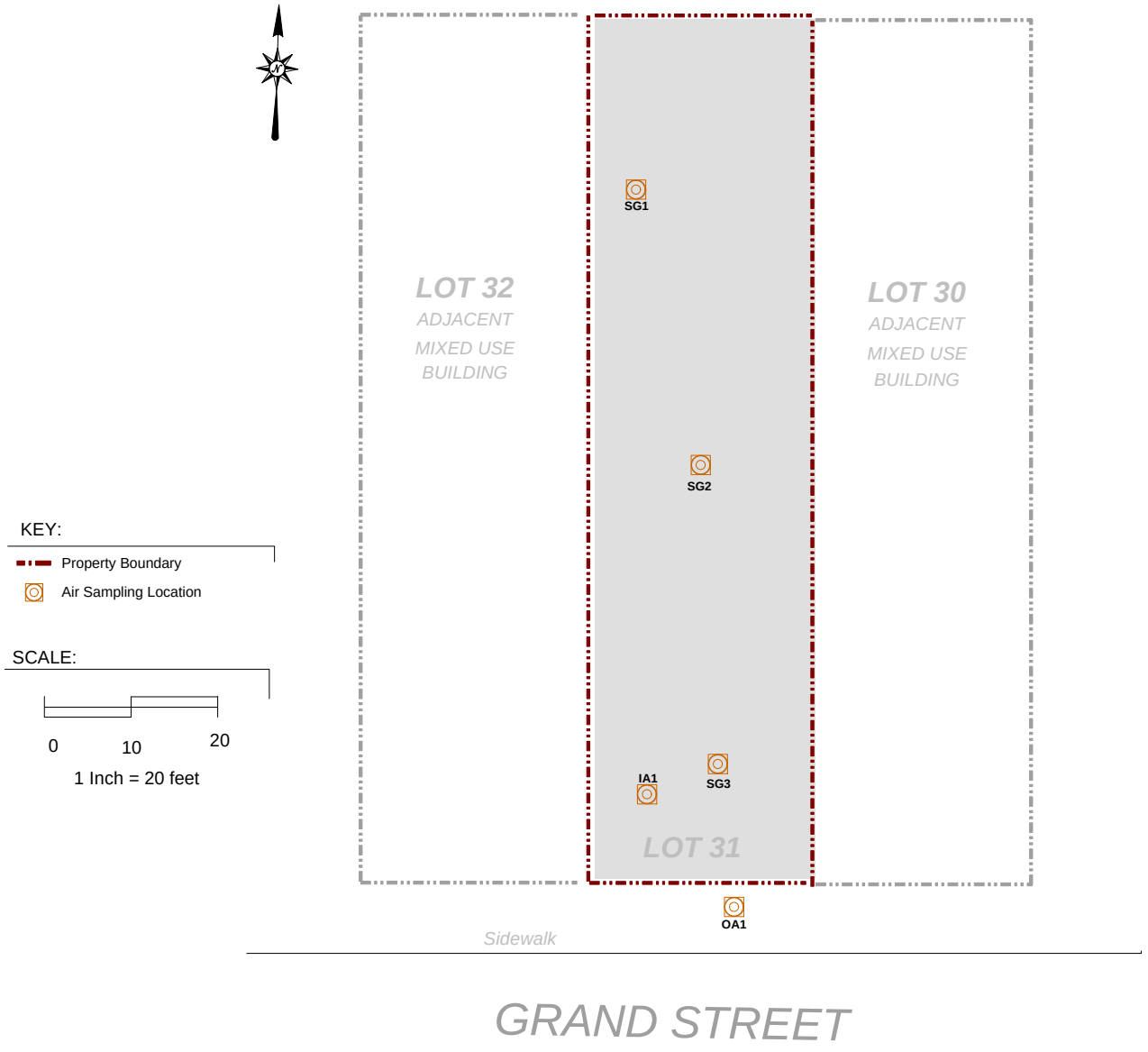

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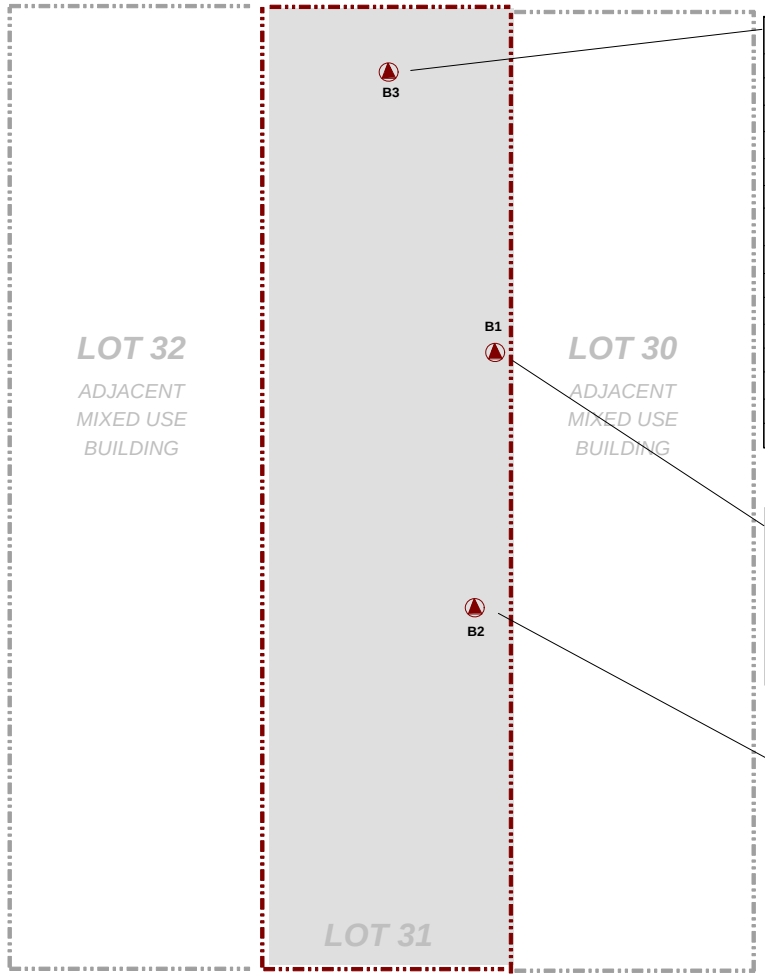
FIGURE 6 SOIL GAS LOCATIONS



B3 (0-2')	
Acetone	61
Cadmium	3.13
Copper	94.2
Lead	386
Mercury	1.51
Zinc	222
B3 (2-4')	
Acetone	73
Benzo(a)anthracene	1,300
Benzo(b)fluoranthene	1,300
Chrysene	1,300
Copper	107
Lead	442
Mercury	2.72
Zinc	173

B1 (0-2')	
Copper	321
Lead	452
B1 (2-4')	
Arsenic	29.3
Mercury	1.79

B2 (0-2')	
Arsenic	18
Copper	206
Lead	122
Mercury	0.87
B2 (2-4')	
Copper	790
Lead	333

SCALE:

0 10 20

1 Inch = 20 feet

KEY:

Property Boundary

Soil Boring Location

VOCs/SVOCs/Pesticides	ppb
Metals	ppm

Exceedence of Restricted Residential SCO

Exceedence of Unrestricted Use SCO

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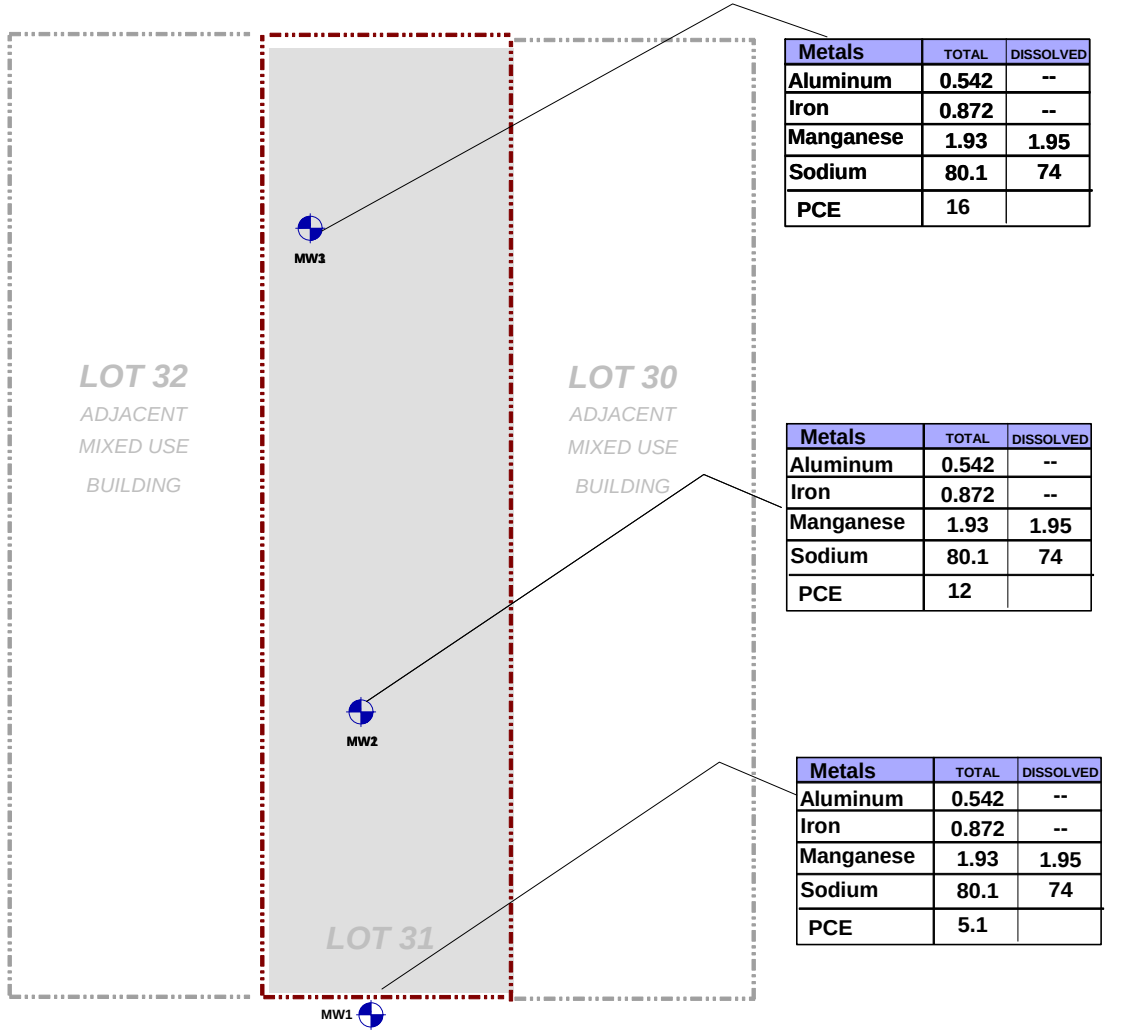
FIGURE 7 SOIL EXCEEDANCES



Metals	TOTAL	DISSOLVED
Aluminum	0.542	--
Iron	0.872	--
Manganese	1.93	1.95
Sodium	80.1	74
PCE	16	

Metals	TOTAL	DISSOLVED
Aluminum	0.542	--
Iron	0.872	--
Manganese	1.93	1.95
Sodium	80.1	74
PCE	12	

Metals	TOTAL	DISSOLVED
Aluminum	0.542	--
Iron	0.872	--
Manganese	1.93	1.95
Sodium	80.1	74
PCE	5.1	

SCALE:

0 10 20

1 Inch = 20 feet

KEY:

Property Boundary

Groundwater Sampling Location

Metals | ppm

Results based on NYS Groundwater Quality Standards

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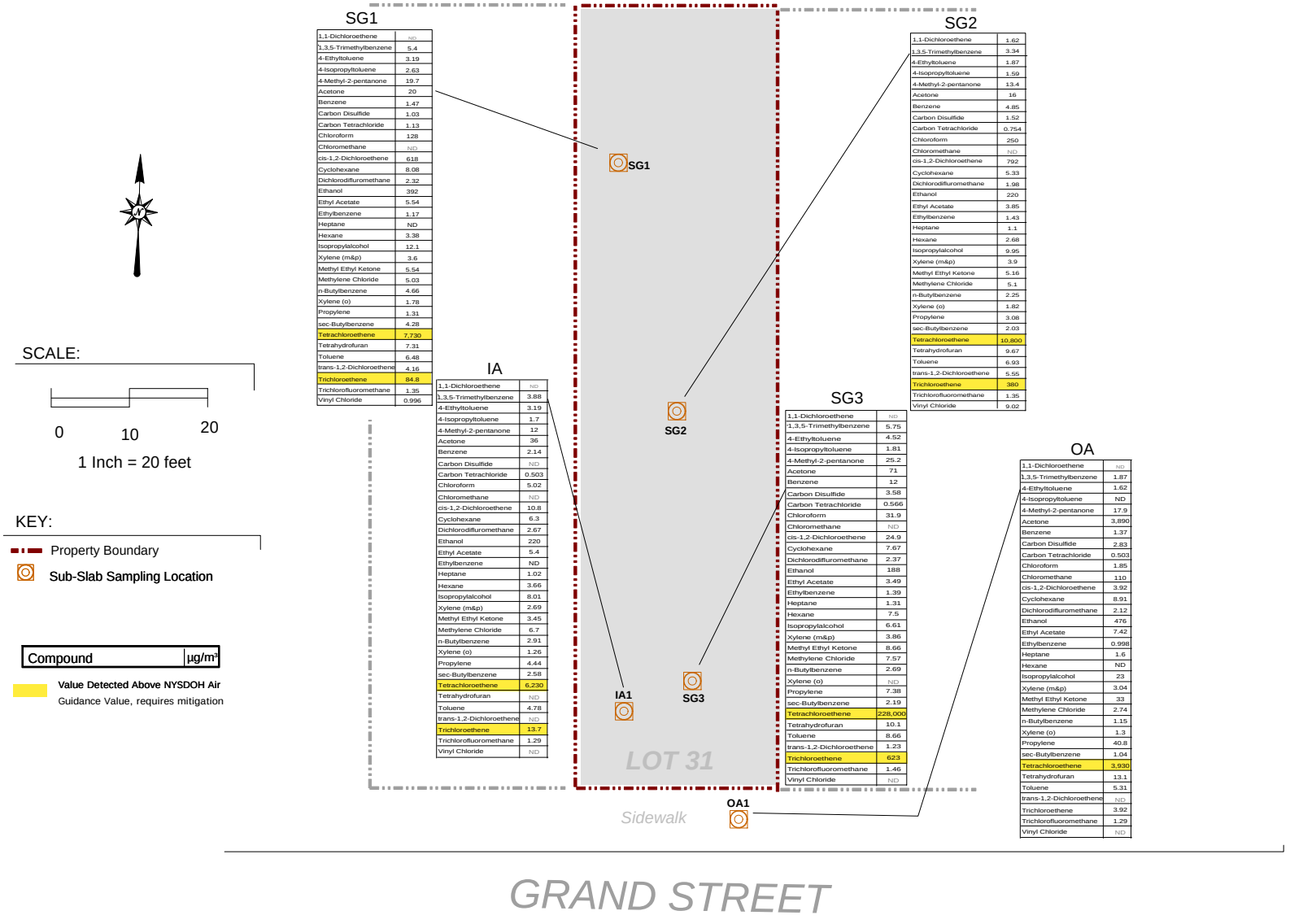
FIGURE 8 GROUNDWATER EXCEEDANCES



