FORMER
CHARLES PFIZER & COMPANY SITE
BCP No. C224175

407 MARCYAVENUE
BROOKLYN NEW YORK
Block 2245 Lot 8

REMEDIAL ACTION WORK PLAN

JULY 2013

Prepared for:
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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

CERTIFICATIONS

I Ariel 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
NYS Professional Engineer #

10/7/2013
Date

Signature

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

This Remedial Action Work Plan has been prepared for a commercial property located 407 Marcy Avenue in the Williamsburg section of Brooklyn (**Figure 1**). The Site known as the Former Charles Pfizer & Company Site (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 on February 5, 2013. The applicant has applied to this program as a Volunteer.

The Site address is 407 Marcy Avenue, Brooklyn, New York 11205. It is located on the southeast corner of Marcy Avenue and Lorimer Street Brooklyn, New York. The site is designated as Block 2245 Lot 8 on the Brooklyn Tax Map. The Site consists of a single tax parcel with 72 feet of street frontage on Marcy Avenue and 224 feet of frontage on Lorimer Street and Walton Street for a total of 18,662 square feet (0.428 acres) (see **Figure 2**). The lot is currently vacant with the concrete slab of the former building, which occupies approximately 1/3 of the Lot, still present.

The property has an elevation of approximately 13 feet above the National Geodetic Vertical Datum (NGVD) feet. The depth to groundwater beneath the site, as determined from field measurements, is approximately 5-7 feet below grade. Based on groundwater contour maps, groundwater flow is northwesterly.

Historic records show the subject site as being developed prior to 1887 with 12 two-story residential homes. By 1935 the home on the corner of Marcy and Lorimer was replaced with a storefront labeled as "club" and the eastern 5 of 8 lots fronting on Lorimer Street are now replaced with a vacant commercial building. The 1950 maps shows the commercial building extending through the remaining three lots on Lorimer and the building is now labeled "truck sales and service". The southern most lot on Marcy is now vacant. By 1965 the property is in its current configuration and identified as "Charles Pfizer and Company". The property remains labeled as Pfizer through 1987. From 1989 to 2007 the property is shown as a warehouse. The subject site was previously developed with a one-story brick building which occupied

subject site was previously developed with a one-story brick building which occupied approximately two-thirds of the lot. The remainder of the lot consisted of a loading dock area and a parking area. The building has since been demolished, however the concrete building slab remains in place.

Semi-volatile organic compound contamination was observed in soil and groundwater and chlorinated solvent contamination was observed in soil gas and groundwater during the Remedial Investigation.

Summary of the Remedial Investigation

The remedial investigation was performed between June 24 and June 28, 2013 in accordance with the Remedial Investigation 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 temporary 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 soil gas samples for VOCs.

The field work portion of the RI was conducted by Environmental Business Consultants (EBC) between June 24 and June 28, 2013, in accordance with the protocols and methods as established in the approved Remedial Investigation Work Plan).

Subsurface soils at the site include a silty non-native fill with bricks, coal ash and other rubble to a depth of approximately 5 feet below grade. There are voids present at many locations beneath the bottom of the building slab and the top of the fill layer. A native brown to grey silty-sand with intermittent gravel is present immediately below the fill material to a depth of at least 20 feet below grade. The fill material contains elevated levels of SVOCs and metals.

Groundwater at the Site is present at a depth of approximately 5 to 7 feet below surface grade within the native silty-sand and flows in a northwesterly direction.

The results of sampling performed during the Phase II Investigation and RI, identified SVOCs in soil in two hot spot areas (B5, 13SB4) which are likely related to a surface spill of fuel oil or diesel fuel in the former loading dock/truck ramp area. The area of impacted soil is estimated at 500 ft^2 and 700 ft^2 respectively with a maximum depth of 10 feet in each case.

With the exception of a single detection of xylene in 13SB4 and common laboratory associated contaminants (acetone, methylene chloride), there were no detections of VOCs above unrestricted use SCOs.

Three chlorinated compounds were detected above Groundwater Standards across the Site; cis-1,2,-dichloroethene, 1,1,1-trichloroethane, and vinyl chloride (1 location). The distribution is such that the TCA is located in the southwestern half of the site with DCE limited to the northeastern half. Based on the groundwater flow direction and absence of chlorinated compounds in soil, it appears that both the TCA and DCE are originating from an off-site source.

With respect to DCE and VC, the absence of PCE and TCE demonstrates that significant dechlorinization has taken place and suggests migration from an off-site source. This conclusion is supported by the absence of CVOCs in soil at the Site.

TCA in groundwater was limited to the southwestern half of the property (former parking, loading area) with the highest concentrations in upgradient positions. This also suggests an off-site, upgradient source for the TCA.

Total CVOC concentrations detected in soil-gas samples collected during the RI were elevated due to high concentrations of 1,1,1-Trichloroethane reported in all samples above the NYSDOH maximum sub-slab value of 100 µg/m^3, ranging from 190 µg/m^3 in location SG9 to 32,200 µg/m^3 at location SG2. Tetrachloroethene was detected in five of the nine soil gas samples at concentrations below NYSDOH Guidance Values. Neither trichloroethene nor carbon tetrachloride were detected in any of the nine samples.

The highest TCA concentrations in soil gas appear to correlate with the highest concentrations in groundwater indicating that the TCA is off-gassing from the impacted groundwater and then migrating along the fill zone beneath the building slab. Observed voids in the fill would affect the migration and accumulation of these vapors.

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 groundwater 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 upon on-site concentrations in groundwater and the distance to the nearest surface water receptor.

Summary of the Remedy

The remedy recommended for the Site consists of the removal of all SVOC contaminated soil from two “hotspot” areas in the former loading dock/truck ramp area and eastern portion of the former warehouse. In addition all fill material to a depth of 15 feet with parameters above restricted residential SCOs will be removed from the Site and properly disposed of at an off-site facility. This will be achieved by excavation of the building foundation areas to a depth of 12

feet with additional excavation of 3 to 8 feet in the remainder of the Site (rear recreation area). The remedy will include the following items:

1. Removal of SVOC impacted soil "hotspots" from the property.
2. Excavate to a minimum depth of 8 feet across the Site with additional excavation to 12 feet beneath the building foundations. Over-excavate as necessary to remediate hot-spot areas to a minimum depth of 12 feet and meet restricted residential SCOs for all remaining soil above 15 ft;
3. Dewatering with treatment and discharge to the NYC Combined sewer system to allow excavation as needed and construction of the buildings foundation;
4. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
5. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of restricted residential SCOs;
6. 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;
7. 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.
8. Installation of a waterproofing membrane/vapor barrier beneath the buildings to be constructed on the 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.

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

On February 5, 2013 Marcy Housing LLC submitted an application to the New York State Department of Environmental Conservation (NYSDEC) to investigate and remediate a 0.428-acre property located at 407 Marcy Avenue in Kings County, New York as a Volunteer in the New York State Brownfield Cleanup Program (BCP). A residential use is proposed for the property. When completed, the Site will be redeveloped with three new multi-family residential apartment buildings. 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 June 24 and June 28, 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 determined that this Site does not pose a significant threat to human health and the environment. The RI for this Site did not identify fish and wildlife resources.

A formal Remedial Design document will not be prepared.

1.1 SITE LOCATION AND DESCRIPTION

The Site address is 407 Marcy Avenue, Brooklyn, New York 11211. It is located on the southeastern corner of Marcy Avenue and Lorimer Street in Brooklyn, New York. The site is designated as Block 2245 Lot 8 on the Brooklyn Tax Map. The Site consists of a single tax parcel with 72 feet of street frontage on Marcy Avenue and 224 feet of frontage on Lorimer Street and Walton Street for a total of 18,662 square feet (0.428 acres). The lot was previously developed with a one-story brick building which occupied approximately two-thirds of the lot.

The remainder of the lot consisted of a loading dock area and a parking area. The building has since been demolished, however, the concrete building slab remains in place.

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 0.428-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 redeveloped through the new construction of two 5-story residential buildings (A & B) and one 6-story residential building (building C). Building A will have nine 5 to 7 bedroom residential apartments with a total above grade area of 25,617 sf, building B will feature ten 3 to 4 bedroom residential apartments with a total above grade area of 19,012 sf and building C will feature nineteen 4 to 5 bedroom apartments with a total area of 30,723 sf. Each of the three buildings will have a full 10 foot deep basement level.

The total footprint area of the three buildings combined is 12,818 sf which is 68.7 percent coverage of the lot. The remaining open portion of the lot will be capped with concrete and used as an outdoor recreation area.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The surrounding land use includes multi-family residential buildings to the north, east and west with vacant or underutilized commercial properties to the south. The adjacent properties to the south on Walton Street are currently used for commercial purposes but are being marketed for residential development following the change in zoning. There are several schools in the immediate area of the Site including an elementary school (PS 380) approximately 550 feet west-

northwest (downgradient) of the Site and an intermediate school (IS 318) approximately 650 feet to the east (see **Figure 3**).

The former Pfizer complex sites which consist of a series of large lots identified as inactive hazardous waste/Voluntary Cleanup Program sites are located 350 to 1,000 feet to the southeast.

The area has been changing in response to the upzoning and many of the former commercial buildings are being converted to, or replaced by, new residential buildings.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The field work portion of the RI was conducted by EBC during a three day period from June 24 through June 28, 2013. The initial RI mobilization began on June 24, 2013 with a second day of drilling on June 27, 2013 to complete the soil sampling and installation of the monitoring wells and soil gas implants. EBC returned to the site on June 28, 2013 to complete groundwater and soil gas sampling activities. 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 gas samples. Drilling services were provided by Eastern Environmental Services (Eastern) of Manorville, NY. Laboratory services were provided by Phoenix Environmental Laboratories of Manchester, CT (NYSDOH 11301). 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

In accordance with the RI workplan, a total of 16 borings were advanced across the Site on June 24 and 27, 2013. Borings 13SB1 through 13SB4 and 13SB10 through 13SB13 were completed on the northwestern portion of the property and borings 13SB5 through 13SB9 and 13SB14 through 13SB16 were completed on the northeastern portion of the property.