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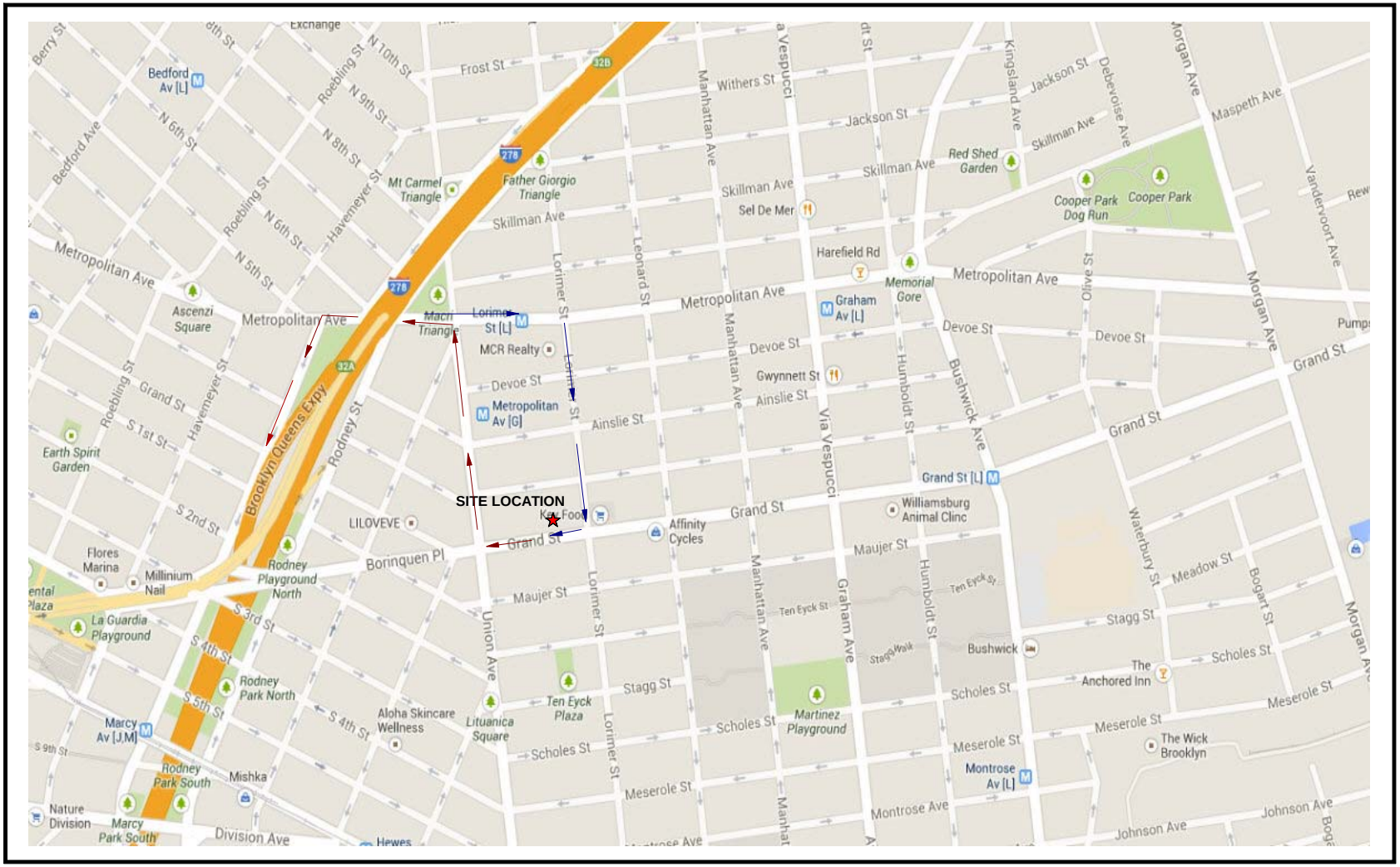
555 GRAND STREET BROOKLYN, NY

FIGURE 9 SOIL GAS DETECTIONS



Key

Truck Route to the Site

Truck Route from the Site

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FIGURE 10 TRUCK ROUTES

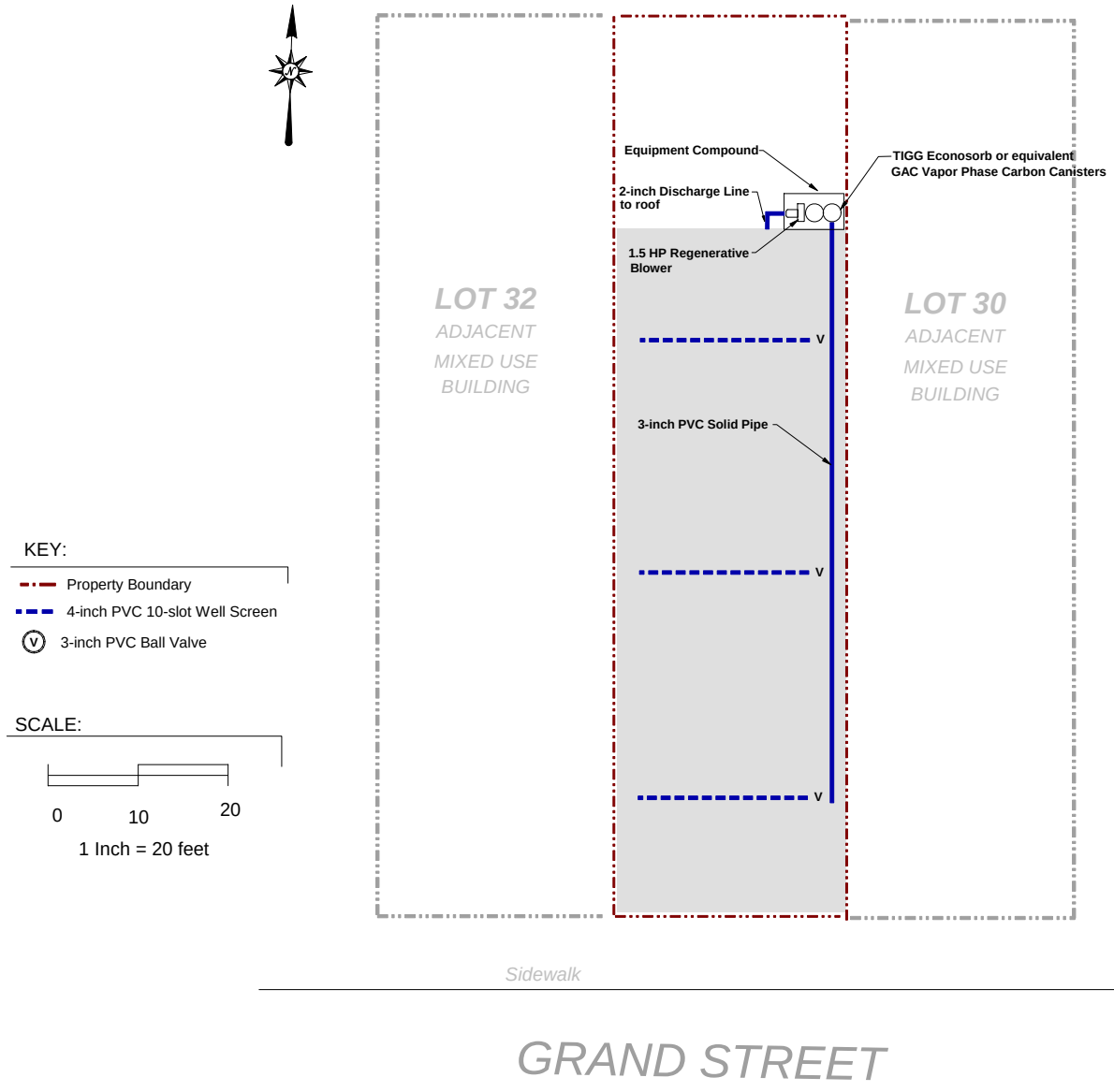

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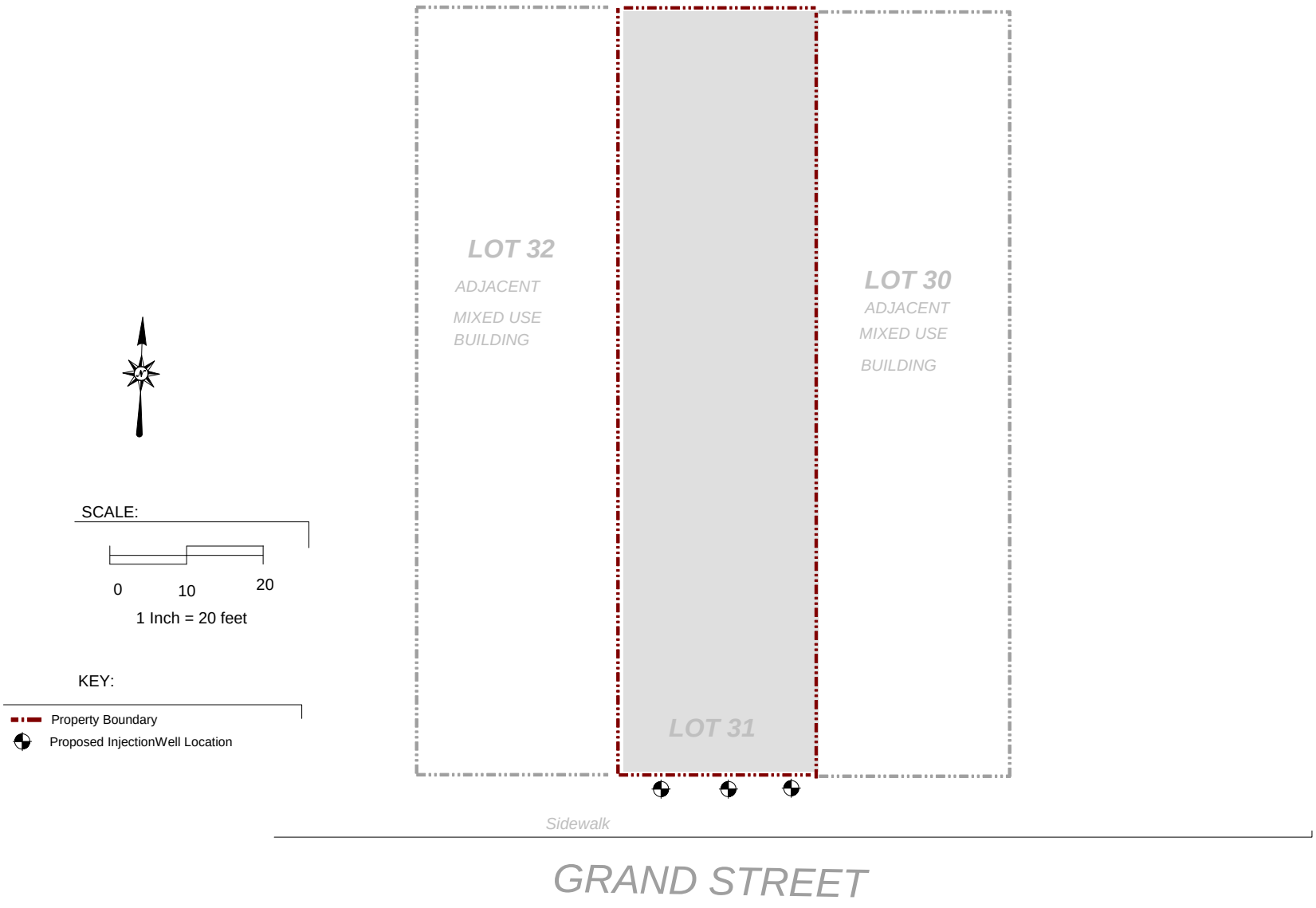
FIGURE 11 SVE System Layout



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555 GRAND STREET
BROOKLYN, NY

FIGURE 12 CHEMICAL INJECTION CONTINGENCY

ATTACHMENT A
Metes and Bounds Description of Property

Legal Description

All that certain Lot, 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:

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 inches to a point;

THENCE westerly and parallel with Grand Street, 25 feet 5 inches (Deed), 25 feet 3 inches (actual);

THENCE southerly parallel with Lorimer Street, 100 feet 5½ inches to the northerly side of Grand Street; and

THENCE easterly along the northerly side of Grand Street, 25 feet 5 inches (Deed), 25 feet 3 inches (actual) to the point or place of BEGINNING.

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City, ST, ZIP:	Brooklyn NY 11211
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EDR Inquiry:	3617864.3
Order Date:	5/25/2013 4:48:56 PM
Certification #:	2471-4D96-B78E
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Volume 4, Sheet 21
Volume 4, Sheet 22

0 Feet 150 300 600

N

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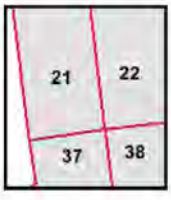

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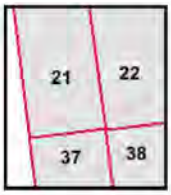

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Volume 4, Sheet 21
Volume 4, Sheet 22

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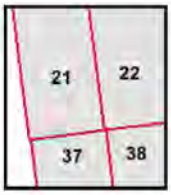

Volume 3, Sheet 37
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Volume 4, Sheet 21
Volume 4, Sheet 22

0 Feet 150 300 600

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1996 Certified Sanborn Map

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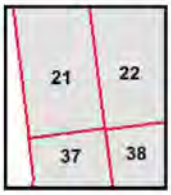

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Volume 4, Sheet 21
Volume 4, Sheet 22
Volume 3, Sheet 37
Volume 3, Sheet 38

0 Feet 150 300 600

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Address:	555 Grand St
City, ST, ZIP:	Brooklyn NY 11211
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EDR Inquiry:	3617864.3
Order Date:	5/29/2013 4:46:59 PM
Certification #:	2471-4D96-B78E
Copyright:	1993

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Volume 3, Sheet 38
Volume 4, Sheet 21
Volume 4, Sheet 22

0 Feet 150 300 600

N

1992 Certified Sanborn Map

Certification # 2471-4D96-B78E

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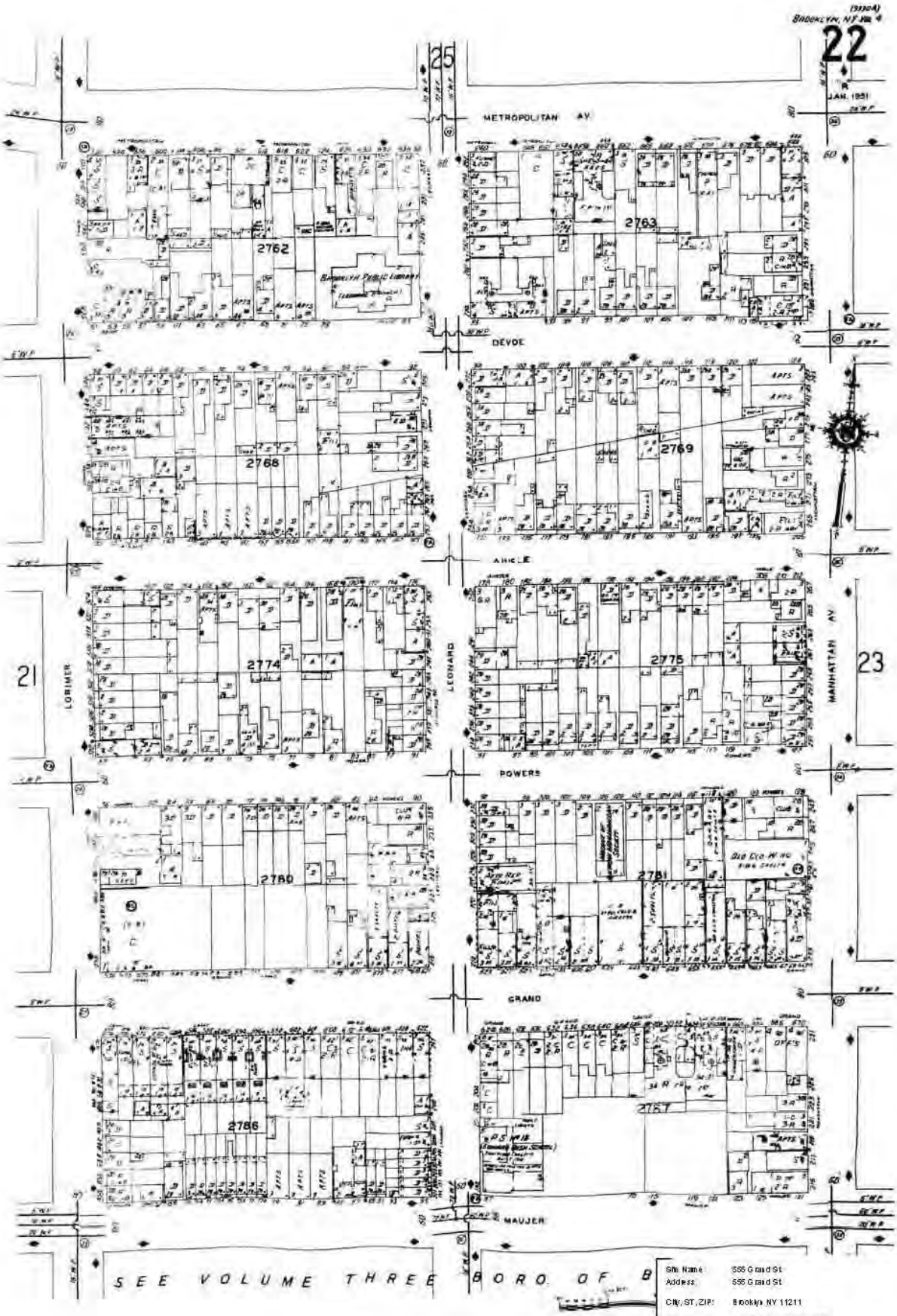
Address: 555 Grand St
City, ST, ZIP: Brooklyn, NY 11211
Client: Env. Business Consultants
EDR Inquiry: 3617864.3
Order Date: 5/28/2013 4:48:59 PM
Certification #: 2471-4D96-B78E
Copyright: 1992

1992 Certified Sanborn Map



Certification # 2471-4D96-B78E

Site Name: 555 Grand St
Address: 555 Grand St
City, ST, ZIP: Brooklyn, NY 11211
Client: Env. Business Consultants
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Order Date: 5/28/2013 4:48:59 PM
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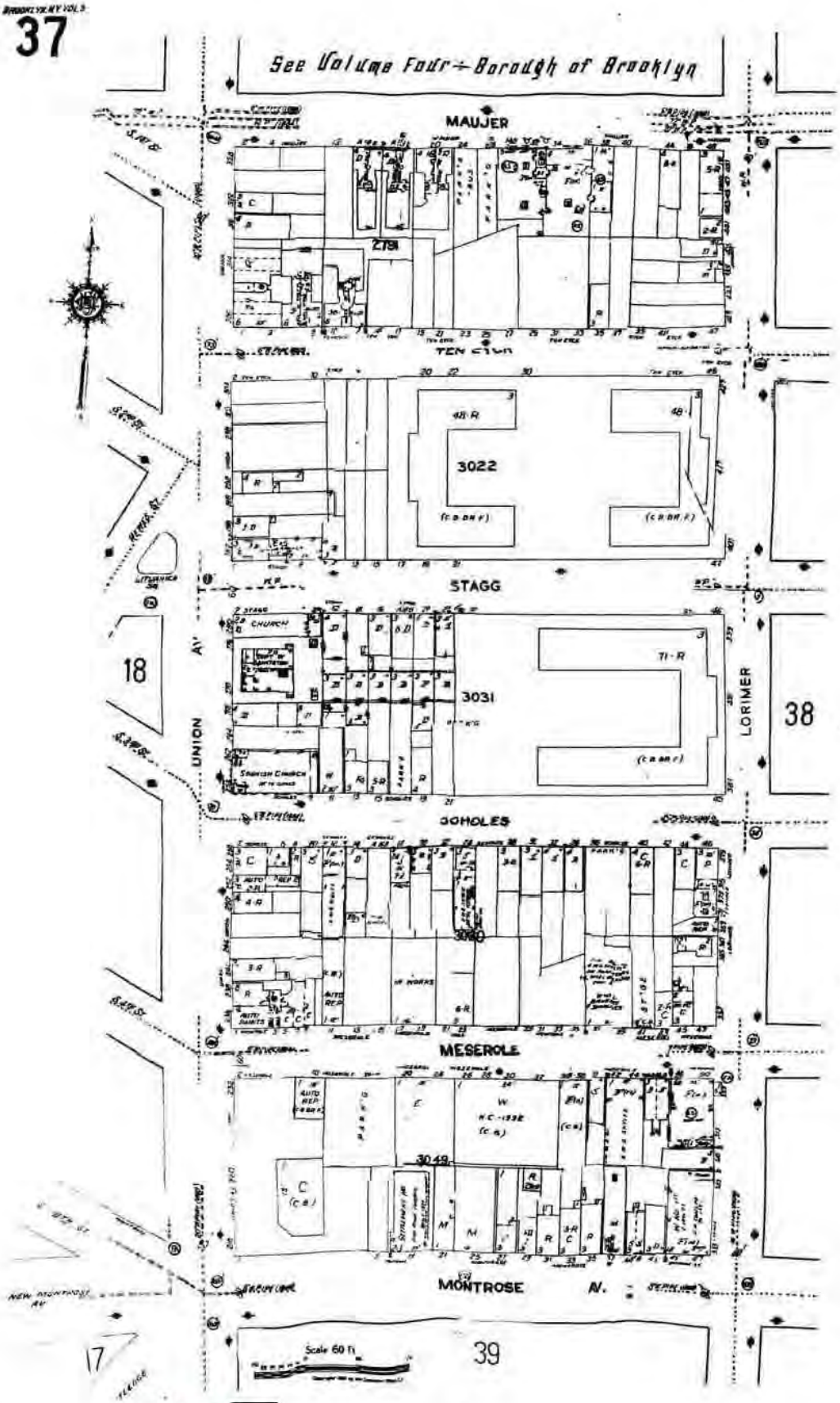
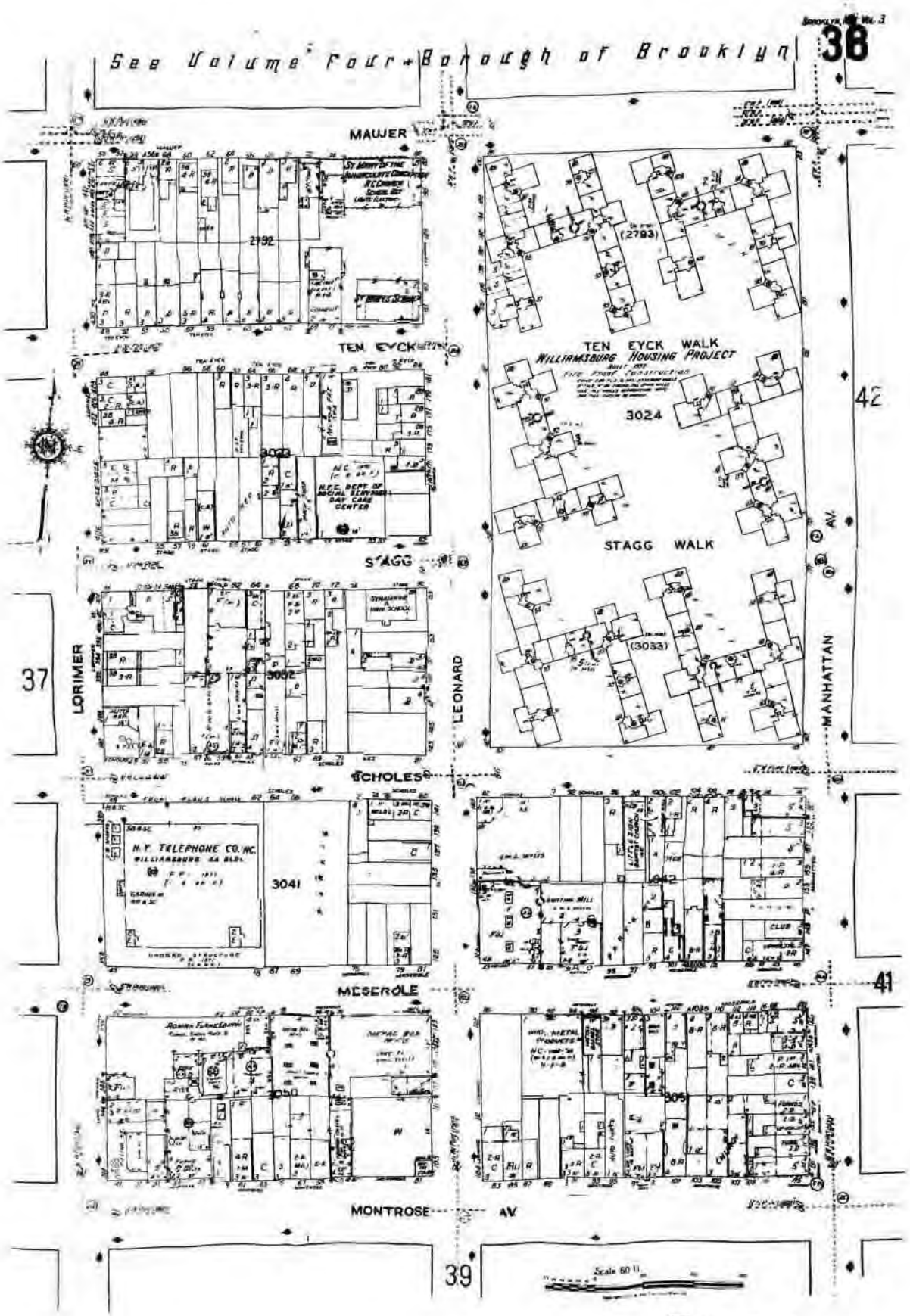


Certification # 2471-4D96-B78E

Site Name: 555 Grand St
Address: 555 Grand St
City, ST, ZIP: Brooklyn, NY 11211
Client: Env. Business Consultants
EDR Inquiry: 3617864.3
Order Date: 5/28/2013 4:48:59 PM
Certification #: 2471-4D96-B78E
Copyright: 1992

1992 Certified Sanborn Map



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Address:	555 Grand St
City, ST, ZIP:	Brooklyn, NY 11211
Client:	Env. Business Consultants
EDR Inquiry:	3617864.3
Order Date:	5/28/2013 4:48:59 PM
Certification #:	2471-4D96-B78E
Copyright:	1992

1991 Certified Sanborn Map

Certification # 2471-4D96-B78E

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Certification #:	2471-4D96-B78E
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City, ST, ZIP: Brooklyn, NY 11211
Client: Esu, Business Consultants

EDR Inquiry: 3617864.3
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Copyright: 1989

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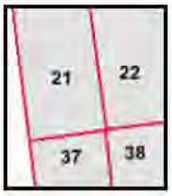

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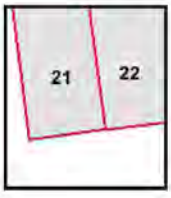

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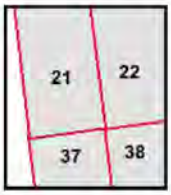

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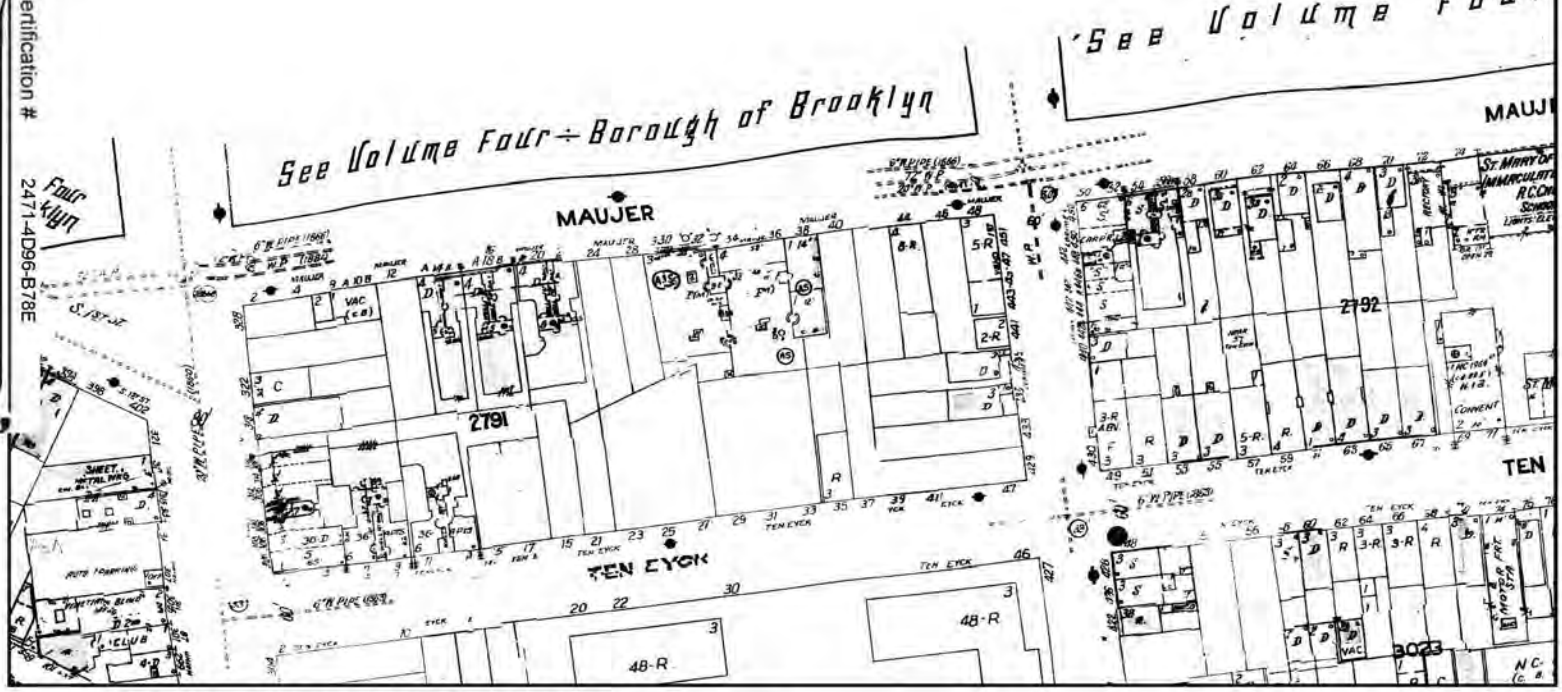

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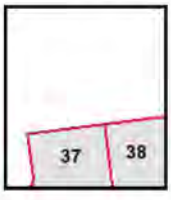

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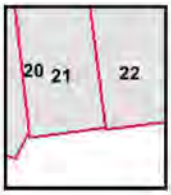