At each soil boring location soil samples were collected continuously in 5-foot intervals using a Geoprobe™ model 54LT or 6620DT, probe drilling machine. The Geoprobe™ system uses a direct push hydraulic percussion system to drive and retrieve core samplers. Soil samples were

retrieved using a 1.5-inch diameter, 5-foot long macro-core 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). 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

In accordance with the RI Work Plan, a total of 10 temporary groundwater monitoring wells (MW1-MW10) were installed to establish general groundwater quality at the site and to determine the magnitude and direction of a potential contaminant plume migrating from the site.

Monitoring wells were installed to a total depth of 15 ft, approximately 8-10 feet below the water table. At each well 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. Monitoring well locations are 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 was collected continuously from grade to a final depth of 15 feet below existing grade for 14 of the 16 boring locations with the exception of locations 13SB1 and 13SB10, which were completed to a final depth of 20 feet below grade due to a change in elevation of the property. Samples were collected using a 5-foot steel macro-core sampler with acetate liners and Geoprobe direct-push equipment. Soil recovered from the borings was field screened for the presence of VOCs with a photo-ionization detector (PID) and visually inspected for evidence of contamination. No PID readings above background concentrations were obtained from any soil samples recovered, with the exception of the 5ft-10ft interval from boring 13SB2 which exhibited a slightly elevated reading of 20 ppmv.

A minimum of one shallow and one deep soil sample was obtained from each of the 16 soil boring locations, with the exception of boring 13SB6 where only one soil sample (deep) was retained due to minimal soil recovery, and submitted for laboratory analysis of volatile organic compounds (VOCs) by EPA Method 8260 and semi-volatile organic compounds (SVOCs-BN) by EPA Method 8270. In addition, TAL Metals, pesticides and PCBs by EPA Method 8081/8082 were analyzed for select samples obtained from 13SB2, 13SB3, 13SB4, 13SB7, 13SB8, 13SB10, and 13SB14.

2.1.3.2 Groundwater Samples

Groundwater samples were obtained from the ten temporary water table wells on June 28, 2013.

A peristaltic pump and polyethylene tubing were used to purge and collect samples from the temporary well locations. Sample tubing was replaced between each sample location. Samples were 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).

All groundwater samples from the temporary monitoring wells were analyzed for VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals (total and dissolved) and pesticides/PCBs by Method 8081/8082.

2.1.3.3 Soil Gas Samples

To assess the presence of VOCs in soil vapor beneath the site, nine soil vapor samples (SG1-SG9) were collected at the site on June 28, 2013. Soil vapor sampling locations are shown on **Figure 6**. All soil vapor 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 C Phoenix Environmental Laboratories of Manchester, CT, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301).

Soil samples were analyzed for one or more of the following depending on location and depth: VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals and pesticides/PCBs by Method 8081/8082. All groundwater samples from the temporary monitoring wells were 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 samples analyzed for VOCs by EPA method TO-15.

2.1.5 Documentation

Maps showing the locations of the soil borings, monitoring wells and soil gas sample collection points are provided in **Figures 4**, **5** and **6**. The results of soil, groundwater and soil gas samples collected during the RI are summarized in **Tables 3** through **14**. Below is a summary of RI findings.

The results of sampling performed during the RI, identified SVOCs in soil in two hot spot areas (B5, 13SB4) which are likely related to a surface spill of fuel oil or diesel fuel in the former loading dock/truck ramp area. The area of impacted soil is estimated at 500 ft^2 and 700 ft^2 respectively with a maximum depth of 10 feet in each case.

In addition to the SVOC hotspots, CVOCs in groundwater (DCE, TCA, VC) and soil gas (TCA) were reported throughout the Site. Based on multiple lines of evidence, the CVOCs in groundwater are related to a CVOC plume migrating on to the Site from an upgradient source.
Off-gassing is occurring from impacted groundwater resulting in elevated concentrations of 1,1,1-trichloroethane in soil gas. The highest concentrations in soil vapor were located in the central portion of the Site with correlation noted between the highest TCA concentration in soil gas (SG2) and that in groundwater (MW4).

No other source areas were identified or indicated during the RI. 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 SIGNIFICANT THREAT

The NYSDEC and NYSDOH are currently reviewing the RI Report and will determine if the site does or does not pose a significant threat to human health and the environment. Notice of that determination will be provided during the 45 day public comment period and the Proposed Decision Document.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

Previous owners and operators of the property are shown 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) and from a Title Search performed by Reliable Abstract Co. Information regarding past operators was obtained from Sanborn Fire Insurance maps, from telephone directory listings and from an internet search of the property address. The property is under contract for purchase by the requestor in an agreement dated December 18, 2012. The building is currently vacant and has been so for some time.

David M. Goldstein is the current owner of the property and has owned it since February 1978. Tenants during this time are unknown. Charles Pfizer & Co owned the property from 1955 to 1978 and occupied the building during this period. International Harvester owned the main part of the property from sometime after 1947 to 1955 when it was sold to Pfizer. It is believed the identification of “truck sales and service” in the 1950 Sanborn map is related to International Harvester’s occupancy.

Previous Owners

Dates	Name	Comments	Contact Info
prior to 3/25/55	International Harvester Co.	Deed	621 State Street Racine, WI 53404
From 3/25/55 to 2/24/78	Charles Pfizer & Co. / Hopmar Realty Corp.	Deed	235 East 42nd Street NY, NY 10017
From 2/24/78 to present	David M. Goldstein	Deed	202 Ross Street Brooklyn, NY 11211

Note: Marcy Housing LLC is in no way affiliated with Charles Pfizer and Co. or any of the prior owners the property.

Previous Operators

Dates	Name	Comments	Contact Info
From at least 1888 to sometime prior to 1935	Residences	Sanborn Maps	Unknown
From at least 1935 to sometime prior to 1950	Residences, Club, unidentified commercial use	Sanborn Maps	Unknown
At least 1950 to sometime prior to 1965	Truck Sales and Service	Sanborn Maps Title Search	621 State Street Racine, WI 53404
At least 1951 to sometime prior to 1965	Paper Storage	Sanborn Maps	Unknown
At least 1965 to sometime prior to 1987	Charles Pfizer and Co.	Sanborn Maps	235 East 42nd Street NY, NY 10017
Sometime after 1987 to sometime prior to 2011	unidentified commercial use	Sanborn Maps	Unknown

Note: Marcy Housing LLC is in no way affiliated with Charles Pfizer and Co. or any of the prior operators at the property.

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

- Title Search by Reliable Abstract Co., LLC
- NYC ACRIS Database

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

- Interviews with Previous Operators
- Environmental Data Resources - City Directory Search
- Sanborn Fire Insurance Maps
- Certificate of Occupancy Records as Maintained by the Department of Buildings
- Internet Address Search

2.3.2 Phase I Reports

January 2013 – Phase I Desktop Environmental Review (EBC)

A Phase I Desktop Environmental Review was conducted by Environmental Business Consultants (EBC) in January 2013.

The review researched the environmental history of the property and evaluated current conditions utilizing the following resources:

- Performed an inspection of the Site on December 12, 2012.
- Query Federal, State and Local Environmental Databases for the Site and surrounding area.
- Review Sanborn Fire Insurance Maps from 1887, 1904, 1918, 1935, 1935, 1947, 1950, 1965, 1977, 1979-1982, 1984, 1986, 1987, 1989, 1991-1996, 2001-2007.
- Review City Directory search of Site and adjacent properties.

The Site was not listed in any of the databases searched. According to historical records the property was developed prior to 1887 with 12 two-story residential homes. By 1935 the home on the corner of Marcy and Lorimer was replaced with a storefront labeled as "club" and the eastern 5 of 8 lots fronting on Lorimer Street are now replaced with a vacant commercial building. The 1950 maps shows the commercial building extending through the remaining three lots on Lorimer and the building is now labeled "truck sales and service". The southern most lot on Marcy is now vacant. By 1965 the property is in its current configuration and identified as " Charles Pfizer and Company". The property remains labeled as Pfizer through 1987. From 1989 to 2007 the property is shown as a warehouse.

Based upon reconnaissance of the subject and surrounding properties, interviews and review of historical records and regulatory agency databases, the historic use of the property for truck sales and service and as a Pfizer Co. facility were identified as recognized environmental conditions.

The review also noted that the subject site has been assigned an E-designation (E-282) for Window Wall Attenuation/Alternate Ventilation (Noise-E), Air Quality/Exhaust Stack Limitations (Air-E) and Hazardous Materials Phase I/Phase II Testing Protocol (Hazmat-E) as part of the 59 Walton Street rezoning action completed by the City of New York in September of 2012 (CEQR No. 10DCP001K). The E-designation prevents the NYC Department of Buildings from issuing building permits unless a release in the form of a Notice to Proceed is issued by OER.

The Noise E requires that any new building constructed on the property include a window wall system which will achieve a minimum of 28 dBA of window/wall attenuation for all new dwelling units. An alternate means of ventilation such as through the wall or central air conditioning will also be required to maintain a closed window condition. Satisfaction of the Noise E requires the submission of a Noise Remedial Action Plan and an Installation Report certified by a Professional Engineer or Registered Architect.

The Air E requires that any new residential or commercial building constructed on the property use natural gas as the fuel source for hot water and HVAC systems and that the boiler stacks be located on the highest bulkhead at least 103 feet high and at least 23.5 feet from the Lorimer Street lot line.

The Hazmat E requires a detailed environmental review and release by the NYC Office of Environmental Remediation. Such reviews require a full subsurface investigation, remedial and health and safety planning, implementation of a remedial program and documentation that the remedial program was completed during redevelopment of the property.

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, 1918, 1935, 1947, 1950, 1965, 1977, 1979, 1980, 1981, 1982, 1984, 1986, 1987, 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:

- Block 2245, Lot 8 (407 Marcy Avenue) – The lot is drawn as eleven 2-story dwellings and a 3-story mixed use building on the corner of Lorimer Street and Marcy Avenue. Eight of the 2-story dwellings were along Lorimer Street (70-82). Three of the 2-story dwellings had frontage on Marcy Avenue. A vacant, undeveloped lot resided behind the dwellings along Lorimer Street.