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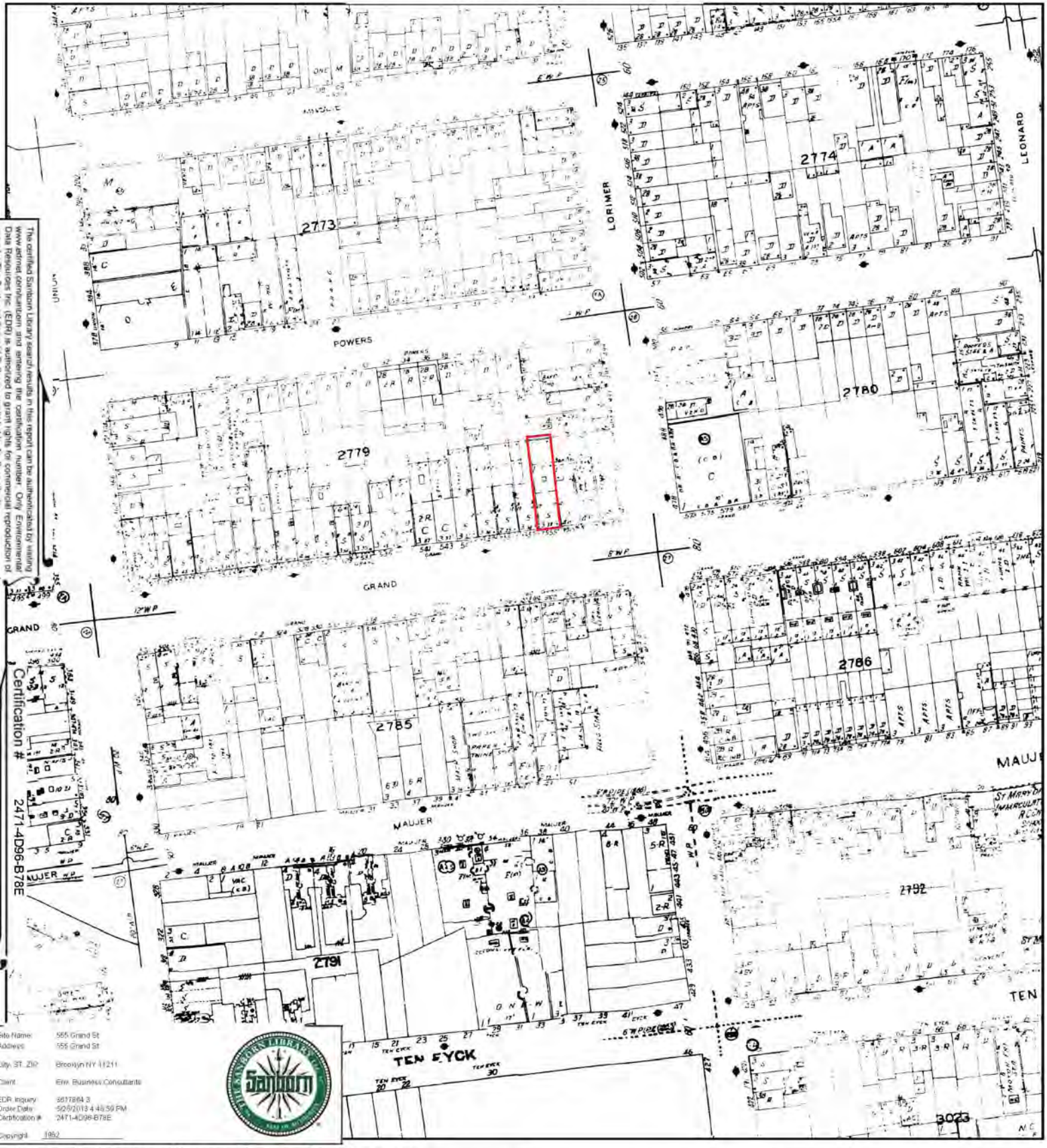

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Order Date: 5/29/2013 4:46:59 PM
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Volume 3, Sheet 38
Volume 4, Sheet 21
Volume 4, Sheet 22

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Certification # 2471-4D96-B78E

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EDR Inquiry:	3617864.3
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Volume 3, Sheet 38
Volume 4, Sheet 21
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City, ST, ZIP:	Brooklyn NY 11211
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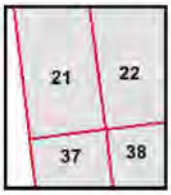

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Volume 3, Sheet 37
Volume 3, Sheet 38

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Volume 4, Sheet 21
Volume 4, Sheet 22

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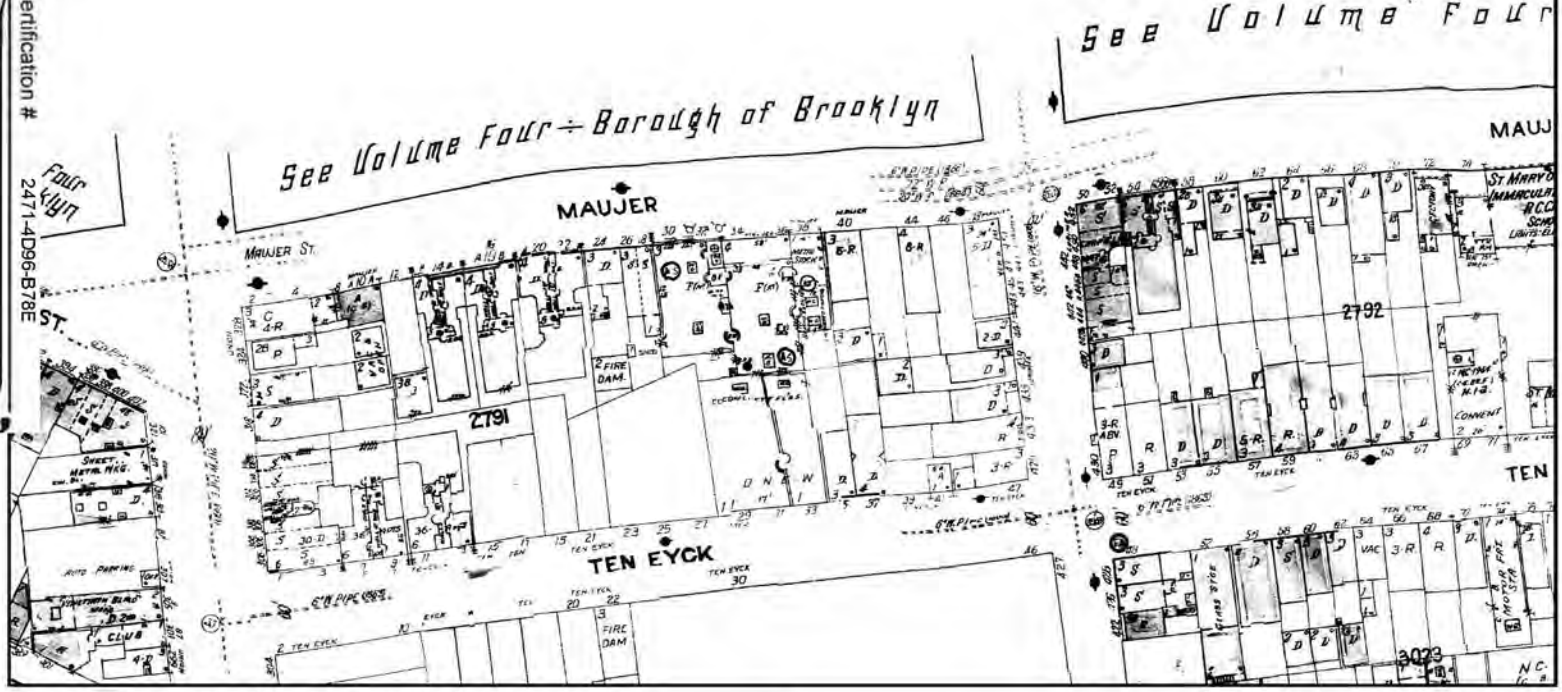

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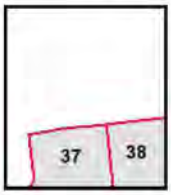

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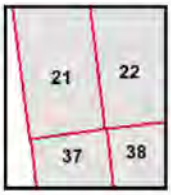

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Volume 4, Sheet 22

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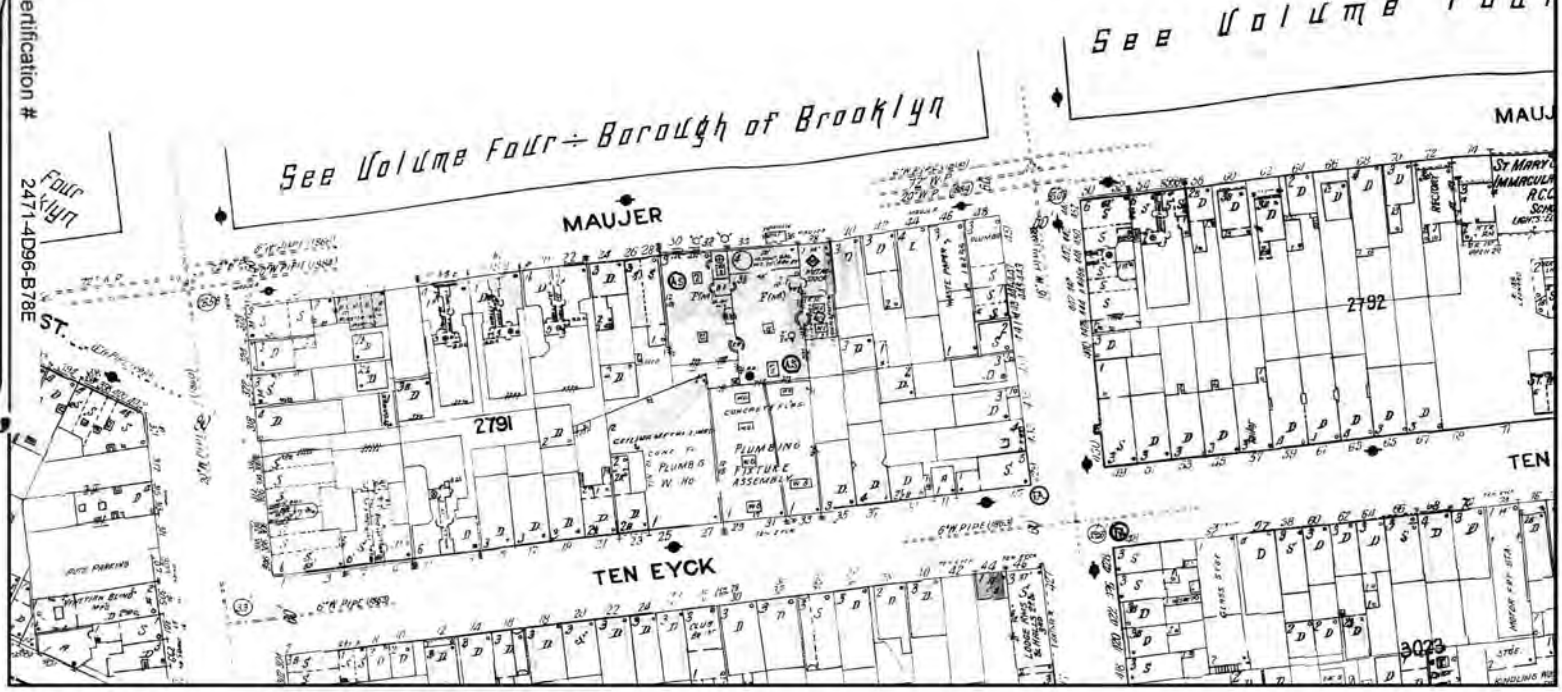

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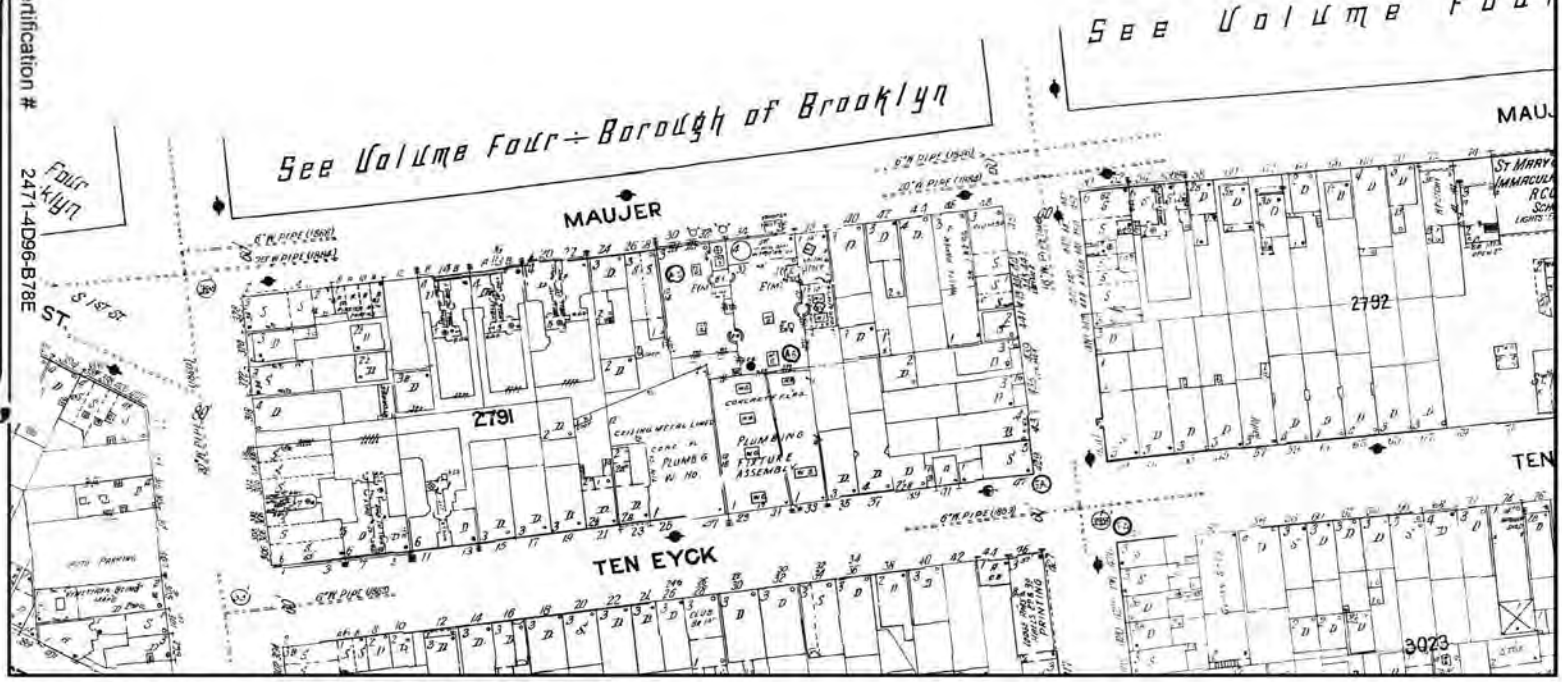

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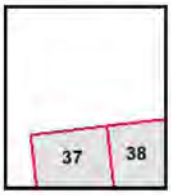

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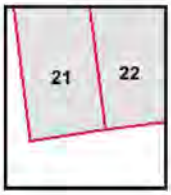

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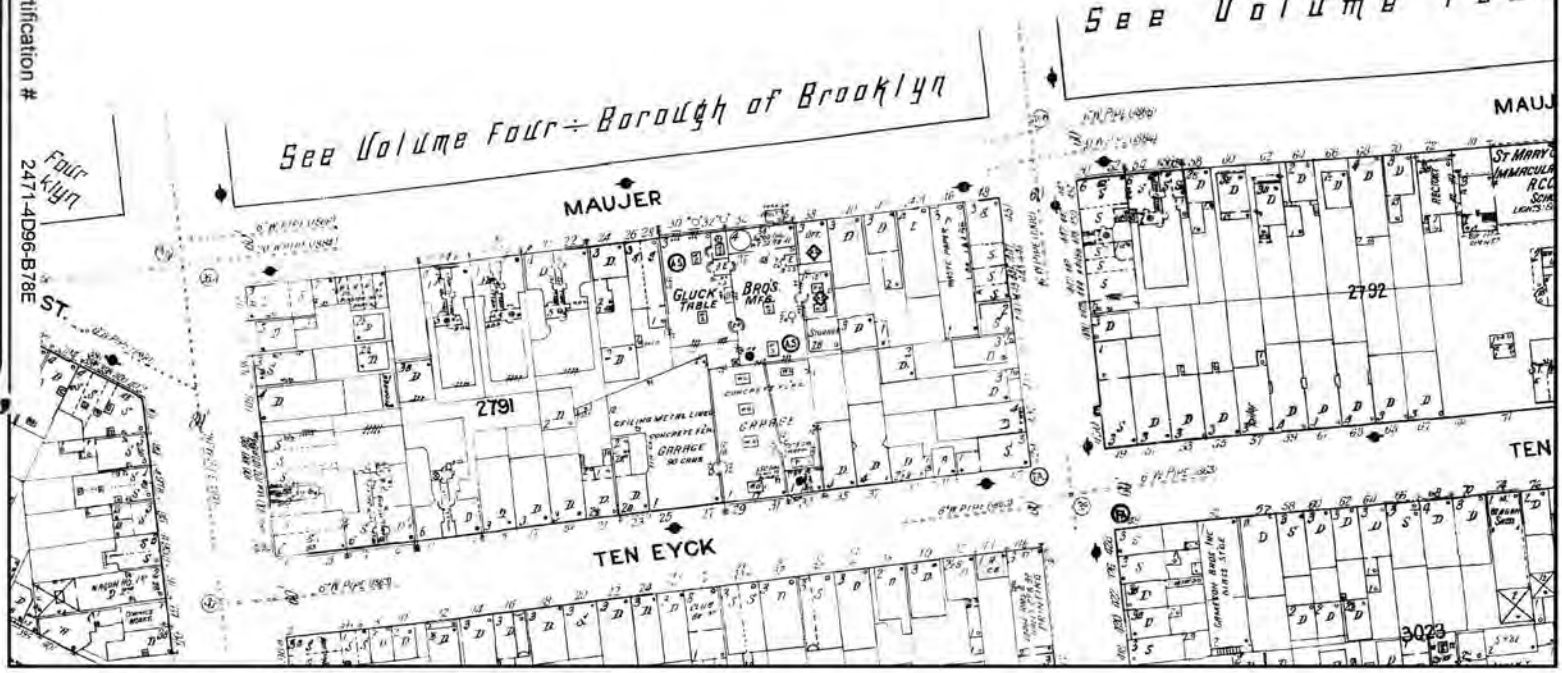

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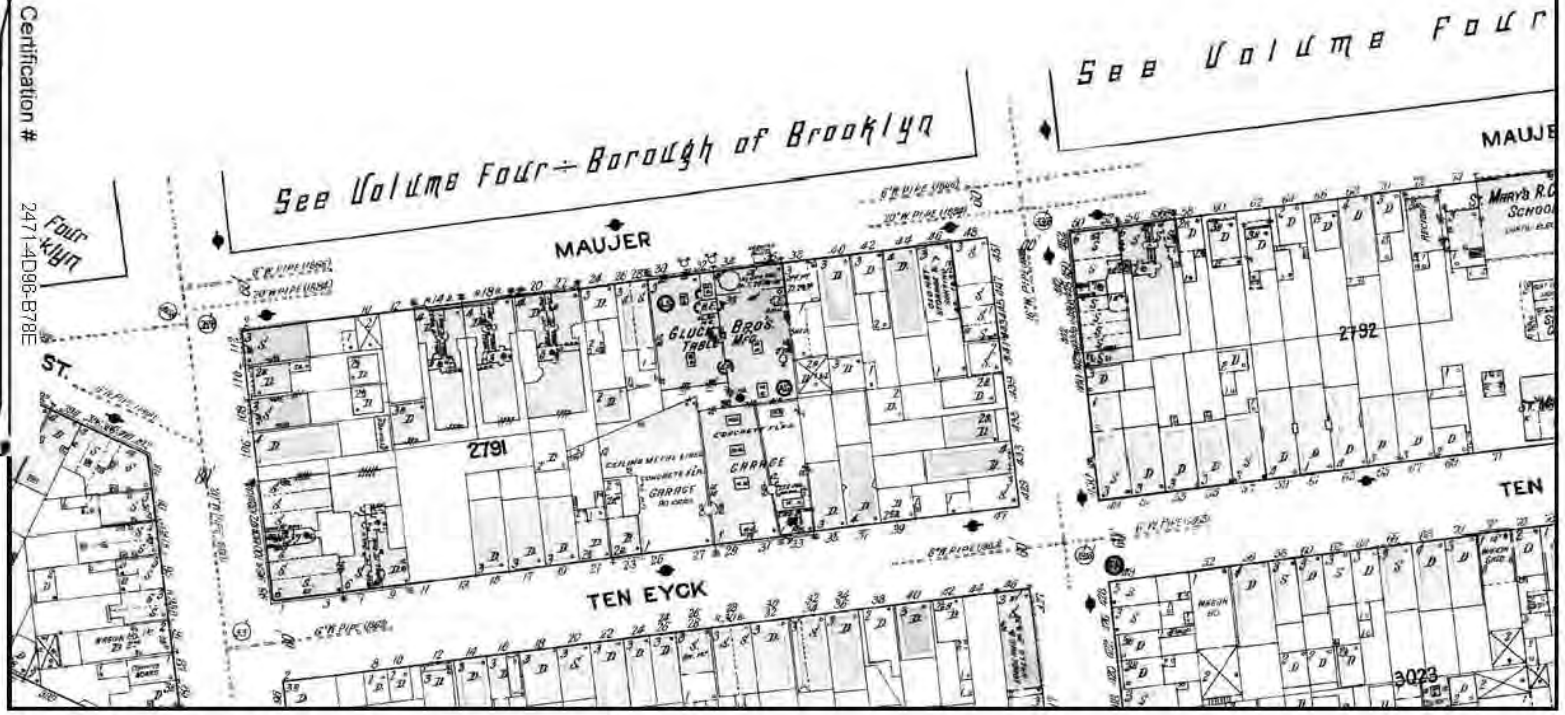

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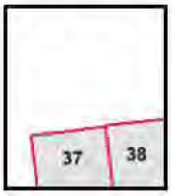

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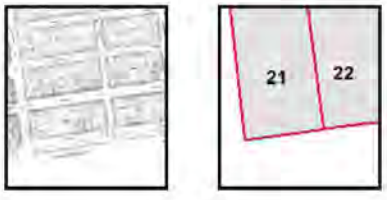

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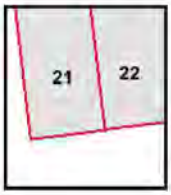

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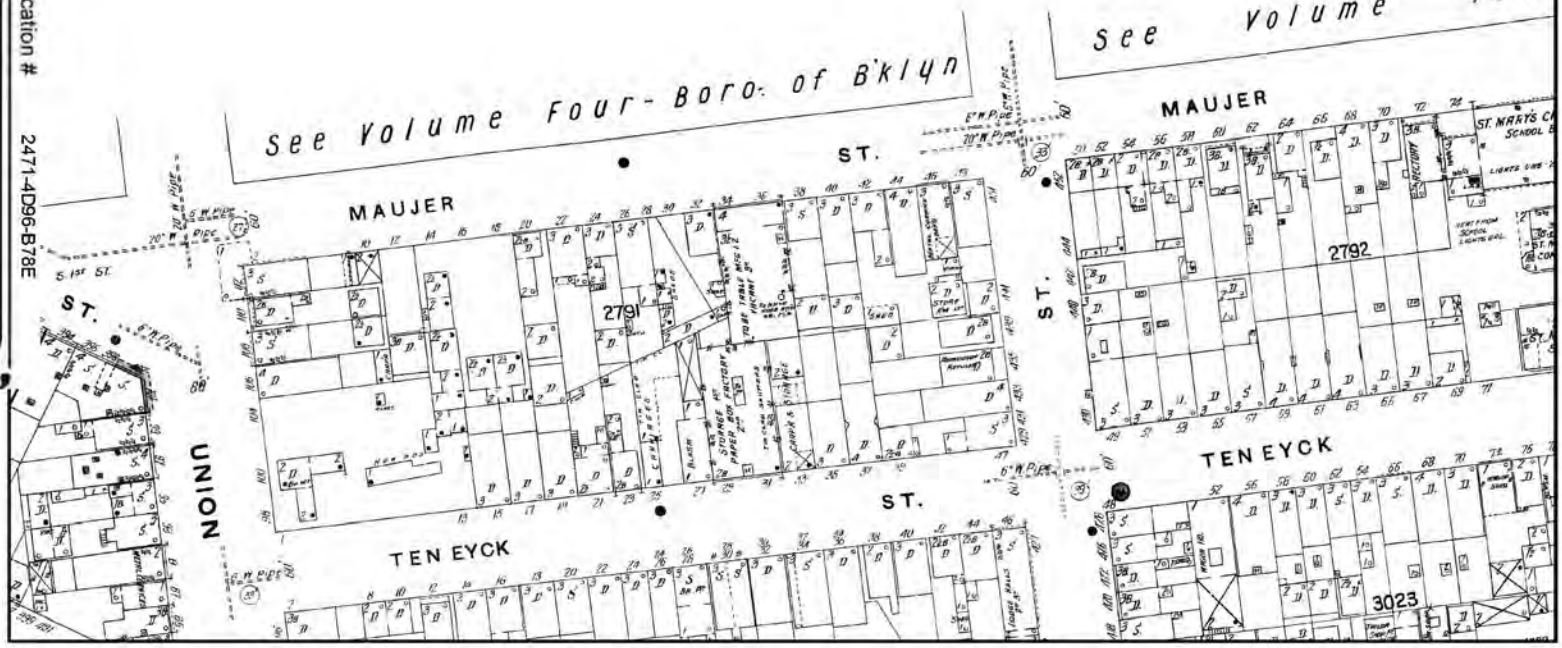

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Volume 3, Sheet 38

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Copyright: 1887

This Certified Sanborn Map combines the following sheets.
Outlined areas indicate map sheets within the collection.

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N

ATTACHMENT C
Health and Safety Plan

555 GRAND STREET

BROOKLYN, NEW YORK 11211
Block 2279, Lot 31

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

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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.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
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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

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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 • Level D protection • Continue monitoring every 10 minutes

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

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

TETRACHLOROETHYLENE

ICSC: 0076

IMPORTANT DATA

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.

NOTES

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

IMPORTANT DATA

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.

NOTES

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 N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0385

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

ICSC: 0385

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 N symbol R: 45-50/53 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:** COLOURLESS CRYSTALS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation

IMPORTANT DATA	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2; (DFG 2004). of its aerosol and through the skin. **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 possibly carcinogenic to humans. May cause genetic damage in humans.
PHYSICAL PROPERTIES	Boiling point: 481°C Melting point: 168°C Solubility in water: none 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 N symbol R: 45-68-50/53 S: 53-45-60-61 UN Hazard Class: 9 UN Packing Group: III Signal: Warning Aqua-Cancer Suspected of causing cancer Very toxic to aquatic life with long lasting effects 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

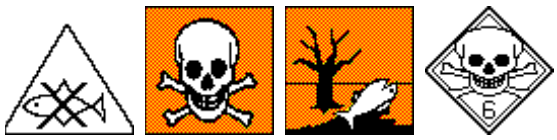
International Chemical Safety Cards

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. Marine pollutant. T symbol N symbol R: 23/25-50/53 S: 1/2-20/21-28-45-60-61 UN Hazard Class: 6.1 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. Note: E T+ symbol N symbol R: 45-26-48/23/25-62-63-68-50/53 S: 53-45-60-61 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

IMPORTANT LEGAL NOTICE:

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: 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 R T A N T D A T 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. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.2 mg/m³ fume (ACGIH 1992-1993). TLV (as Cu, dusts & mists): 1 mg/m³ (ACGIH 1992-1993). Intended change 0.1 mg/m³ Inhal., A4 (not classifiable as a human carcinogen); MAK: 0.1 mg/m³ (Inhalable fraction) Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005). OSHA PEL*: TWA 1 mg/m^3 *Note: The PEL also applies to other copper compounds (as Cu) except copper fume. NIOSH REL*: TWA 1 mg/m^3 *Note: The REL also applies to other copper compounds (as Cu) except Copper fume. NIOSH IDLH: 100 mg/m^3 (as Cu) See: 7440508	**EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of fumes may cause metal fume fever. See Notes. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact may cause skin sensitization.
PHYSICAL PROPERTIES	Boiling point: 2595°C Melting point: 1083°C Relative density (water = 1): 8.9	Solubility in water: 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: 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	Density: 11.34 g/cm3
	Melting point: 327.5°C	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. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0056

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

MERCURY

ICSC: 0056

I M P O R T A N T D A T A	**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. F symbol N symbol R: 15-17-50/53 S: 2-7/8-43-46-60-61 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
ODOURLESS GREY TO BLUE POWDER.

PHYSICAL DANGERS:
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.

CHEMICAL DANGERS:
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.

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.

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.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of fumes may cause metal fume fever. The effects may be delayed.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis.