Adjacent properties:

North

- 69-77 Lorimer Street – Developed with a 2-story building located along Lorimer Street. The first floor is utilized as a store.
- 79 Lorimer Street – Developed with a 1-story carpenter located along Lorimer Street.
- 84 Lorimer Street – Developed with a 3-story building located along Lorimer Street. The first floor was utilized as a store. A 2-story dwelling was located in the rear of the lot.
- 83-91 Lorimer Street - Five adjoining undeveloped lots.

West

- 400-408 Marcy Avenue – Developed with a small 1-story storage shed located at 408 Marcy Avenue. The remaining area was vacant and undeveloped.

South

- 415-417 Marcy Avenue - Developed with a 3-story building labeled "Meeting Rm".
- 33-49 Walton Street - Developed with a 1-story multi room foundry and hall. The building is occupied by North American Iron Works. Zinc ovens, brass furnaces, and engines were located in the rear of the building (adjacent to the property).
- 51-55 Walton Avenue - Developed with a 3-story building. The first floor is occupied by "Mineral Waters". The upper floors were labeled as a cabinet maker.

East

- 84 Lorimer Street – Developed with a 2-story dwelling. The rear yard had a ropewalk (no longer in operation) that extended to Harrison Avenue. The lot has not been cut by Union Avenue by 1887.

1904

Subject Site:

No significant changes were noted for the Site on the 1904 Sanborn map when compared to the 1887 Sanborn map.

Adjacent properties:

North

- 83-89 Lorimer Street - Developed with a multilevel (1-3) building. The building is occupied by "N.Y. Funding & Dev. Co." and described as a chemical works.

West

- 406 Marcy Avenue – Developed with a 1-story storage shed labeled "rags and paper".
- 404 Marcy Avenue - Developed with a 1-story storage shed labeled "carriage shop". It is unclear if these buildings were utilized by the paint company to the south or the smelting refining co. to the east.

South

- 415-417 Marcy Avenue - The 3-story building is labeled as a store on the first floor.
- 33-49 Walton Street - Developed with a 1-story multi room foundry and hall. The building is occupied by North American Iron Works. Zinc ovens and copper furnaces, and engines were located in the rear of the building (adjacent to the property).
- 51-55 Walton Avenue - Developed with a 3-story building. The first floor is occupied by "Mineral Waters". The upper floors were labeled as a cabinet maker.

East

- 84 Lorimer Street – Developed with a 2-story dwelling. The rear yard had a ropewalk (no longer in operation) that extended to Harrison Avenue. The lot has not been cut by Union Avenue by 1887.

1918

Subject Site:

- Block 2245, Lot 8 (407 Marcy Avenue) – The rear of the 415 Marcy Avenue is noted as rubbish and junk. In addition, two small 1-story sheds were developed. It is unclear if the sheds are utilized by the dwelling on Lorimer Street, 415 Marcy Street, or the metal door manufacturer on Walton.

Adjacent properties:

North

- 77 Lorimer Street – Noted as an iron works.

- 83-91 Lorimer Street - Occupied by Edison Electric Manufacturing Co. District No. 3. The building was noted as having battery storage in the rear and rotary transformers in the front.

West

- 404-406 Marcy Avenue – 1-story buildings labeled as rags.

South

- 33-49 Walton Street - Occupied by Grinden Art Metal Co. and described as a metal door manufacturers.
- 51-55 Walton Avenue - Occupied by a cabinet works.

East

- 84 Lorimer Street – No longer a ropewalk in the rear of the dwellings.

1935

Subject Site:

- Block 2245, Lot 8 (407 Marcy Avenue) – 76-80 Lorimer Street redeveloped with a 1-story building.

Adjacent properties:

North

- 77 Lorimer Street – Noted as an iron works.
- 79-81 Lorimer Street - Redeveloped into a 1-story factory. It is unclear if Edison Co. Inc. or a seperate company.

West

- 400-406 Marcy Avenue – Redeveloped with a multilevel (1-2 story) building owned by Rubel Ice Div. Corporation.

South

- 415-417 Marcy Avenue - Redeveloped into a 1-story building occupying the entire property.

East

- 84 Lorimer Street – Vacant and undeveloped.

1947

Subject Site:

- Block 2245, Lot 8 (407 Marcy Avenue) – 76-80 Lorimer Street 1-story building noted as vacant.

Adjacent properties:

South

- 415-417 Marcy Avenue - The 1-story building noted as an auto repair
- 33-41 Walton Street - Labeled as a garage and drum storage for the steel drum cleaning adjacent (43-49 Walton Street) to the building. A gas tank was noted in the front of the building along Walton Street.
- 43-49 Walton Street - Labeled as steel drum cleaning in the front of the building and storage in the rear and next door (33-41 Walton Street).

1950

Subject Site:

- Block 2245, Lot 8 (407 Marcy Avenue) – 70-80 Lorimer Street redeveloped with a larger 1-story building noted as truck sales and service.

Adjacent properties:

North

- 83-93 Lorimer Street - Noted as a "elec. mach. junking".

West

- 400-406 Marcy Avenue – It is unclear if the occupants are the same or Charles Pfizer & Co. (adjoining buildings).

South

- 415-417 Marcy Avenue - The building was noted as storage for the steel drum storage and cleaning operation adjacent to the south and east.

East

- 84 Lorimer Street – The 1-story truck sales and service building occupying the Site extended to 102 Lorimer Street.

1965

Subject Site:

- Block 2245, Lot 8 (407 Marcy Avenue) – The site is occupied by Charles Pfizer & Co. Inc. and described as receiving and shipping. 68 Lorimer Street was redeveloped into an adjoining truck loading bay. 407-413 Marcy Avenue noted undeveloped.

Adjacent properties:

South

- 415-417 Marcy Avenue - Occupied by Charles Pfizer Co. Inc. and described as storage.

1977

Subject Site:

No significant changes were noted for the subject site on the 1977 Sanborn map when compared to the 1965 Sanborn map for the subject site.

Adjacent properties:

North

- 83-93 Lorimer Street - undeveloped and vacant.

West

- 400-418 Marcy Avenue – Undeveloped parking area.

1979

Subject Site:

No significant changes were noted for the subject site on the 1979 Sanborn map when compared to the 1977 Sanborn map for the subject site.

Adjacent properties:

North

- Not displayed on this Sanborn Map.

1980-1987

No significant changes were noted for the subject site and its adjacent properties on the 1980 through 1987 Sanborn maps when compared to the 1979 Sanborn map.

1989

Subject Site:

- Block 2245, Lot 8 (407 Marcy Avenue) – Noted as a warehouse.

Adjacent properties:

South

- 33-41 Walton Street - Noted as a warehouse.
- 43-49 Walton Street - Noted as auto sales.

1991-1996

No significant changes were noted for the subject site and adjacent properties on the 1991 through 1996 Sanborn maps when compared to the 1989 Sanborn map for the subject site.

2001

Subject Site:

No significant changes were noted for the subject site on the 2001 Sanborn map when compared to the 1996 Sanborn map for the subject site.

Adjacent properties:

North

- 83-89 Lorimer Street - Redeveloped with four 4-story residential buildings.

West

- 60 Lorimer Street, 400 Marcy Avenue - Redeveloped with a 4-story residential building with frontage on Lorimer Street.

2002-2007

No significant changes were noted for the subject site and adjacent properties on the 2002 through 2007 Sanborn maps when compared to the 2001 Sanborn map for the subject site.

The Site was not listed in any of the databases searched. According to historical records the property was developed prior to 1887 with 12 two-story residential homes. By 1935 the home on the corner of Marcy and Lorimer was replaced with a storefront labeled as "club" and the eastern 5 of 8 lots fronting on Lorimer Street are now replaced with a vacant commercial building. The

1950 maps shows the commercial building extending through the remaining three lots on Lorimer and the building is now labeled "truck sales and service". The southern most lot on Marcy is now vacant. By 1965 the property is in its current configuration and identified as " Charles Pfizer and Company". The property remains labeled as Pfizer through 1987. From 1989 to 2007 the property is shown as a warehouse.

Based upon reconnaissance of the subject and surrounding properties, interviews and review of historical records and regulatory agency databases, the historic use of the property for truck sales and service and as a Pfizer Co. facility were identified as recognized environmental conditions.

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 is an igneous intrusive classified as the Hartland formation 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 been historically used to reinforce and extend shoreline areas and to raise and improve the drainage of low lying areas.

Subsurface soils at the site include a silty non-native fill with bricks, coal ash and other rubble to a depth of approximately 5 feet below grade. A native brown to grey silty-sand with intermittent gravel is present immediately below the fill material to a depth of at least 20 feet below grade. Groundwater is present under water table conditions at a depth of approximately 5-7 feet below the surface and generally flows from the southeast to the northwest toward Wallabout Channel (**Figure 7**).

According to the USGS topographic map for the area (Brooklyn Quadrangle), the elevation of the property 13 feet above the National Geodetic Vertical Datum (NGVD).

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

Contaminants of concern at the site include SVOCs in soil and CVOCs in groundwater and soil gas. With the exception of SVOCs associated with historic fill throughout the site, two high concentration "hot spots" of SVOC's are present along a northeast / southwest band located just inside the former loading dock area of the site.

The level of SVOCs reported is significantly higher than that typically observed in historic fill and may be related to a surface release of fuel oil or diesel fuel. Sanborn fire insurance maps identify a commercial building at the Site labeled "truck sales and service". By 1965 the property is in its current configuration and identified as "Charles Pfizer and Company". The property remains labeled as Pfizer through 1987. From 1989 to 2007 the property is shown as an identified warehouse.

There is no evidence of fuel storage tanks at the property. It's important to note that the current lot was previously merged with the adjacent lot to the east and that the original building covered both lots before being divided. A 5,000 gallon fuel oil tank and related equipment to heat the entire building were located on the adjacent lot to the east.

The release of SVOCs in the form of fuel oil or diesel fuel and CVOCs could have been associated with either the truck service operations at the Site or operations related to the use of the property by the Pfizer Company. The shallow nature of the SVOC contamination suggests a surface spill, fill port or fuel line. Note that this could have occurred under either the truck service period or Pfizer period. In either case the releases appear to be related to surface spills and are limited and isolated in areal and vertical extent. This would be a function of small volume surface spills combined with a shallow water table and low permeability soils.

The CVOCs in groundwater consist of cis-1,2-dichloroethene, 1,1,1-trichloroethane and vinyl chloride. With respect to DCE and VC, the absence of PCE and TCE demonstrates that

significant dechlorinization has taken place and suggests migration from an off-site source. This conclusion is supported by the absence of CVOCs in soil at the Site.

TCA in groundwater was limited to the southwestern half of the property (former parking, loading area) with the highest concentrations in upgradient positions. This also suggests an off-site, upgradient source for the TCA. The highest TCA concentrations in soil gas appear to correlate with the highest concentrations in groundwater indicating that the TCA is off-gassing from the impacted groundwater and then migrating along the fill zone beneath the building slab. Observed voids in the fill would affect the migration and accumulation of these vapors.

2.5.2 Description of Areas of Concern

The source of SVOCs is limited to two "hot spot" areas in the north and south central areas of the Site in which shallow soil (<10 ft) has been affected. The SVOC contamination is likely related to a limited volume surface spill or spills which entered the ground through cracks or voids in the concrete floor. The extent of contamination is limited to an approximate 500 ft^2 area in the south central hotspot (B5) and an approximate 700 ft^2 area in the north central hotspot (13SB4). The vertical extent of contamination in both areas extends from the top of the fill surface to a maximum depth of 10 feet.

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

2.5.3 Soil/Fill Contamination

High levels of SVOC's were reported in shallow soil during both the Phase II sampling event and during this RI within the staging areas just inside the former loading dock area of the site. The level of SVOCs reported is significantly higher than that typically observed in historic fill and is likely related to a surface release of fuel oil or diesel fuel during historic use of the Site for truck service operations or possibly operations related to use of the property by the Pfizer Company. The SVOC contamination in the Phase II borings (B2, B5) was limited to the shallow soil (2-4 ft) with SVOCs meeting unrestricted SCOs in the deeper soils (8-10 ft) at these same locations.

Samples from the RI borings, showed SVOC contamination in this area in the 8-10 ft interval (boring 13SB4) but not in the 13-15 ft interval. It must be recognized that there were voids below the concrete slab in this area with little to no return in many of the sample cores from the shallow intervals. It may be that the soil identified as the 8-10 foot interval was actually from a shallower depth.

With the exception of a single detection of xylene in 13SB4 and common laboratory associated contaminants (acetone, methylene chloride), there were no detections of VOCs above unrestricted use SCOs.

Fill material has been documented throughout the Site to a depth of approximately 5 feet below the existing slab grade. Voids of 1 to 4 feet have been noted between the bottom of the slab and the top of the fill layer.

The fill contains elevated levels of SVOCs and metals as follows:
SVOCs including anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene were reported above unrestricted soil cleanup objectives (SCOs).

One or more metals including arsenic, barium, cadmium, copper, lead and mercury were reported above restricted residential SCOs in shallow soil in seven boring locations. Chromium, selenium and zinc were detected in one or more boring locations at concentrations above unrestricted use SCOs.

2.5.3.1 Summary of Soil/Fill Data

Soil sample results from the RI are summarized in **Tables 3-8**. Further information on soil sample collection, handling and analysis can be found in the RI Report (EBC 7/13).

2.5.3.2 Comparison of Soil/Fill with SCGs

Table 9 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 8**.

2.5.4 On-Site and Off-Site Groundwater Contamination

Three chlorinated compounds were detected above Groundwater Standards across the Site; cis-1,2,-dichloroethene, 1,1,1-trichloroethane, and vinyl chloride (1 location). The distribution is such that the TCA is located in the southwestern half of the site with DCE limited to the northeastern half. Based on the groundwater flow direction and absence of chlorinated compounds in soil, it appears that both the TCA and DCE are originating from an off-site source. This is evidenced by the location of the highest TCA concentration in an upgradient position. The off-site origin of DCE is less clear based on the distribution which shows the highest concentrations in the central area of the site. However, chlorinated compounds in groundwater have been well documented in this area originating from known former Pfizer sites in positions upgradient of the Site. The absence of CVOCs in soil suggests that both TCA and DCE in groundwater are migrating onto the Site from an upgradient source.

No petroleum VOC impacts were detected in groundwater. SVOC parameters were detected throughout the Site, with the highest concentrations located along the northern, downgradient, portion of the property in correlation to the area which exhibited high SVOC concentrations in soil.

2.5.4.1 Summary of Groundwater Data

The results of groundwater samples collected during the RI are summarized in **Tables 10-14**. Further information on groundwater sample collection, handling and analysis can be found in the RI Report (EBC 7/13).

2.5.4.2 Comparison of Groundwater with SCGs

Sample results above GA groundwater standards in monitor wells prior to the remedy are shown in **Table 15**. A spider map which shows groundwater sampling locations and summarizes results above GA groundwater standards prior to the remedy are shown in **Figure 9**.

2.5.5 On-Site and Off-Site Soil Vapor Contamination

Several petroleum related VOCs were detected at elevated concentrations in one or more of the soil vapor samples. Total petroleum related volatile organic compounds were generally moderate along the perimeter of the property, ranging from 98.06 µg/m^3 in SG7 located adjacent to the southwest property line in the central portion of the property to 675.49 µg/m^3 in SG9 located adjacent to the western property line also in the central portion of the property. The highest concentrations of BTEX concentrations were detected in soil gas samples SG2 and SG3 location in the central portions of the property, at concentrations of 1,573 µg/m^3 and 3,212 µg/m^3, respectively. Petroleum related VOCs were detected in soil samples from one of the sixteen boring locations, 13SB4, in the central portion of the property, adjacent to the area where soil gas sample SG2 was obtained.

Total CVOC concentrations detected in soil-gas samples collected during the RI were elevated due to high concentrations of 1,1,1-Trichloroethane reported in all samples above the NYSDOH maximum sub-slab value of 100 µg/m^3, ranging from 190 µg/m^3 in location SG9 to 32,200 µg/m^3 at location SG2. Tetrachloroethene was detected in five of the nine soil gas samples at concentration below NYSDOH Guidance Values. Neither trichloroethene nor carbon tetrachloride were detected in any of the nine samples.

Figure 10 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 16**. Further information on soil gas sample collection, handling and analysis can be found in the RI Report (EBC 7/13).

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 SVOCs is limited to two "hot spot" areas in the north and south central areas of the Site in which shallow soil (<10 ft) has been affected. The SVOC contamination is likely related to a limited volume surface spill or spills which entered the ground through cracks or voids in the concrete floor. The extent of contamination is limited to an approximate 500 ft^2 area in the south central hotspot (B5) and an approximate 700 ft^2 area in the north central hotspot (13SB4). The vertical extent of contamination in both areas extends from the top of the fill surface to a maximum depth of 10 feet.

CVOC contamination in groundwater beneath the site is related to an off-site groundwater plume which appears to be migrating onto the property from the southeast. Some of the CVOCs (TCA) are off-gassing from the affected groundwater.
Elevated levels of SVOCs and metals are also present in fill materials throughout the Site.

Contaminant Release and Transport Mechanism

SVOC impacted soils are unlikely to undergo any significant migration due to the physical and chemical characteristics of the compounds. Although a slight correlation in SVOCs appears

between boring 13SB4 and monitoring well MW5 this is most likely an artifact of the well installation process.

CVOCs present in groundwater are volatilizing to air and contributing to elevated levels of contamination in soil gas across the Site, as seen in analytical results from all nine of the soil gas sampling locations. A correlation can be seen between the highest TCA levels in groundwater and the highest TCA levels in soil gas samples at some of the locations.

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 SVOCs, CVOCs and heavy metals through several routes. Workers excavating impacted soil may be exposed to SVOCs, and heavy metals through inhalation, ingestion and dermal contact. Workers excavating non-impacted soil may be exposed to CVOCs in soil gas 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 proposed buildings may be exposed to vapor intrusion if remediation of the source area is not completed, and if preventive measures are not incorporated into the new building design to protect against vapors migrating onto the site from an off-site source. This potential route of exposure will be reduced in response to the degree and success of source area remediation. However, vapor intrusion originating from off-site sources may continue to pose a threat if preventive measures are not taken.

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 off-gassing from impacted groundwater migrating beneath the Site. 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. Wallabout Channel is located approximately 4,700 feet west (sidegradient of the Site). Based upon the concentrations of CVOC contaminants currently in groundwater beneath the Site and the distance and position of the Site relative to Wallabout Channel, 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 Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.

2.7.2 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 migration of contaminants that would result in groundwater or surface water contamination.
- 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 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 SVOCs and metals in the native soils at the Site in the 12 foot interval it is expected that a Track 1 alternative will require excavation to a minimum depth of 8 feet across the site, with additional excavation of SVOC "hotspots" to a depth of 12 feet. Alternative 1 includes the installation of a waterproofing membrane/vapor barrier beneath the building foundation as part of the building construction. 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 2, remediation of all soils to restricted residential criteria to a depth of 15 feet below grade. This alternative would require excavation approximately 8 feet across the site with additional excavation to 12 feet below grade in one of the SVOC "hotspots". Alternative 2 includes the installation of a waterproofing membrane/vapor barrier beneath the building foundation as part of the building construction. This alternative does not allow the use of long-term institutional /engineering controls to meet soil cleanup objectives. Long-term institutional /engineering controls are allowed to address or prevent exposures from other impacted media however such as soil gas.

- Alternative 3 - Track 4, would include excavation of historic fill to that which is required to construct the basement level foundations of the new building. The Track 4 alternative will allow the use of site specific SCOs for remaining fill materials to avoid over-excavation and the excavation of soils from the portion of the lot not covered by the building footprint. 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 the installation of a waterproofing membrane/vapor barrier beneath the basement foundation of the new building.

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 will be protective of human health and the environment by eliminating the SVOC 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 will be eliminated by excavation of all historic fill soils and hot spot areas

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.