PHYSICAL PROPERTIES

Boiling point: 907°C
Melting point: 419°C
Relative density (water = 1): 7.14
Solubility in water: reaction
Vapour pressure, kPa at 487°C: 0.1
Auto-ignition temperature: 460°C

ENVIRONMENTAL DATA

NOTES

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

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.)? _____

_____

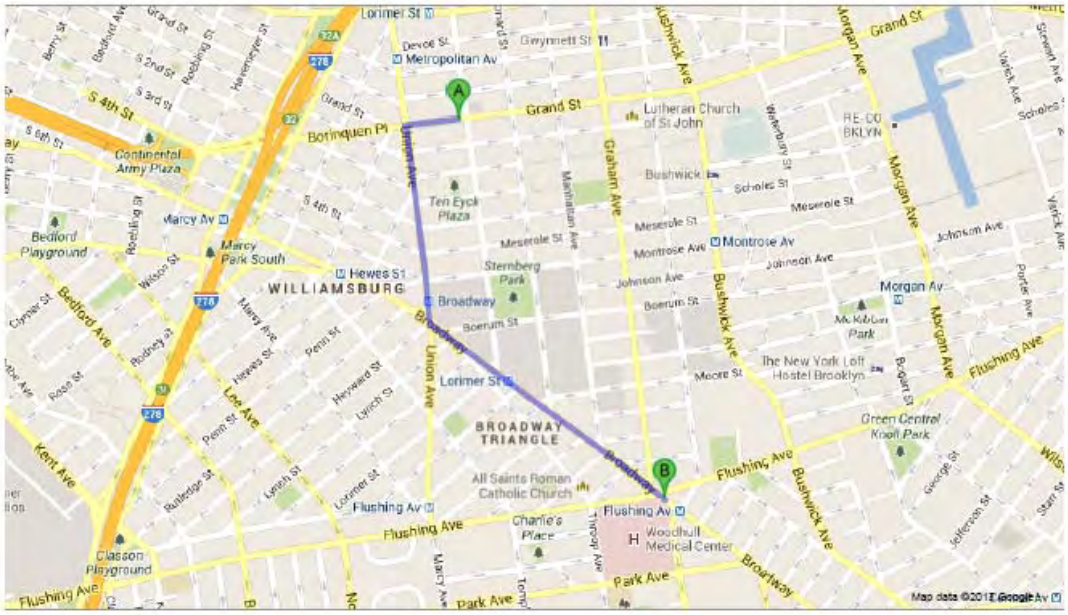
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

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 D
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:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD
RIDGE, NY 11961

TABLE OF CONTENTS

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 Miller 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, Kevin Waters; 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	K. Waters, EBC
Project Manager	Implementation of the RI according to the RIWP.	Chawinie Miller, 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 soil / groundwater by USEPA Method 8260, SVOCs in soil / groundwater by USEPA Method 8270BN, Target Analyte List (TAL) Metals in soil and groundwater, pesticides / PCBs by USEPA Method 8081/8082 and 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
Soil	Excavation Bottom	2	1 per 900 square feet	Endpoint verification	SVOCs by 8260 / 8270 and TAL Metals	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
Soil	Excavated Historic Fill Material	1	1 per 800 cy	Waste Characterization	VOCs EPA Method 8260B, pesticides and PCBs by EPA 8081/8082, other as per disposal facility	0	0	0	0

TABLE 2
SAMPLE COLLECTION AND ANALYSIS PROTOCOLS

Sample Type	Matrix	Sampling Device	Parameter	Sample Container	Sample Preservation	Analytical Method#	CRQL / MDLH	Holding Time
Soil	Soil	Scoop Direct into Jar	VOCs	(1) 2 oz Jar	Cool to 4° C HCL	EPA Method 8260	Compound specific (1-5 ug/kg)	14 days
Soil	Soil	Scoop Direct into Jar	SVOCs	(1) 8 oz jar	Cool to 4° C	EPA Method 8270 BN	Compound specific (1-5 ug/kg)	14 day ext/40 days
Soil	Soil	Scoop Direct into Jar	Pest/PCBs	from 8oz jar above	Cool to 4° C	EPA Method 8081/8082	Compound specific (1-5 ug/kg)	14 day ext/40 days
Soil	Soil	Scoop Direct into Jar	Metals	from 8oz jar above	Cool to 4° C	TAL Metals	Compound specific (01-1 mg/kg)	6 months
Groundwater	Water	Pump tubing	VOCs	(3) 40 ml vials	Cool to 4° C	EPA Method 8260	Compound specific (1-5 ug/L)	14 days
Groundwater	Water	Pump tubing	SVOCs	(1) 1 Liter Amber Bottle	Cool to 4° C	EPA Method 8270 BN	Compound specific (1-5 ug/L)	14 days
Groundwater	Water	Pump tubing	Pesticides and PCBs	(2) 1 Liter Amber Bottle	Cool to 4° C	EPA Method 8081 / 8082	Compound specific (1-5 ug/L)	14 days
Groundwater	water	Pump tubing	Total Metals	(1) 100 ml	HNO3	TAL Metals	Compound specific (1-5 mg/L)	6 months
Groundwater	water	Pump tubing	Dissolved Metals	(1) 100 ml	None	TAL Metals	Compound specific (1-5 mg/L)	6 months

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.
MCAWW = Methods for Chemical Analysis of Water and Wastes.
NA = Not available or not applicable.

ATTACHMENT E
Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

555 GRAND STREET
BROOKLYN, NY

NOVEMBER - 2013

555 GRAND STREET, BROOKLYN NY

COMMUNITY AIR MONITORING PLAN
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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 ($\mu g/m_3$). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$ 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 $\mu g/m_3$ 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 $\mu g/m^3$ 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 $\mu g/m^3$, 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.

ATTACHMENT F
Resumes

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Charles B. Sosik, PG, PHG, Principal

Professional Experience

24 years

Education

MS, Hydrogeology, Adelphi University, NY
BS, Geology, Northern Arizona University, AZ

Areas of Expertise

- Brownfields Redevelopment
- Hazardous Waste Site Investigations
- Pre-purchase Site Evaluations and Support
- Regulatory Negotiations
- Remedial Planning and "Cost to Cure" Analysis
- Strategic Planning
- Real Estate Transactions
- NYC "E" Designations

Professional Certification

- Professional Geologist, NH
- Professional Geologist, Hydrogeologist, WA
- OSHA 40-hr HAZMAT
- OSHA 8-hr. Supervisor

Professional Affiliation / Committees

- NYS Council of Professional Geologists (NYSCPG)
- Association of Groundwater Scientists & Engineers (AGSE)
- NYS RBCA Advisory Committee
- Massachusetts LSP Association
- New Hampshire Association of Professional Geologists
- Interstate Technology Regulatory Council/MTBE Team
- Environmental Business Association, Brownfields Task Force
- Part 375 Working Group

PROFILE

Mr. Sosik has 24 years of experience in environmental consulting. He specializes in advising clients on managing environmental compliance with federal, state, and municipal agencies and has successfully directed numerous investigation and remediation projects involving petroleum, pesticides, chlorinated solvents, heavy metals and radiologically activated media. His work included extensive three-dimensional investigations on MTBE, which have been used effectively to help shape public policy. He also has experience in applying models to groundwater related problems and has completed several large-scale projects to determine fate and transport of contaminants, establish spill scenarios, and closure criteria. His experience and expertise in the area of contaminant hydrogeology has resulted in requests from environmental attorneys, property owners and New York State to serve as an expert witness and technical advisor on a variety of legal disputes.

For the past 10 years Mr. Sosik has been primarily engaged in providing environmental consulting to developers responding to the extensive re-zoning of former industrial and commercial properties, which is currently taking place throughout New York City. These services include everything from pre-purchase evaluations and contract negotiations to gaining acceptance in and moving projects through the NYS Brownfields Program. Mr. Sosik has taken a pro-active role in the continued development of the NYS Brownfields Program and related policy, by attending numerous working seminars, active participation in work groups and task forces and by providing commentary to draft versions of new guidance documents. Throughout his professional career, Mr. Sosik has remained committed to developing innovative cost- efficient solutions to environmental issues, specifically tailored to the needs of his clients.

SELECTED PROJECTS

Scavenger Waste Treatment Facility (SWTF), Suffolk County, NY

Water Treatment Plant EIS - Focused EIS - In response to requests from the Suffolk County Council on Environmental Quality and the Brookhaven Conservation Advisory Council, Mr. Sosik prepared a focused EIS to evaluate the potential impacts to an important surface water resource from the proposed facility including cumulative and synergistic effects with established contaminant plumes in the area.

Advanced Residential Communities, Rockville Centre, NY

Brownfield Project – As the senior project manager on this large scale, high profile redevelopment project, Mr. Sosik was asked to develop a plan to accelerate the regulatory process in the face of general community opposition. Through numerous discussions with the BCP management team, He was able to condense the schedule and review period, through the submission of supporting documents (Investigation Report, Remedial Work Plan) with the BCP application package. Community opposition, which focused on the environmental condition of the site as a means to block the project, was used to advantage in expediting approval of the aggressive interim remedial plan. This will allow the developer to begin remedial work approximately 5 months ahead of schedule.

Former Temco Uniform site, West Haverstraw, NY

Brownfield Project – Mr. Sosik took over management of this project from another consultant following transition of this VCP site to the BCP. Mr. Sosik used the opportunity to renegotiate and revise the scope of work to allow a more cost effective and focused investigation plan without re-writing or resubmitting the RIWP. During the NYSDEC's review of the transition package, he met with and coordinated changes with the NYSDEC Project Manager to gain approval. The result saved the client a significant amount of money, but perhaps more importantly in this case, did so without loss of time.

Grovick Properties, Jackson Heights, NY

Brownfield Project – This Brownfield property is somewhat unique in that it had been investigated and partially remediated by the NYSDEC through the petroleum spill fund. The client was interested in purchasing the property and redeveloping it as office and retail space. Mr. Sosik reviewed the NYSDEC investigation and developed a

supplemental plan to meet the requirements of an RI under the BCP program. By performing this limited amount of field work "up-front" he was able to complete an RI Report and Remedial Plan and submit both with the BCP application package. The NYSDEC and NYSDOH approved the RI Report and the Remedial Plan with minor changes. This cut 120 days from the review process and allowed the client to arrange financing and move his project forward knowing what the clean-up costs would be at the outset.

Metro Management, Bronx, NY

Brownfield Project – The site of a former gas station, the developer had planned to construct a 12-story affordable housing apartment complex with first floor retail space. Since the site was located in an Environmental zone, potential tax credits of 22% for site development, remediation and tangible property could be realized under the BCP. In a pre-application meeting with the NYSDEC, Mr. Sosik realized that the department did not believe the site was eligible for the BCP, since it had been previously investigated and closed under the spills program.

Mr. Sosik assisted the developer in securing financing, and due to the demands of an aggressive construction schedule developed an Interim Remedial Measure (IRM), based on chemical oxidation treatment. Working closely with the clients environmental counsel, Mr. Sosik was able to get the IRM approved without a public comment period. Implementation of the IRM is currently underway.

The project was awarded the 2009 NYC Brownfield Award for Innovation.

Brandt Airflex, NY

Technical Consulting Services - Mr. Sosik provided senior level technical advice and strategic planning in developing an off-site RI/FS for the site, in negotiating a tax reduction for the property due to the environmental condition and in preparing a cost to cure estimate for settlement between business partners. After achieving a favorable tax consideration and settlement agreement for his client

Allied Aviation Services, Dallas, Fort Worth, Airport, Dallas, TX

Jet Fuel Investigation - Mr. Sosik developed and managed an investigative plan to quickly identify the extent and source of jet fuel which was discharging from the Airport's storm drain system to a creek a mile away. Through the use of a refined conceptual model, accelerated investigative techniques and a flexible work plan, he was able to identify the source of the fuel and the migration route within a single week. He then identifled remedial options and successfully negotiated a risk based plan with the Texas regulatory agency that had issued a notice of enforcement action against the facility.

KeySpan – Former LILCO Facilities, Various NY Locations

Pesticide Impact Evaluation - Mr. Sosik developed, negotiated and implemented a site screening procedure to evaluate impact to public health and the environment as the result of past herbicide use at 211 utility sites. Using an unsaturated zone leaching model (PRZM) on a small subset of the sites, he was able to establish mass loading schedules for the remaining sites. This was combined with public well data in a GIS environment to perform queries with respect to mass loading, time transport and proximity to vunerable public supply wells. Using this approach Mr. Sosik was able to show that there were no concerns for future impact. This effort satisfied the public health and resource concerns of the state environmental agency and county health department in a reasonable amount of time and at a fraction of the cost of a full scale investigation.

Former Computer Circuits (Superfund) Site, Hauppauge, NY

CERCLA RI/FS - As Senior Project Manager for the site, he played a major role in regaining control of the investigation activites for the PRP. This action prevented the USEPA from initiating an extensive investigation at the site using a RAC II contractor allowing the client to perform a more efficient investigation. He was involved in all negotiations with EPA and was the project lead in developing a revised site characterization plan (work plan, field sampling plan, quality assurance plan, etc.). By carefully managing all phases of the investigation and continued interaction with each of the three regulatory agencies involved, Mr. Sosik was able to keep the project focused and incrementally reinforce the clients position. The estimated cost of the revised investigation is expected to save the client 1.5 to 2 million dollars.

Sun Oil, Seaford, NY

Remediation Consuliting Services & Project Management - Under an atmosphere of regulatory distrust, political pressure and mounting public hostility toward the client, Mr. Sosik conducted an off-site 3-D investigation to define the extent of contamination and the potential impact on public health. By designing and implementing an aggressive source area remediation program and personal interaction with the public and regulatory agencies, he was able to successfully negotiate a limited off-site remediation favorable to the client. Source area remediation was completed within 6 months and the project successfully closed without damage to the client's public image or working relationship with the regulatory agencies.

Con Edison, Various Locations, NY

Hydrogeologic Consulting Services - Under a general consulting contract, Mr. Sosik conducted detailed subsurface hydrogeologic investigations at five locations to assist in the development of groundwater contingency planning. He also developed and implemented work plans to investigate and remediate existing petroleum, cable fluid, and PCB releases at many of the generating facilities and substations. An important aspect of his role was in assisting the client in strategic planning and negotiations with the regulatory agency.

Keyspan - Tuthill Substation, Aqueboque, NY

Accelerated Site Characterization - Using accelerated site characterization techniques, Mr. Sosik presented the project as a case study in establishing the transport of an herbacide and its metobolites aplied at utility sites in the 1980's The results were then used to establish a screening method for evaluating 211 similar sites controlled by the client in a reasonable and eficient manner.

NYSDEC Spill, East Moriches, NY

Spill Release Analysis - With recognized expertise in the area of gasoline plume development on Long Island, Mr. Sosik was asked by

Charles B. Sosik, PG, PHG, Principal

the State to establish the release date (and principal responsible party) of an extensive petroleum spill, which impacted a residential neighborhood. He used multiple lines of evidence, and a new EPA model (HSSM), which he has helped to refine, to reconstruct the release scenario and spill date, in support of the State Attorney General's cost recovery effort from the PRP.

Minmilt Realty, Farmingdale, NY

Fate & Transport Modeling - He completed an RI/FS at this location for a PCE plume that had been in transit for over 30 years. Mr. Sosik applied a conservative model to evaluate time/concentration impacts under a variety of transport scenarios to a municipal wellfield located 13,000 feet away. Through the use of the model and careful interpretation of an extensive data set compiled from several sources, Mr. Sosik was able to propose a plan which was both acceptable to the regulator and favorable to the client.

Sebonack Golf Course Project, Town of Southampton, NY

IPM Pesticide Study - Provided professional hydrogeologic services in support of the EIS prepared for the development of the site. The proposed development included an 18-hole golf course, clubhouse, dormitory facility, cottages, associated structures, and a 6,000 square foot research station for Southampton College. Mr. Sosik performed an extensive evaluation (using a pesticide-leaching model) on the effects of pesticide and nitrogen loading to groundwater as part of the projects commitment to an Integrated Pest Management (IPM) approach.

NYSDEC, Spills Division, Regions 1 – 4

Petroleum Spills Investigation & Remediation - As a prime contractor/consultant for the NYSDEC in Regions 1-4, Mr. Sosik has managed the investigation and remediation of numerous petroleum spills throughout the State. Many of these projects required the development of innovative investigation and remediation techniques to achieve project goals. He was also involved in many pilot projects and research studies to evaluate innovative investigation techniques such as accelerated site characterization, and alternative approaches to remediation such as monitored natural attenuation and risk based corrective action.

Sun Oil, E. Meadow, NY

Exposure Assessment - Performed to seek closure of the spill file, despite the presence of contaminants above standards, Mr. Sosik determined after the extended assessment that the level of remaining contamination would not pose a future threat to human health or the environment. He used multiple lines of evidence, and a fate and transport model to show that degradation processes would achieve standards within a reasonable time.

Sand & Gravel Mine, NY

Property Development - As part of the development of a sand and gravel mine, Mr. Sosik provided environmental consulting services to assist in obtaining a mining permit, which would result in the construction of a 150-acre lake. Specifically, Mr. Sosik investigated if the proposed lake would reduce groundwater quantity to domestic and public well fields, and/or accelerate the migration of potential surface contaminants to the lower part of the aquifer. After assuming the lead role in negotiations with the regulatory agency, Mr. Sosik was able to obtain a permit for the client by adequately addressing water quality and quantity issues, and by preparing a monitoring plan and spill response plan, acceptable to all parties.