The proposed basement level will be more than one foot below the groundwater table, therefore it is not possible to operate an SSDS system to mitigate potential post-remediation exposures to on-site residents from soil vapors. 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).

3.1.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 1 will achieve compliance with the remedial goals, SCGs and RAOs for soil through removal to Track 1 unrestricted cleanup levels. SCGs for groundwater may not be achieved as impacted groundwater has been shown to be migrating on to the property from an upgradient source. 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 impacts is eliminated though risk from groundwater may still remain. 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 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by meeting unrestricted objectives. The removal/remediation of on-site soil will 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 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, 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 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. Note that excavation to this depth will require both shoring and dewatering.

3.1.7 Cost

Costs associated with Alternative 1 are estimated at approximately $1,067,879. This cost estimate includes the following elements and assumptions:

- Excavate to a minimum depth of 8 feet across the Site with additional excavation to 12 feet beneath the building foundations. Over-excavate as necessary to remediate hot-spot areas to a minimum depth of 12 feet and meet unrestricted SCOs for all remaining soil;
- Additional shoring to allow excavation to the lot line to a depth of 8 feet or greater;
- Construction dewatering as needed for excavation with additional dewatering to allow excavation below the water table to the lot line;
- Disposal of approximately 5,524 cy of petroleum contaminated and historic fill soil as non-hazardous;
- Disposal of approximately 1,899 cy of clean soil for construction of the building's basement foundations;
- Backfilling with approximately 1,767 cy of certified clean fill to return the rear parking lot area to construction grade;
- Installation of a waterproofing membrane beneath the foundations of the new buildings;
- 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 C2-2 commercial overlay zoning. 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.

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 SVOC concentrations present in subsurface soils at the Site and by eliminating constituents related to historic fill above restricted residential criteria to a depth of 15 feet. The potential for human and environmental exposure to these constituents on-site will be eliminated by excavation of all soils with parameters in excess of restricted residential criteria to a depth of 15 feet, off-site disposal or on-site reuse excavated materials 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 waterproofing membrane/vapor barrier beneath the basement foundation. 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 cleanup levels for the top 15 feet. SCGs for groundwater may not be achieved as impacted groundwater has been shown to exist onsite as a result of soil impacts. 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 objectives to a depth of 15 feet. Under this Alternative risk from soil 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 objectives in the upper 15 feet. The removal/remediation of on-site soil 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 the lot line will require additional shoring and dewatering beyond that needed for construction purposes.

3.2.7 Cost

Costs associated with Alternative 2 are estimated at approximately $1,008,950. This cost estimate includes the following elements and assumptions:

- Excavate to a minimum depth of 8 feet across the Site with additional excavation to 12 feet beneath the building foundations. Over-excavate as necessary to remediate hot-spot areas to a minimum depth of 12 feet and meet restricted residential SCOs for all remaining soil above 15 ft;
- Additional shoring to allow excavation to the lot line to a depth of 8 feet or greater;
- Construction dewatering as needed for excavation with additional dewatering to allow excavation below the water table to the lot line;
- Disposal of approximately 5,524 cy of petroleum contaminated and historic fill soil as non-hazardous;
- Excavation of approximately 1,899 cy of clean soil for construction of the building's basement foundations with on-site reuse of approximately 1,767 cy;
- Backfilling with approximately 1,767 cy of clean soil from the foundation excavation to return the rear parking lot area to construction grade;
- Installation of a waterproofing membrane beneath the foundations of the new buildings;
- HASP and CAMP monitoring for the duration of the remedial activities.

3.2.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current R7A residential with a C2-2 commercial overlay zoning. Following remediation the Site will meet restricted residential use

objectives which is appropriate 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, it will be considered to be acceptable to the community.

3.3 REMEDIAL ALTERNATIVE 3

The following sections provide an evaluation of Alternative 3 based on the nine evaluation criteria as previously discussed.

3.3.1 Overall Protection of Human Health and the Environment

Alternative 3 will be protective of human health and the environment by eliminating contaminants present in subsurface soils above restricted residential criteria by excavation in accordance with the planned construction of the Site and by capping the remainder of the Site. The potential for human and environmental exposure to these constituents on-site will be eliminated by the excavation and / or capping of all soils with parameters above restricted residential criteria. Residual fill with parameters above restricted residential criteria which remain following construction excavation, will be effectively capped with the concrete foundation slab of the new building and paved rear parking area.

Potential post-remediation exposures to on-site residents from soil vapors would be addressed through the use of a waterproofing membrane/vapor barrier beneath the basement foundation and paved rear parking area. 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.

3.3.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 3 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 identified onsite. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.3.3 Long-term Effectiveness and Permanence

Alternative 3 achieves long term effectiveness and permanence by permanently removing and/or remediating all soils affected by Site contaminants above restricted residential objectives to a depth required for redevelopment. Under this Alternative, risk from soil impacts is eliminated for on-site residents. Alternative 3 will continue to meet RAOs for soil in the future, providing a permanent long-term solution for the Site.

3.3.4 Reduction in Toxicity, Mobility or Volume through Treatment

Alternative 3 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-site soil by meeting restricted residential objectives to a depth required for redevelopment. The removal/remediation of on-site soil will also reduce the toxicity, mobility, and volume of contaminants within on-site soil vapor.

3.3.5 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 3 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.

3.3.6 Implementability

The techniques, materials and equipment to implement Alternative 3 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 4 feet will not require shoring or dewatering.

3.3.7 Cost

Costs associated with Alternative 3 are estimated at approximately $730,753. This cost estimate includes the following elements and assumptions:

- Excavate as per the basement foundation plans for the new buildings to a depth of 12 feet at the Site;
- Construction dewatering as needed for excavation;
- Disposal of approximately 3,792 cy of historic fill soil as non-hazardous;
- Installation of waterproofing membrane/vapor barrier beneath new construction;
- HASP and CAMP monitoring for the duration of the remedial activities.

3.3.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current R7A residential with a C2-2 commercial overlay zoning. Following remediation the Site will meet restricted residential use objectives which is appropriate for its planned multi-tenant residential use. A groundwater use restriction will be required to prevent future exposure to affected groundwater.

3.3.9 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, it 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 2 alternative (Alternative 2) which consists of the removal of all SVOC contaminated soil "hotspots" present at the site through excavation to a depth of 12 feet. In addition all fill material to a depth of 15 feet with parameters above restricted residential SCOs will be removed from the Site and properly disposed of at an off-site facility.

Overall Protection of Public Health and the Environment

The recommended remedial action achieves protection of the public health and the environment by eliminating the identified release area with elevated concentrations of SVOCs in soil and all other parameters in historic fill above restricted residential criteria to a depth of 15 feet. The potential for human and environmental exposure to these constituents on-site will be eliminated by excavation of the all soils with parameters in excess of restricted residential criteria, disposing of excavated materials off-site and backfilling as needed with certified clean fill/topsoil. 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 groundwater 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 groundwater. The proposed action will effectively remove the source area and all historic fill soils resulting in compliance with SCGs for 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 or historic fill materials above restricted residential SCOs to a depth of 15 feet. Current groundwater quality at the site is impacted due to on-site migration from an off-site source. Under this remedy, risk from soil impacts is eliminated and risk from site-related groundwater impacts significantly reduced. The selected remedy will continue to meet RAOs for soil and groundwater 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 meeting restricted residential objectives for all on-site soil to a depth of 15 feet.

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 the selected remedy are estimated at approximately $1,008,950. This cost estimate includes the following elements and assumptions:

- Excavate to a minimum depth of 8 feet across the Site with additional excavation to 12 feet beneath the building foundations. Over-excavate as necessary to remediate hot-spot areas to a minimum depth of 12 feet and meet unrestricted SCOs for all remaining soil;
- Additional shoring to allow excavation to the lot line to a depth of 8 feet or greater;
- Additional dewatering to allow excavation below the water table to the lot line;
- Disposal of approximately 5,524 cy of petroleum contaminated and historic fill soil as non-hazardous;
- Excavation of approximately 1,899 cy of clean soil for construction of the building's basement foundations with on-site reuse of approximately 1,767 cy;

- Backfilling with approximately 1,767 cy of clean soil from the foundation excavation to return the rear parking lot area to construction grade;
- Installation of a waterproofing membrane beneath the foundations of the new buildings;
- HASP and CAMP monitoring for the duration of the remedial activities.

Community Acceptance

Public participation plays a large role in the BCP process. A fact sheet has been prepared and sent out to all interested parties as identified in the site contact list. A draft version of this document was placed in a local repository (NYSDEC Region 2 office and the Bushwick Branch of the Brooklyn Public Library,) and made available for public review and comment for a period of 45 days. No questions regarding the Site were raised regarding the proposed remedial action. 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 with a C2-2 commercial overlay zoning. 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/C2-2 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 59 Walton Street 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 September 2012, re-zoned the property from M3-2 commercial to R7A residential with a C2-2 commercial overlay. The preferred remedy will comply with applicable land use plans.

Surrounding Property Uses

The surrounding land use includes multi-family residential buildings to the north, east and west with vacant or underutilized commercial properties to the south. The adjacent properties to the south on Walton Street are currently used for commercial purposes but are being marketed for residential development following the change in zoning. The former Pfizer complex sites which consist of a series of large lots identified as inactive hazardous waste/Voluntary Cleanup Program sites are located 350 to 1,000 feet to the southeast.

The property is located in what has historically been a heavy manufacturing district. in response to a series of zoning changes from manufacturing and heavy commercial uses to residential with light commercial/retail use, the area has seen significant redevelopment as old industrial, commercial buildings and warehouses have been replaced by multi-family residential buildings. The Project's residential use blends perfectly with this pattern of development as the remaining commercial buildings are renovated or replaced with new residential contstruction.

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 has been prepared and is available for public review at the identified document repositories (NYSDEC Region 2 Office, Bushwick 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.

Since the goal of the remedy will achieve a residential level of cleanup and will remove contaminated materials from the community, the remedy poses no environmental justice concerns.

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 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 Marcy and Union Avenues. 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.

Proximity to floodplains

No portion of the Site is located within a designated flood zone area. The nearest moderate risk flood zone is located 1,350 feet to the east and nearest high risk flood zone is located 1,650 feet to the east.