NYSDEC, Mamaroneck, NY

Site Characterization / Source Identification - In a complex hydrogeologic setting consisting of contaminant transport through fractured metomorphic bedrock and variable overburden materials, Mr. Sosik was able to develop and implement a sub-surface investigation to differentiate and separate the impact associated with each of two sources. The results of this investigation were successful in encouraging the spiller to accept responsibility for the release.

Riverhead Municipal Water District, NY

Site Characterization / Remedial Planning - Using accelerated characterization techniques, he implemented a 3-D site investigation to identify two service stations 4,000 ft. away as the source of contamination impacting a municipal wellfield. In accordance with the strict time table imposed by the need to return the wellfield to production by early spring, he designed and implemented a multi-point (9 RW, 6 IW) recovery and injection well system using a 3-d numerical flow model, and completed the project on time. Using a contaminant transport model, Mr. Sosik developed clean-up goals which were achieved in 9 months of operation, well below the projected 3 to 5 year project duration.

Montauk Fire Department, NY

Site Assessment - Mr. Sosik performed a limited investigation and used a 2-D flow model to demonstrate that the property could not have been the source of contamination which had impacted an adjacent wellfield as per the results of a previous investigation. This small focused effort successfully reversed a $500,000, and rising, claim against the department by the water district and the NYSDEC.

PREVIOUS EXPERIENCE

P.W. Grosser Consulting, Bohemia, NY
Senior Project Manager, 1999-2006

Environmental Assessment & Remediation, Patchogue, NY
Senior Project Manager, 1994-1999

Miller Environmental Group, Calverton, NY
Project Manager, 1989-1994

DuPont Biosystems, Aston, PA
Hydrogeologist, 1988-1989

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Charles B. Sosik, PG, PHG, Principal

EXPERT WITNESS TESTIMONY AND DEPOSITIONS

Fact Witness -Testimony on relative age of petroleum spill based on nature and extent of residual and dissolved components at the Delta Service Station in Uniondale, NY Fall/1999

Expert Witness / Expert Report for defendant in cost recovery case by NYS Attorney General regarding a Class II Inactive Hazardous Waste (State Superfund) project by the NYSDEC (October 2004 – present, Report: March 2005, Deposition: April 2005)

Expert Witness / Fact Witness for plaintiff seeking compensation for partial expenses incurred during the investigation and remediation of a USEPA CERCLA site due to the release and migration of contaminants from an "upgradient" industrial property. (Deposition May 2005, case settled April 2007).

Expert Witness / Fact Witness for NYS Attorney General with respect to cost recovery for a NYSDEC petroleum spill site in Holtzville, NY (Deposition April 2005 - case settled).

Expert Witness – Statement of opinion and expert testimony at trial for plaintiff seeking damages from a major oil corporation for contamination under a prior leasing agreement in Rego Park, NY. Case decided in favor of plaintiff. Trial July 2007, in favor of Plaintiff. Qualified as Expert Witness.

Expert Witness / Fact Witness for NYS Attorney General with respect to cost recovery for a NYSDEC petroleum spill site in Lindenhurst, NY (Trial date December 2009, in favor of plaintiff. Qualified as Expert Witness.

Expert Witness / Fact Witness for defendant with respect to cost recovery and third party responsibility for a NYSDEC petroleum spill site. (Expert Statement of Fact – October 2005).

Expert Witness for plaintiff seeking damages related to a petroleum spill from the previous owner/operator of a gas station in College Point, NY. Case settled 2009.

Expert Witness for plaintiff (municipal water supply purveyor) seeking damages from major oil companies and manufacturer of MTBE at various locations in Suffolk County, NY. Expert reports July 2007, August 2007 and October 2007, Case settled August, 2008.

Expert Witness - Deposition for NYS Attorney General regarding NYSDEC cost recovery for a petroleum spill site at Sag Harbor, NY. August 2002

Expert Witness - for NYS Attorney General regarding NYSDEC cost recovery for a petroleum spill site at Riverhead, NY. Case settled July 2008.

Expert Witness for defendant responding to a claim from adjacent commercial property owner on the origin of chlorinated solvents on plaintiff's property located in Cedarhurst, NY. Expert opinion submitted to lead counsel on March 6, 2009, case settled April 2009.

Expert Report - for Attorney General on modeling performed to determine the spill release scenario at a NYSDEC petroleum spill site in East Moriches, NY. June 2000.

MODELING EXPERIENCE (PARTIAL LISTING)

PROJECT	MODEL	APPLICATION
Riverhead Water District, Riverhead, NY	MODFLOW, MODPATH	Remediation system design to intercept MTBE plume and prevent continued impact to municipal well field.
NYSDEC - Region 1, Holbrook, NY	MODFLOW, MODPATH	Simulate transport of MTBE plume to predict future impact.
NYSDEC - Region 1, East Moriches, NY	HSSM	Evaluate release scenario and start date of petroleum spill in support of cost recovery by NYS AG office.
AMOCO, Deer Park, NY	HSSM	Estimate release amount, start date and spill scenario to evaluate the potential for mass unaccounted for
Keyspan Energy, Nassau/Suffolk Counties Substations	PRZM	Estimate mass load of simazine used at 211 electric substations and screen sites according to potential for human health and ecological impacts.
Saboneck Golf Club, Southampton NY	PRZM	Estimate mass load of proposed pesticides on new golf course to evaluate acceptability under an IPM program.
Suffolk County Department of Public Works (SCDPW) Scavenger Waste Treatment Plant, Yaphank, NY	DYNFLOW, DYNTRAC	Evaluate time-transport and nitrogen impact on local river system.
SCDPW SUNY Waste Water Treatment Plant, Stony Brook, NY	DYNFLOW, DYNTRAC	Determine outfall location and time-transport of nitrogen from proposed upgrades to an existing wastewater treatment plant
Water Authority of Great Neck North Great Neck, NY	MODFLOW, MODPATH, MT3D	Review of modeling study performed by EPA to evaluate potential future impact to Well field from PCE plume. Identified serious flaws in model construction and implementation, which invalidated conclusions

PUBLICATIONS / PROFESSIONAL PAPERS

Smart Pump & Treat Strategy for MTBE Impacting a Public Water Supply (14th Annual Conference on Contaminated Soils Proceedings, 1998)

Transport & Transformation of BTEX & MTBE in a Sand Aquifer (Groundwater Monitoring & Remediation 05/1998)

Characteristics of Gasoline Releases in the Water Table Aquifer of Long Island (Petroleum Hydrocarbons Conference Proceedings, 1999)

Field Applications of the Hydrocarbon Spill Screening Model (HSSM) (USEPA Interactive Modeling Web Course www.epa.gov/athens/software/training/webcourse Authored module on model application and applied use of calculators, 02/2000)

Comparative Evaluation of MTBE Sites on Long Island, US EPA Workshop on MTBE Bioremediation (Cincinnati, 02/2000)

Comparison of Four MTBE Plumes in the Upper Glacial Aquifer of Long Island (American Geophysical Union, San Francisco, 12/1996)

Analysis and Simulation of the Gasoline Spill at East Patchogue, New York (American Geophysical Union, San Francisco, 12/1998)

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ARIEL CZEMERINSKI, P.E.

Mr. Czemerinski is a New York State Professional Engineer and CEO of AMC Engineering PLLC an EBC affiliate. Mr. Czemerinski has with 16 years of experience in the chemical and environmental areas. Areas of expertise include environmental compliance, permitting, remedial system design, process and plant safety, and management of a production facility. Mr. Czemerinski is a Registered Professional Engineer in NY, IN, IL, and MI.

Professional Experience
EBC: January 2007
Prior: 20 years

Education
Master of Science in Chemical Engineering, Columbia University, New York, NY, Feb. 1990. Bachelor of Science in Chemical Engineering, University Of Buenos Aires, Buenos Aires, Argentina, May 1987

Areas of Expertise

- Vapor Intrusion - Barrier and Sub Slab Venting System Design
- Environmental Assessment Statements and Environmental Impact Assessments under CEQR, ULURP
- Remedial Program Design and Management
- Environmental Compliance, Clean Water Act, Clean Air Act, Hazardous Materials
- Transfer Station Permitting and Compliance
- Chemical Process Design and Optimization
- Wastewater Treatment Systems and Permitting, SPEDES, Air
- Zoning Regulations and Permitting
- Safety and environmental training

Professional Certification

- OSHA 40-hr HAZWOPER
- OSHA 8-hr HAZWOPER Supervisor

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ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin R. Brussee, Project Manager

Professional Experience
EBC: January 2008
Prior: 6 years

Education
Bachelor of Science, Environmental Science, Plattsburgh State University, NY
Master of Science, Environmental Studies, University of Massachusetts, Lowell

Areas of Expertise
- Management of Site Investigations / Remedial Oversight NYC "E" Designation Sites
- Management of RI Investigations / RAWP Implementation NYS BCP Sites
- NYSDEC Spill Site Investigations
- Phase I / Phase II Property Assessments
- Waste Characterization / Soil Management

Professional Certification
- OSHA 40-hr HAZWOPER
- OSHA 8-hr HAZWOPER Supervisor

PROFILE

Mr. Brussee has 10 years experience as an environmental consultant/contractor and has worked on and managed a wide range of environmental projects. Mr. Brussee has conducted Phase I, II and III Environmental Site Assessments for commercial, industrial, and residential properties in New York, New Jersey, Maryland and Delaware.

Mr. Brussee's field experience includes tank removal and installations, spill management and closure, soil and groundwater sampling, and both the oversight and operation of soil boring and well installation equipment. In addition, Mr. Brussee has performed project research, data reduction and evaluation, and has prepared reports for both regulatory and client use.

PREVIOUS EXPERIENCE

Eastern Environmental Solutions, Inc., Manorville, NY
Project Manager, 2006-2008

EA Engineering, Science & Technology
Hydrogeologist, 2005-2006

P.W. Grosser Consulting, Bohemia, NY
Field Hydrogeologist, 2002-2003

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ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin R. Brussee, Project Manager

SELECT PROJECT EXPERIENCE

Project:	Former Dico G, Autio and Truck Repair Site - Bronx Park Apartments, redevelopment from commercial to mixed use
Location:	Bronx, NY, White Plains Road
Type:	NYS BCP Site, Former gas station, repair shop & junk yard
Contamination:	Petroleum - Gasoline
Role:	Project Manager, during Site Management Phase

Project:	Former Uniforms for Industry Site – Richmond Hill Senior Living Residences / Richmond Place
Location:	Jamaica Ave, Richmond Hill Queens, NY
Type:	NYS BCP, NYC E-Site Hazmat, Noise, Former industrial Laundry
Contamination:	Chlorinated Solvents, Historic Fill, Petroleum - Fuel oil/Mop oil
Role:	Project Manager, RAWP implementation

Project:	Former Gas Station / car wash to mixed use affordable housing / commercial
Location:	Bronx, NY, Southern Boulevard
Type:	NYS BCP, NYC E-Site Hazmat, Former gas station / gar wash
Contamination:	Petroleum - Gasoline
Role:	Project Manager, RAWP implementation

Project:	Redevelopment of former industrial property to residential
Location:	Williamsburg section of Brooklyn, NY, Bedford Ave
Type:	NYC E-Designation Site, Former dye manufacturing plant
Contamination:	Hazardous levels of heavy metals, fuel oil tanks
Role:	Project Manager, RAWP implementation

Project:	Former Domsey Fiber Corp Site
Location:	Williamsburg section of Brooklyn, NY, Kent Ave
Type:	NYC E-Designation Site, Former commercial property
Contamination:	Chlorinated solvents, fuel oil and Historic fill
Role:	Project Manager, RIWP Development and Implementation, RAWP development and implementation, waste characterization and soil management

PUBLICATIONS

Chemical Stress Induced by Copper, Examination of a Biofilm System;
(Water Science Technology, 2006; 54(9): 191-199.)

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ENVIRONMENTAL BUSINESS CONSULTANTS

Chawinie Miller, Project Manager / Industrial Hygienist

Professional Experience
EBC: March 2013
Prior: 7.5 years

Education
Bachelor of Science, Environmental Health and Safety, Stony Brook University, NY

Areas of Expertise
- Phase I / Property Condition Assessments
- Occupational Health and Safety Sampling
- Indoor Air Quality (IAQ) Investigations
- Mold Investigations and Remediation
- Soil and Ground Water Investigations
- Noise Studies

Professional Certification
- OSHA 40-hr HAZWOPER
- NYS Asbestos Inspector
- NYC Asbestos Investigator
- OSHA 10-hr Construction Health and Safety
- Hazard Analysis and Critical Control Point (HACCP) Certified

PROFILE

Ms. Miller has 7.5 years experience as an environmental consultant/contractor and has worked on and managed a wide range of environmental projects. Ms. Miller has conducted Phase Is and Property Condition Assessments for commercial, industrial, and residential properties in New York, New Jersey and Connecticut. In addition, Ms. Miller has conducted various IAQ, asbestos, mold and occupational health and safety sampling investigations for a variety of city, state, federal and private clients.

PREVIOUS EXPERIENCE

The Louis Berger Group, New York, New York
Industrial Hygienist, 2008-2013

AEI Consultants, Jersey City, New Jersey
Environmental Scientist, 2005-2008

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ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin Waters, Hydrogeologist

Professional Experience
EBC: October 2010
Prior: 5 years

Education
Bachelor of Science, Geology, State University of New York, Stony Brook

Areas of Expertise
- Field Operations
- Phase II and RI Implementation, Site Characterization Studies
- Health & Safety Monitoring and Oversight
- Waste Characterization / Soil Management
- Site Logistics

Professional Certification
- OSHA 40-hr HAZWOPER
- OSHA 8-hr HAZWOPER Supervisor

PROFILE

Mr. Waters has 7 years experience as an environmental consultant and has worked on a wide range of environmental projects. Mr. Waters has conducted Phase II and III Environmental Site Assessments for commercial, industrial, and residential properties in New York.

Mr. Waters' field experience includes soil, air and groundwater sampling, operations and maintenance of groundwater remediation systems, tank removals, spill management and closure, and oversight of monitoring well installations. In addition, Mr. Waters has prepared reports for both regulatory and client use.

PREVIOUS EXPERIENCE

P.W. Grosser Consulting, Bohemia, NY
Field Hydrogeologist, 2003-2008

SELECT PROJECT EXPERIENCE

Project:	Former Gas Station / car wash to mixed use affordable housing / commercial
Location:	Bronx, NY, Southern Boulevard
Type:	NYS BCP, NYC E-Site Hazmat, Former gas station / gar wash
Contamination:	Petroleum - Gasoline
Role:	Field Operations Manager, Health and Safety Officer

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin Waters, Hydrogeologist

SELECT PROJECT EXPERIENCE

Project:	Former Uniforms for Industry Site – Richmond Hill Senior Living Residences / Richmond Place
Location:	Jamaica Ave, Richmond Hill Queens, NY
Type:	NYS BCP, NYC E-Site Hazmat, Noise, Former industrial Laundry
Contamination:	Chlorinated Solvents, Historic Fill, Petroleum - Fuel oil/Mop oil
Role:	Field Operations Manager, Health and Safety Monitoring and Field Oversight

Project:	Rikers Island – West Intake Facility
Location:	NYC Department of Corrections, Rikers Island, NY
Type:	Municipal Construction Project
Contamination:	Hazardous levels of lead, heavy metals in Historic fill
Role:	Field Operations Manager, Health and Safety Monitoring and Field Oversight

Project:	Residential Redevelopment Project
Location:	Williamsburg Section of Brooklyn, Wallabout Street
Type:	NYC E-Designation Site
Contamination:	Hazardous levels of lead, heavy metals, SVOCs in Historic fill
Role:	Implement RI Work Plan, Supervise sample collection in all media

ATTACHMENT G
BCP Signage Specifications

New York State Brownfields Cleanup Program

555 Grand Street
BCP Site No. C-XXXXXX
555 Grand Units, LLC

Governor Andrew M. Cuomo
NYSDEC Commissioner Joe Martens
Mayor Michael R. Bloomberg

Transform the Past. Build for the Future.