Geography and geology of the Site

The selected remedy will excavate soil from the Site to a depths ranging from 8 to 12 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 consists of the removal of all SVOC contaminated soil from two "hotspot" areas in the former loading dock/truck ramp area and eastern portion of the former warehouse. In addition all fill material to a depth of 15 feet with parameters above restricted residential SCOs will be removed from the Site and properly disposed of at an off-site facility. This will be achieved by excavation of the building foundation areas to a depth of 12 feet with additional excavation of 3 to 8 feet in the remainder of the Site (rear recreation area). The remedy will include the following items:

1. Removal of SVOC impacted soil "hotspots" from the property.
2. Excavation of soil/fill exceeding Track 2 restricted residential SCOs as listed in **Table 1** to a depth of 15 feet below grade;
3. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
4. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of restricted residential SCOs;
5. 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;
6. 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.
7. Installation of a waterproofing membrane/vapor barrier beneath the buildings to be constructed on the Site.
8. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
9. 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.

A soil vapor investigation will be completed in the rear recreation area of the Site upon completion of redevelopment activities to determine whether a vapor intrusion concern remains at the Site. Results of the investigation will be submitted to the NYSDEC under separate cover.

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 Ms. Chawinie Miller. 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.

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 approved 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
Bushwick Street Branch
340 Bushwick Avenue at Seigal Street
Brooklyn, NY 11206
(718) 602-1348

Hours:

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

5.2 GENERAL REMEDIAL ACTION INFORMATION

5.2.1 Project Organization

The Project Manager for the Remedial Activity will be Ms. Kristen DiScenza. 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 removal and disposal of the SVOC impacted soil and historic fill material followed by confirmation sampling. The work is expected to take 4 weeks as part of the construction excavation and foundation installation.

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

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 Lorimer Street. Traffic related to on-going remedial activity will require the staging of 10-wheel dump trucks along Lorimer Street and Marcy Avenue on a daily basis during soil excavation activity. The soil disposal transport route will be as follows: ENTERING SITE - from the Brooklyn Queens Expressway take the Flushing Avenue exit (30) and head east on Flushing Avenue to Marcy Avenue. Turn left, heading north on Marcy Avenue 3 blocks to Lorimer Street. Turn right on Lorimer and the Site entrance on the right. EXITING SITE – head east on Lorimer Street to Union Avenue. Turn right heading south on Union Avenue tp Flushing Avenue. Turn left on Flushing Avenue and continue to the Brooklyn Queens Expressway on-ramp. A map showing the truck routes is included as **Figure 11**.

5.2.7 Worker Training and Monitoring

An excavation contractor will remove historic fill, and uncontaminated soil. The excavation contractor's on-site personnel will have a minimum of 24 hour Hazardous Waste Operations and Emergency Response Operations training.

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 17**. 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 18**. 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 $975,427. An itemized and detailed 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 be installed in accordance with the New York Guidelines for Urban Erosion and Sediment Control. Haybales and/or silt fence will be placed by the remedial contractor at locations surrounding excavation areas and within the perimeter fencing as needed, to control stormwater runoff and surface water from exiting the excavation. These control measures will be installed prior to initiating the soil excavation.

5.3.3 Stabilized Construction Entrance(s)

Stabilized construction entrances will be installed at all points of vehicle ingress and egress to the Site. The stabilized entrances will be constructed of a 4 to 6-inch bed of crushed stone or crushed concrete which will be sloped back toward the interior of the Site. The stabilized entrances will be inspected on a daily basis during soil loading activities and reinforced as needed with additional stone/concrete material to prevent the accumulation of ruts, mud or soil.

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

A temporary truck decontamination pad will be constructed to decontaminate trucks and other vehicles/equipment leaving the Site. The pad will be constructed by placing a stone aggregate

such as crushed rock or concrete. The pad will be bermed at the sides and sloped back to the interior of the Site. The truck pad will be sized to accommodate the largest construction vehicle used and located in line with the stabilized construction entrance.

5.3.8 Site Fencing

An 8-foot high temporary construction fence will be installed along Marcy Avenue and Lorimer Street with entrance / egress gates located on each. 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 soil beneath the planned building foundations to a depth of 12 feet below grade and historic fill materials which are present through out the site to a depth of 8 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. Removal of the SVOC impacted soil will be performed by a qualified remedial contractor and fully trained personnel (40HR OSHA HAZWOPER). 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 native soils will be performed by the excavation contractor for the construction project.

The selected remedial action includes the excavation of soil within the identified SVOC "hotspot" area to a depth of 12 feet and the excavation of historic fill materials to a depth of approximately 8 feet throughout the Site or as needed to achieve restricted residential SCOs.

Due to the presence of groundwater between 5-7 feet below grade, dewatering is anticipated for the excavation of contaminated areas and for foundation construction.

6.1 CONTINGENCY - UST REMOVAL METHODS

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 15** 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 8**.

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 (VOCs, SVOCs and metals).

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.

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 VOCs and SVOCs according to EPA method 8260/8270BN 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 2. 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 to a depth of 5 to 8 feet below grade. It is expected that approximately 5,524 cubic yards (8,286 tons) of historic fill classified as non-hazardous will be excavated from the site for off-site disposal.

Additional excavation of clean native soil will be required beneath the planned building foundations. This will generate approximately 1,899 cy (2848 tons) of clean soil, 1,767 cy of which can be re-used on site to backfill the rear recreation area, assuming this soil meets restricted residential SCOs. Assuming all of clean soil excavated from the building foundations meets RR SCOs, then approximately 132 cy of clean soil will require off-site disposal.

6.5 SOIL/MATERIALS MANAGEMENT PLAN

6.5.1 Excavation of SVOC Contaminated Soils

SVOC impacted soil has been documented within two hotspot areas near the former loading dock/truck ramp area and eastern portion of the former warehouse. The vertical extent is limited to 12 feet below existing grade.

Excavated soil 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.

The final determination on classification will be based on the results of waste characterization analysis and the NYSDEC.

Soil excavation will be performed in accordance with the procedures described under Section 5.5 of DER-10 as follows:

- A description and photographic documentation of the excavation.
- 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).

Final excavation depth, length, and width will be determined by the Remedial Engineer or his designee, and will depend on the horizontal and vertical extent of contaminated soils as identified through physical examination (PID response, odor, staining, etc.). Expansion of the excavation beyond the planned hotspot area is anticipated and can easily be accommodated.

The following procedure will be used for the excavation of impacted soil (as necessary and appropriate):

- Wear appropriate health and safety equipment as outlined in the HASP;

- Prior to excavation, ensure that the area is clear of utility lines or other obstructions. Lay plastic sheeting on the ground next to the area to be excavated;

- Using a rubber-tired backhoe or track mounted excavator, remove overburden soils and stockpile or dispose of separate from the impacted soil;

- If USTs are discovered, the NYSDEC will be notified and the best course of action to remove the structure should be determined in the field. This may involve the continued removal of overburden to access the top of the structure or continued trenching around the perimeter to minimize its disturbance;

- If physically contaminated soil is present (e.g., staining, odors, sheen, PID response, etc), an attempt will be made to remove it to the extent not limited by the site boundaries. If possible, physically impacted soil will be removed using the backhoe or excavator, segregated from clean soils and overburden, and staged on separate dedicated plastic sheeting or live loaded into trucks from the disposal facility. Removal of the impacted soils will continue until visibly clean material is encountered and monitoring instruments indicate that no contaminants are present;

- Excavated soils which are temporarily stockpiled on-site will be covered with 6-mil polyethylene sheeting while disposal options are determined. Sheeting will be checked on a daily basis and replaced, repaired or adjusted as needed to provide full coverage. The sheeting will be shaped and secured in such a manner as to drain runoff and direct it toward the interior of the property;

- Once the Remedial Engineer is satisfied with the removal effort, verification or confirmatory samples will be collected from the excavation as described in **Section 6.3** of this document.

The excavation of SVOC contaminated areas will be performed by a qualified remedial contractor and fully trained personnel (40HR OSHA HAZWOPER).

6.5.2 Excavation of Historic Fill Materials

Historic fill has been identified throughout most of the site to a depth of approximately 5-8ft 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.

6.5.3 Excavation of Native Soils

Native soils are present directly below the fill materials and will not require excavation for the construction of the new building. 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.

6.5.4 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.

6.5.5 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.

6.5.6 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 hotspot 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 hotspot or 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.

6.5.7 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 Flushing Avenue exit (30) and head east on Flushing Avenue to Marcy Avenue. Turn left, heading north on Marcy Avenue 3 blocks to Lorimer Street. Turn right on Lorimer and the Site entrance on the right. EXITING SITE – head east on Lorimer Street to Union Avenue. Turn right heading south on Union

Avenue to Flushing Avenue. Turn left on Flushing Avenue and continue to the Brooklyn Queens Expressway on-ramp. A map showing the truck routes is included as **Figure 11**.

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.

6.5.8 Materials Disposal Off-Site

Multiple disposal facility designations will 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 5,524 cubic yards including both SVOC impacted soil and historic fill.

All petroleum contaminated and 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 petroleum contaminated soils and 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 and contaminated soils 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. basement levels) will be handled as unregulated or beneficial use disposal. This soil will undergo a testing program to confirm that it meets unrestricted SCOs or residential / groundwater protection SCOs prior to unregulated disposal or meets restricted residential SCOs prior to 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, parking areas 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. Asphalt removed from the parking areas will be sent to a separate recycling facility.

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.

6.5.9 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 and contaminated soil, 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.

6.5.10 Fluids Management

As the depth to groundwater at the site is approximately 5 feet below grade, dewatering operations will likely be employed during construction. 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.

6.5.11 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.

6.5.12 Stormwater Pollution Prevention

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering. Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area.

6.5.13 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.

6.5.14 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 complete CAMP developed for this site is included in **Attachment F** or this Work Plan.

6.5.15 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."

6.5.15.1 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.

6.5.15.2 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.

6.5.15.3 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 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 IC is 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.

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:

- Waterproofing membrane / vapor barrier beneath the new buildings to be constructed on the Site.

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

8.0 ENGINEERING CONTROLS

8.1 VAPOR BARRIER/WATERPROOFING MEMBRANE

The waterproofing membrane for all submerged sub-grade building elements areas including elevator shafts, basement slabs and walls will be the Preprufe 300R system as manufactured by Grace or equivalent system. Preprufe 300 is a 1.2 mm (0.046 in) thick HDPE film with a pressure sensitive adhesive that bonds to the poured concrete. It is suitable for both under slab and vertical wall applications. Exterior wall sections above the water line will be utilize Preprufe 160R, or a functionally equivalent waterproofing / vapor barrier system.

The work will be inspected as necessary to meet the requirements of the product warranty. The waterproofing membrane/vapor barrier will extend throughout the basement foundations. The specifications for installation will be provided to the construction management company and the foundation contractor or installer of the liner.

An EBC field inspector under the direct supervision of a professional engineer will inspect and photograph the waterproofing membrane/vapor barrier at several critical stages before during and after the installation is complete.

9.0 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.

9.1 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;
- 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.

9.2 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.

The Site Management Plan in the Final Engineering Report will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site-wide performance of the remedy. Appropriately placed groundwater monitor wells will also be installed immediately down-gradient of all volatile organic carbon remediation areas for the purpose of evaluation of the effectiveness of the remedy that is implemented.

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.

10.0 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 Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that

shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual 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 residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs 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).

10.1 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

11.0 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. Mobilization will be followed by removal and disposal of the SVOC impacted soil and historic fill material followed by confirmation sampling. The work is expected to take approximately 4 weeks as part of the construction excavation and foundation installation. The schedule of tasks completed under this RAWP is as follows:

Conduct pre-construction meeting with NYSDEC	Within 1 week of RAWP approval
Mobilize equipment to the site and construct truck pad and other designated areas	Within 1 week following the pre-construction meeting
Mobilize Excavation Contractor and equipment to the Site	Within 1 week following Site prep and truck pad construction
Begin excavation of historic fill	Immediately following mobilization
Complete excavation and disposal of historic fill soils and SVOC "hotspots".	Within 6 weeks of mobilization
Perform endpoint verification of entire site	Performed in sequence as final depth of each excavated area is complete.

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
Former Pfizer & Co. Site
407 Marcy Avenue, Brooklyn NY 11206
SUMMARY OF SAMPLING PROGRAM RATIONALE AND ANALYSIS

Matrix	Location	Number of Samples	Rationale for Sampling	Laboratory Analysis
Subsurface soil (0 to 20 feet bgs)	16 borings throughout the site.	31	To supplement previous sampling and delineate SVOC and CVOC (if present) affected soil at the Site.	VOCs EPA Method 8260B plus TICs, SVOCS EPA Method 8270BN plus TICs
Subsurface soil (0 to 15 feet bgs)	8 of the above borings.	14	To evaluate soil quality of urban fill materials and native soil below across the Site.	Pesticides / PCBs EPA Method 8081/8082, TAL metals.
Total (Soils)		45		
Groundwater (water table)	From 10 monitoring wells across the Site.	10	To supplement previous sampling and delineate VOC affected groundwater.	VOCs EPA Method 8260B plus TICs, SVOCs EPA Method 8270 plus TICs, pesticide / PCBs EPA Method 8081/8082, TAL metals dissolved and total.
Total (Groundwater)		10		
Soil Gas (3-6 ft below existing grade)	9 soil gas implants to be installed around perimeter of Site.	9	Evaluate soil gas at perimeter of Site.	VOCs EPA Method TO15
Total (Soil Gas)		9		
MS/MSD	Matrix spike and Matrix spike duplicates at the rate 5%	2	To meet requirements of QA / QC program	1 MS/MSD for VOCs EPA Method 8260B and 1 MS/MSD for SVOCs EPA Method 8270 BN, pesticide / PCBs EPA Method 8081/8082, TAL metals.
Trip Blanks	One laboratory prepared trip blank to accompany samples each time they are delivered to the laboratory.	2	To meet requirements of QA / QC program	VOCs EPA Method 8260B
Total (QA / QC Samples)		4		

TABLE 3
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, NY
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*	13SB1				13SB2				13SB3				13SB4				13SB5				13SB6			
			(7-10') µg/Kg		(18-20') µg/Kg		(7-10') µg/Kg		(13-15') µg/Kg		(8-10') µg/Kg		(13-15') µg/Kg		(8-10') µg/Kg		(13-15') µg/Kg		(10-12') µg/Kg		(13-15') µg/Kg		(10-12') µg/Kg			
			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-Trichloroethane	680	100,000	ND	7.6	ND	7.1	2.9	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,1,2,2-Tetrachloroethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,1,2-Trichloroethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,1-Dichloroethane	270	26,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,1-Dichloroethene	330	100,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,2,3-Trichlorobenzene			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,2,4-Trichlorobenzene			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,2-Dibromo-3-chloropropane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,2-Dibromoethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,2-Dichlorobenzene	1,100	100,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,2-Dichloroethane	20	3,100	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,2-Dichloropropane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,3-Dichlorobenzene	2,400	4,900	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
1,4-Dichlorobenzene	1,800	13,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
2-Hexanone (Methyl Butyl Ketone)			ND	38	ND	36	ND	53	ND	49	ND	32	ND	34	ND	5900	ND	60	ND	29	ND	50	ND	35		
4-Methyl-2-Pentanone			ND	38	ND	36	ND	53	ND	49	ND	32	ND	34	ND	5900	ND	60	ND	29	ND	50	ND	35		
Acetone	50	100,000	19	46	9.2	43	62	110	22	49	16	38	22	41	ND	12000	15	48	13	35	20	100	10	71		
Benzene	60	4,800	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Bromochloromethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Bromodichloromethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Bromoform			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Bromomethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Carbon Disulfide			ND	7.6	ND	7.1	1.7	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	4	5.8	3	10	6.4	7.1		
Carbon tetrachloride	760	2,400	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Chlorobenzene	1,100	100,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Chloroethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Chloroform	370	49,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Chloromethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
cis-1,2-Dichloroethene	250	100,000	ND	7.6	5.7	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	41	7.1		
cis-1,3-Dichloropropene			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Cyclohexane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Dibromochloromethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Dichlorodifluoromethane		100,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Ethylbenzene	1,000	41,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	260	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Isopropylbenzene			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
m&p-Xylenes	260		ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	480	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Methyl Ethyl Ketone (2-Butanone)	120	100,000	ND	46	ND	43	12	63	ND	59	ND	38	ND	41	ND	7100	ND	72	ND	35	ND	60	ND	43		
Methyl t-butyl ether (MTBE)	930	100,000	ND	15	ND	14	ND	21	ND	20	ND	13	ND	14	ND	2400	ND	24	ND	12	ND	20	ND	14		
Methylacetate			ND	7.6	ND	7.1	ND	11	ND	10	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Methylcyclohexane			ND	7.6	ND	7.1	ND	11	ND	10	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Methylene chloride	50	100,000	ND	7.6	ND	7.1	2.4	11	ND	9.8	ND	6.4	ND	6.9	1,400	1200	ND	12	ND	5.8	ND	10	ND	7.1		
o-Xylene	260	100,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Styrene			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Tetrachloroethene	1,300	19,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Toluene	700	100,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	210	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Total Xylenes			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	480	1200	ND	12	ND	5.8	ND	10	ND	7.1		
trans-1,2-Dichloroethene	190	100,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	2.4	7.1		
trans-1,3-Dichloropropene			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Trichloroethene	470	21,000	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	26	7.1		
Trichlorofluoromethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Trichlorotrifluoroethane			ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Vinyl Chloride	20	900	ND	7.6	ND	7.1	ND	11	ND	9.8	ND	6.4	ND	6.9	ND	1200	ND	12	ND	5.8	ND	10	ND	7.1		
Total BTEX Concentration			0.0		0.0		0.0		0.0		0.0		0.0		470		0.0		0.0		0.0		0.0			
Total VOCs Concentration			19		14.9		81		22		16		22		2830		15		17		23		85.8			

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	13SB7				13SB8				13SB9			
			(8-10') µg/Kg		(13-15') µg/Kg		(8-10') µg/Kg		(13-15') µg/Kg		(10-12') µg/Kg		(13-15') µg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1,1-Trichloroethane	680	100,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
1,1,2,2-Tetrachloroethane			ND	9.2	ND	4.9	ND	330	ND	5.9	ND	5.5	ND	4.5
1,1,2-Trichloroethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
1,1-Dichloroethane	270	26,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
1,1-Dichloroethene	330	100,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
1,2,3-Trichlorobenzene			ND	9.2	ND	4.9	ND	330	ND	5.9	ND	5.5	ND	4.5
1,2,4-Trichlorobenzene			ND	9.2	ND	4.9	ND	330	ND	5.9	ND	5.5	ND	4.5
1,2-Dibromo-3-chloropropane			ND	9.2	ND	4.9	ND	330	ND	5.9	ND	5.5	ND	4.5
1,2-Dibromoethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
1,2-Dichlorobenzene	1,100	100,000	ND	9.2	ND	4.9	ND	330	ND	5.9	ND	5.5	ND	4.5
1,2-Dichloroethane	20	3,100	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
1,2-Dichloropropane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
1,3-Dichlorobenzene	2,400	4,900	ND	9.2	ND	4.9	ND	330	ND	5.9	ND	5.5	ND	4.5
1,4-Dichlorobenzene	1,800	13,000	ND	9.2	ND	4.9	ND	330	ND	5.9	ND	5.5	ND	4.5
2-Hexanone (Methyl Butyl Ketone)			ND	46	ND	25	ND	53	ND	29	ND	27	ND	22
4-Methyl-2-Pentanone			ND	46	ND	25	ND	53	ND	29	ND	27	ND	22
Acetone	50	100,000	69	92	8.5	49	150	110	19	29	25	27	77	45
Benzene	60	4,800	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Bromochloromethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Bromodichloromethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Bromoform			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Bromomethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Carbon Disulfide			ND	9.2	ND	4.9	8.2	11	ND	5.9	2.3	5.5	1.4	4.5
Carbon tetrachloride	760	2,400	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Chlorobenzene	1,100	100,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Chloroethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Chloroform	370	49,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Chloromethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
cis-1,2-Dichloroethene	250	100,000	2.4	9.2	ND	4.9	3.3	11	ND	5.9	ND	5.5	16	4.5
cis-1,3-Dichloropropene			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Cyclohexane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Dibromochloromethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Dichlorodifluoromethane		100,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Ethylbenzene	1,000	41,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Isopropylbenzene			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
m&p-Xylenes	260		ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Methyl Ethyl Ketone (2-Butanone)	120	100,000	15	55	ND	30	26	64	ND	35	ND	33	ND	27
Methyl t-butyl ether (MTBE)	930	100,000	ND	18	ND	9.9	ND	21	ND	12	ND	11	ND	9
Methylacetate			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Methylcyclohexane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Methylene chloride	50	100,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
o-Xylene	260	100,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Styrene			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Tetrachloroethene	1,300	19,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Toluene	700	100,000	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Total Xylenes			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
trans-1,2-Dichloroethene	190	100,000	2.4	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
trans-1,3-Dichloropropene			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Trichloroethene	470	21,000	1.6	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Trichlorofluoromethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Trichlorotrifluoroethane			ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Vinyl Chloride	20	900	ND	9.2	ND	4.9	ND	11	ND	5.9	ND	5.5	ND	4.5
Total BTEX Concentration			0.0		0.0		0.0		0.0		0.0		0.0	
Total VOCs Concentration			84		12.5		184.2		22.3		27.3		94.4	