ATTACHMENT H
Estimated Remedial Costs

TABLE 1
555 GRAND STREET
Brooklyn, NY

Summary of Project Costs

TASK	NYS Brownfields Cleanup Program Costs by Task	
BCP Entry Documents		COMPLETED
Remedial Work Plan, Remedy Scoping & Coordination		COMPLETED
Remedial Program Implementation	$	54,072.50
Final Engineering Report, Site Management Plan & IC/ECs	$	91,450.00
Site Management - Operation and Maintenance Program	$	30,000.00
Subtotal	$	175,522.50
15% Contingency	$	26,328.38
Total	**$**	**201,850.88**

ATTACHMENT I
Vapor Barrier/Sealant Specifications

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN INDUSTRIES

Product Description

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

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

Product Use

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

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

Size & Packaging

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

Under-Slab Vapor/Gas Retarder

Product	Part #
VaporBlock Plus 20	VBP 20

APPLICATIONS

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

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VAPORBLOCK® PLUS™ VBP20

ISO 9001:2008 CERTIFIED MANAGEMENT SYSTEM

Under-Slab Vapor / Gas Barrier

		VAPORBLOCK PLUS 20	
PROPERTIES	**TEST METHOD**	**IMPERIAL**	**METRIC**
Appearance		White/Gold	
Thickness, Nominal		20 mil	0.51 mm
Weight		102 lbs/MSF	498 g/m²
Classification	ASTM E 1745	CLASS A, B & C	
Tensile Strength lbf/in (N/cm) average MD & TD (new material)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
Impact Resistance	ASTM D 1709	2600 g	
Maximum Use Temperature		180° F	82° C
Minimum Use Temperature		-70° F	-57° C
Permeance (new material)	ASTM E 154 Section 7 ASTM E 96 Procedure B	0.0051 Perms grains/(ft²·hr·in·Hg)	0.0034 Perms g/(24hr·m²·mm Hg)
Radon Diffusion Coeffiecient	K124/02/95	$< 1.1 \times 10^{-13}$ m²/s	
Methane Permeance	ASTM D 1434	$< 1.7 \times 10^{-10}$ m²/d• atm 0.32 GTR (Gas Transmission Rate) ml/m²•D•ATM	

VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.
Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.
ASTM E-1643 also provides general installation information for vapor retarders.

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

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

RAVEN INDUSTRIES
Engineered Films Division
P.O. Box 5107
Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333

Toll Free: **800-635-3456**
Email: **efdsales@ravenind.com**
www.ravenefd.com

Limited Warranty available at www.RavenEFD.com

1061 Transport Drive, Valparaiso, IN 46383
Toll Free 888.323.4445 ● P 219.465.7671
F 219.531.0898 ● www.elitecrete.com

TD.468 – TECHNICAL DATA: E100-VB5™ Waterborne Epoxy Vapor Barrier

Revised: 2.27.12

Product Name: E100-VB5™ Waterborne Epoxy Vapor Barrier

Product Class: A waterborne epoxy vapor barrier for concrete surfaces that are to be top coated with an epoxy finish.

DESCRIPTION: E100-VB5™ Waterborne Epoxy Vapor Barrier is a high solids, low viscosity, two-component epoxy primer system designed to reduce or eliminate out gassing bubbles in concrete and seal out water penetration. Excellent impact resistance, chemical resistance and superior substrate penetration. Out performs solvent based sealers and primers.

Typical Uses:

- Sealing green concrete surfaces (7 days depending on conditions).
- Sealing existing concrete surfaces.
- Reduces or eliminates out gassing bubbles in concrete.
- Resistant to up to 12 pounds of vapor pressure in concrete.
- Seals concrete from moisture intrusion.
- Very good chemical resistance.

Key Features:

- Slows hydration in new concrete, increasing strength
- Reduce or eliminate out-gassing bubbles in top coats
- Seals out moisture intrusion
- Nearly No Odor
- VOC compliant (0 g/l)
- Air Releasing
- Low Viscosity
- Fast Cure Rate
- Excellent Strength Properties
- Excellent Impact Resistant
- Easy to Place
- USDA Acceptable

Product Properties: (Material and curing conditions at 75^{0}F (23° C) unless noted, 50% R.H.)

- Color – Amber/Green
- Viscosity @ 75^{0}F (23° C)
  - Part A 900 cps
  - Part B 1000 cps
  - Mixed 300 cps (WITH WATER ADDED)
- Pot Life: 25 minutes
- Tack Free: 4 hours
- Recoat or top coat: 5-6 hours
- Foot traffic 6-12 hours
- Heavy duty traffic: 2-4 days

PHYSICAL PROPERTIES
(@77^{0}F (24° C), 7 day ambient cure)

Solids by volume	58%
Volatile Organic Content	0%
Colors available	Amber/Green only
Recommended thickness	5-8 mills (3-6 mills dry)
Coverage per mixed gallon	225 to 300 sq. ft. per gallon
Packaging	2 gallon or 10 gallon units. 100 gallon units available as special request
Mix Ratio:	1 Part A to 1 Part B by volume (Note: add 2 pints of water per mixed gallon **after** mixing A & B)
Shelf Life	1 year in unopened containers (do not store below 45 F°)
Abrasion resistance	
Taber Abrasion CS-17 wheel with 1000 gm. load	ASTM 4060 — 45 MG loss
Impact resistance	
Gardner impact direct	50 in. lb. (passed)
Adhesion 450 psi	
@ elcometer	100% concrete failure no delamination

CHEMICAL RESISTANCE
Splash & Spill Applications (2 hour clean up)

Water (fresh and Salt)	**Butanol**
10% Sodium Hydroxide	**Xylene**
10% Sulfuric Acid	**111 Trichloroethane**
10% HCL	**Gasoline**

IMPORTANT: Mix part A and Part B throughly for 2 minutes with slow speed drill and mix paddel.

Then add 2 pints of clean potable water to each mixed gallon. APPLICATOR MUST FIRST MIX PART A AND B BEFORE ADDING THE WATER.

Packaging: 2 gal. kits and 10 gal. kits. 100 gal. kits available as special order.

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PI.220 – PRODUCT INFORMATION: Using E100-PT1™ Crystal Clear Epoxy

Revised: 7.14.12

E100-PT1™ Crystal Clear Epoxy is a 100% solids, two component, premium quality, durable, clear coating for protecting interior concrete, polymer modified concrete overlays, stained concrete, colored concrete and concrete floors.

1. DESCRIPTION and USES:
E100-PT1™ is engineered and formulated as a slightly thinner viscosity epoxy compared to E100-UV1™ and is designed for coating and protecting new or old interior concrete floors, polished concrete and polymer modified concrete overlays where a very durable finish is desired.

E100-PT1™ is a 100% solids, two component, premium, clear coating with nearly no odor during or after application and virtually no VOC.

E100-PT1™ is available as a standard set cure and a fast set cure.

E100-PT1™ protects and reduces staining from materials such as oil, grease, food spills, many chemicals and abrasion wear by producing a low maintenance, abrasion resistant film.

E100-PT1™ is excellent for protecting conventional interior concrete floors, polished concrete and concrete which has been coated with E100-PT4™ Pigmented Epoxy, E100-VB5™ or polymer modified concrete overlays.

E100-PT1™ is highly effective when used over conventional concrete, polished concrete or polymer modified concrete overlays which have been colored with CHEM-STONE™ Reactive Stain, HYDRA-STONE™ Dye Stain or ULTRA-STONE™ Antiquing Stain, which produce uneven, variegated and translucent coloring similar to that of natural stone. E100-PT1™ enhances the appearance as well as protects the surface from normal use.

E100-PT1™ should be applied evenly. When applying E100-PT1™ to surfaces with little or no texture, a urethane with a slip resistant additive such as aluminum oxide may be needed to increase skid resistance.

E100-PT1™ is a recommended carrier for REFLECTOR™ Enhancer. It is critical to adequately mix the REFLECTOR™ Enhancer to eliminate “fish eyeing” or “comets”. Once the REFLECTOR™ Enhancer is added, it is recommended to mix for a minimum of 2 minutes. Mixing should take place with a high speed drill with mixing paddle. Stiring or mixing with a stick or “boxing” is never sufficent.

2. LIMITATIONS:
E100-PT1™ must only be used on interior concrete that is well drained and is not subject to hydrostatic pressure. Alkali stains may form at edges, cracks and expansion joints.

If the substrate has vapor emission problems or potential or if the concrete does not have a suitable vapor barrier, E100-VB5™ Vapor Barrier Epoxy should be applied.

E100-PT1™ is not recommended for concrete subject to continuous water submersion or direct UV light.

E100-PT1™ must be allowed to dry completely prior to being exposed to water.

Always use clean mixing containers, mixing tools and application tools to ensure there is no contamination which will result in surface blemishes or coating failure.

Due to the fast curing and achieved hardness of E100-PT1™, additional coats may not adhere properly without first sanding and solvent wiping the first coat. This lack of adhesion may result in surface blemishes or complete coating failure if not properly addressed.

If mixing or using less than the full kit, both components must be adequately pre-mixed with separate mixing paddles before dispensing. Failure to do so may result in curing or finish issues.

E100-PT1™ is a high quality coating and may require occasional maintenance and re-application to maintain premium performance.

For additional abrasion or chemical resistance apply protective top coats of urethane.

3. CHEMICAL COMPOSITION:
E100-PT1™ is a 100% solid epoxy resin solution of aliphatic and cycloaliphatic amines. Solids reduction is not recommended.

4. APPLICABLE STANDARDS:
E100-PT1™ complies with all applicable air quality management regulations including those restricting VOC content to less than 50 g/L.

5. PACKAGING:
E100-PT1™ is available from stock in 1.5, 3, 15 and 150 gallon kits.

6. COVERAGE:
Typical application rates vary from: 100 to 150 sq. ft. per gallon as a clear coating. 70 to 100 sq. ft. per gallon when used with REFLECTOR™ Enhancer. 450 to 500 sq. ft. per gallon when used as an “orange peel” top coat texture. Coverage will also vary depending on method of application and the porosity of the surface. Although one coat is common, user must determine application needs.

7. SHELF LIFE:
When stored in temperature controlled areas, shelf life is one year for unopened containers. It is recommended to rotate stock as formula improvements may be made when technology becomes available.

8. CAUTIONS:
Although E100-PT1™ has little or no odor and carriers zero VOC, E100-PT1™ should only be used with adequate ventilation. Avoid contact with eyes and skin. DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN. Ensure fresh air entry during application. If you experience watering eyes, headaches, or dizziness or if air monitoring demonstrates vapor levels are above applicable limits, wear a properly fitted respirator (NIOSH/MSHA TC 23C approved) during and after application. Follow respirator manufacturer’s directions for use.

Read the Material Safety Data Sheet for additional information.

9. APPLICATION EQUIPMENT:
Protective gear should be worn when using equipment and materials during preparation and installation.

A notched squeegee, flat squeegee, high quality adhesives type roller, mohair roller or adhesives applicator is recommended for most applications of E100-PT1™ to apply an even coat.

10. APPLICATION:
Cover surrounding areas, walls, equipment, furniture and adjacent surfaces with masking to protect from spills and tracking. The entire work area should be roped off.

Test substrate for cleanliness and adhesion - Before placement of the E100-PT1™, test the cleaned concrete substrate for soundness and cleanliness with a Tensile Pull Test ACI 503 R (min.200 psi). 100% concrete must fail to pass either test without bond line failure.

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Test Concrete for Vapor Emission –
1. It is recommended that a vapor transmission test(s) be completed before accepting any project.

2. To obtain useful data the concrete must be cleaned in the same manner as it is planned for the complete project.

3. Consult with an Elite Crete Systems Trained Technician for advice on testing and solving vapor transmission problems.

Preconditioning Epoxy Resins - When temperatures drop, epoxy resins typically thicken, may crystalize and becomes harder to flow or to spread. When the temperatures are warmer they typically become thinner. To improve the product flow-ability maintain temperature at about 20^0C (73^0F) before mixing. When the substrate temperature is 10^0C (50^0F) or lower preheat each epoxy component to 90^0F before mixing. Caution the pot life will be reduced by about 50%.

Mixing - E100-PT1™ must be properly mixed prior to application. Failure to mix properly may result in uneven sealing and allow vapor emission throughout the finish. Pre-mix Component "A", then pour Component "B" and component "A" into a clear mixing container and mix for at least 60 seconds (until one even color develops) with a mixing paddle attached to a drill (400-600rpm). The mixed product is ready for immediate placement.

Laying the Product - Application must be made at the coverage rates recommended in section 6 for the intended application. E100-PT1™ should be applied on a dry day when the surface and ambient temperatures are between 40° and 90° F and will not fall below 32° within the next 6 to 8 hours. Do not apply E100-PT1™ foggy, rainy to extremely humid weather conditions. On hot, dry days, application should be made during the cooler part of the day and when the surface is cool.

1. Pour the mixed E100-PT1™ onto the floor and spread evenly over the surface.

2. Back roll the wet epoxy into the surface of the concrete with a roller or applicator. Work the material into the concrete by pressing down onto the roller with extra pressure.

3. Leave a wet film of epoxy on the surface of the concrete after rolling.

4. Inspect all areas to ensure that the concrete has been coated by the epoxy.

5. E100-PT1™ must be applied evenly while maintaining a wet edge and overlapping must be controlled.

Curing -
1. Allow the epoxy to gel and cure until tack free.

2. Carefully inspect the entire area to ensure that the E100-PT1™ film is solid without film break or concrete surface protrusions.

3. If film break or protrusion(s) occur reapply E100-PT1™.

11. CAUTION:
Component "A"- Irritant
Contains epoxy resins. Prolonged contact with skin may cause irritation, rash or allergic reaction. Avoid contact with eyes.

Component "B" - Corrosive
Contains aliphatic and cycloaliphatic amines. Contact with skin may cause severe burns, rash or allergic reaction. Avoid eye contact. Product is a strong sensitizer.

Important Information -
Use of safety goggles, chemical-resistant gloves, adequate ventilation and NIOSH/MSHA approved respirator is recommended.

12. CLEAN UP:
In case of spills wear suitable protective equipment, contain spill, and collect with absorbent material, place in suitable container. Ventilate area. Avoid contact. Dispose according to applicable local, state, and federal regulations.

The use of EXIT™ will assist in the cleanup of work area and tools.

13. FIRST AID:
In case of skin contact, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water for at least 15 minutes. For respiratory problems, remove person to fresh air. Contact Physician Immediately. Wash clothing before re-use.

14. PRODUCT AVAILABILITY:
E100-PT1™ is marketed nationwide and internationally, directly to trained installers through strategically located authorized distributor and suppliers.

15. PRODUCT COST:
At an application rate of 100 to 150 sq. ft. per gallon, the material cost per coat is approximately $0.32 to $0.48 per sq. ft..

16. OTHER SEALER OPTIONS:
Additional information is available in the Elite Crete Systems Technical Data TD-414 Protective Sealer and Coating Options.

17. WARRANTY SUMMARY:
For the complete warranty statement and important limitations, read the Material Safety Data Sheet and Warranty. Generally, Elite Crete Systems, Incorporated represents and warrants only that its products are of consistent quality. No other oral or written statement is authorized. Any liability is limited to refund or replacement of the defective product. The end user shall determine product's suitability and assume all risks and liability.