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
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, NY
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*	13SB10		13SB11		13SB12		13SB13		13SB14		13SB15		13SB16		Duplicate
			(7-10') µg/Kg	(18-20') µg/Kg	(8-10') µg/Kg	(13-15') µg/Kg	(7-9') µg/Kg	(13-15') µg/Kg	(8-10') µg/Kg	(13-15') µg/Kg	(8-10') µg/Kg	(13-15') µg/Kg	(8-10') µg/Kg	(13-15') µg/Kg	(8-10') µg/Kg	(13-15') µg/Kg	µg/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-Trichloroethane	680	100,000	ND 7.3	ND 6.7	2.8 8.6	ND 13	39 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,1,2,2-Tetrachloroethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,1,2-Trichloroethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,1-Dichloroethane	270	26,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,1-Dichloroethene	330	100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,2,3-Trichlorobenzene			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,2,4-Trichlorobenzene			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,2-Dibromo-3-chloropropane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,2-Dibromoethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,2-Dichlorobenzene	1,100	100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,2-Dichloroethane	20	3,100	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,2-Dichloropropane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,3-Dichlorobenzene	2,400	4,900	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
1,4-Dichlorobenzene	1,800	13,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
2-Hexanone (Methyl Butyl Ketone)			ND 36	ND 34	ND 43	ND 65	ND 35	ND 46	ND 44	ND 48	ND 34	ND 42	ND 36	ND 34	ND 65	ND 35	ND 1700
4-Methyl-2-Pentanone			ND 36	ND 34	ND 43	ND 65	ND 35	ND 46	ND 44	ND 48	ND 34	ND 42	ND 36	ND 34	ND 65	ND 35	ND 1700
Acetone	50	100,000	32 36	8 34	22 43	50 50	ND 50	19 46	35 44	17 48	21 41	14 42	43 43	54 67	380 130	210 69	ND 3500
Benzene	60	4,800	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Bromochloromethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Bromodichloromethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Bromoform			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Bromomethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Carbon Disulfide			ND 7.3	ND 6.7	3.1 8.6	ND 13	ND 7	2.4 9.1	4.1 8.9	ND 9.5	2.8 6.8	ND 8.4	9.5 7.1	1.4 6.7	4.3 13	1.3 6.9	ND 350
Carbon tetrachloride	760	2,400	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Chlorobenzene	1,100	100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Chloroethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Chloroform	370	49,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Chloromethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
cis-1,2-Dichloroethene	250	100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
cis-1,3-Dichloropropene			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Cyclohexane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Dibromochloromethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Dichlorodifluoromethane		100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Ethylbenzene	1,000	41,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Isopropylbenzene			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
m&p-Xylenes	260		ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Methyl Ethyl Ketone (2-Butanone)	120	100,000	ND 44	ND 40	ND 52	ND 78	ND 42	ND 55	ND 53	ND 57	ND 41	ND 51	ND 43	6.1 40	96 78	52 42	ND 2100
Methyl t-butyl ether (MTBE)	930	100,000	ND 15	ND 13	ND 17	ND 26	ND 14	ND 18	ND 18	ND 19	ND 14	ND 17	ND 14	ND 13	ND 26	ND 14	ND 690
Methylacetate			ND 7.3	ND 7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 10	ND 6.8	ND 8	ND 7.1	ND 6.7	ND 13	ND 7	ND 350
Methylcyclohexane			ND 7.3	ND 7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 10	ND 6.8	ND 8	ND 7.1	ND 6.7	ND 13	ND 7	ND 350
Methylene chloride	50	100,000	ND 7.3	ND 6.7	1.7 8.6	7.9 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	470 350
o-Xylene	260	100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Styrene			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Tetrachloroethene	1,300	19,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Toluene	700	100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Total Xylenes			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
trans-1,2-Dichloroethene	190	100,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
trans-1,3-Dichloropropene			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Trichloroethene	470	21,000	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Trichlorofluoromethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Trichlorotrifluoroethane			ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
Vinyl Chloride	20	900	ND 7.3	ND 6.7	ND 8.6	ND 13	ND 7	ND 9.1	ND 8.9	ND 9.5	ND 6.8	ND 8.4	ND 7.1	ND 6.7	ND 13	ND 6.9	ND 350
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
Total VOCs Concentration			32	8	29.6	57.9	39	21.4	39.1	17	23.8	14	52.5	61.5	480.3	263.3	470

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 5
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, NY
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*	13SB1				13SB2				13SB3				13SB4				13SB5				13SB6			
			(7-10') µg/Kg		(18-20') µg/Kg		(7-10') µg/Kg		(13-15') µg/Kg		(8-10') µg/Kg		(13-15') µg/Kg		(8-10') µg/Kg		(13-15') µg/Kg		(10-12') µg/Kg		(13-15') µg/Kg		(10-12') µg/Kg			
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL		
1,1-Biphenyl			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	13,000	2700	ND	280	280	290	ND	280	ND	290		
1,2,4,5-Tetrachlorobenzene			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2,3,4,6-Tetrachlorophenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2,4,5-Trichlorophenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2,4,6-Trichlorophenol			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
2,4-Dichlorophenol			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
2,4-Dimethylphenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2,4-Dinitrophenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2,4-Dinitrotoluene			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
2,6-Dinitrotoluene			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
2-Chloronaphthalene			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2-Chlorophenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2-Methylnaphthalene			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	46,000	2700	ND	280	800	290	ND	280	ND	290		
2-Methylphenol (o-cresol)	330	100,000	ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
2-Nitroaniline			ND	1900	ND	2000	ND	2200	ND	1900	ND	2200	ND	2000	ND	19000	ND	2000	ND	2100	ND	2000	ND	2100		
2-Nitrophenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
3&4-Methylphenol (m&p-cresol)	330	100,000	ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	3,900	2700	ND	280	ND	290	ND	280	ND	290		
3,3'-Dichlorobenzidine			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
3-Nitroaniline			ND	1900	ND	2000	ND	2200	ND	1900	ND	2200	ND	2000	ND	19000	ND	2000	ND	2100	ND	2000	ND	2100		
4,6-Dinitro-2-methylphenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
4-Bromophenyl phenyl ether			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
4-Chloro-3-methylphenol			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
4-Chloroaniline			ND	770	ND	790	ND	900	ND	780	ND	870	ND	820	ND	7800	ND	790	ND	840	ND	790	ND	820		
4-Chlorophenyl phenyl ether			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
4-Nitroaniline			ND	1900	ND	2000	ND	2200	ND	1,900	ND	2200	ND	2000	ND	19000	ND	2,000	ND	2100	ND	2,000	ND	2100		
4-Nitrophenol			ND	1900	ND	2000	ND	2200	ND	1900	ND	2200	ND	2000	ND	19000	ND	2000	ND	2100	ND	2000	ND	2100		
Acenaphthene	20,000	100,000	ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	50,000	2700	ND	280	2,000	290	ND	280	ND	290		
Acenaphthylene	100,000	100,000	ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	12,000	1600	ND	160	250	170	ND	160	ND	160		
Acetophenone			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Anthracene	100,000	100,000	ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	120,000	2700	ND	280	4,300	290	ND	280	ND	290		
Atrazine			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
Benzo(a)anthracene	1,000	1,000	440	270	ND	280	ND	310	ND	270	ND	300	ND	290	170,000	2700	ND	280	8,700	290	ND	280	ND	290		
Benzaldehyde			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Benzo(a)pyrene	1,000	1,000	540	150	ND	160	ND	180	ND	160	ND	170	ND	160	120,000	1600	ND	160	6,600	170	ND	160	ND	160		
Benzo(b)fluoranthene	1,000	1,000	670	270	ND	280	ND	310	ND	270	ND	300	ND	290	150,000	2700	ND	280	8,300	290	ND	280	ND	290		
Benzo(g,h,i)perylene	100,000	100,000	320	270	ND	280	ND	310	ND	270	ND	300	ND	290	45,000	2700	ND	280	3,600	290	ND	280	ND	290		
Benzo(k)fluoranthene	800	3,900	220	270	ND	280	ND	310	ND	270	ND	300	ND	290	46,000	2700	ND	280	2,800	290	ND	280	ND	290		
Butyl benzyl phthalate			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Bis(2-chloroethoxy)methane			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Bis(2-chloroethyl)ether			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
Bis(2-chloroisopropyl)ether			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Bis(2-ethylhexyl)phthalate			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Caprolactam			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Carbazole			ND	1900	ND	2000	ND	2200	ND	1900	ND	2200	ND	2000	60,000	19000	ND	2000	1,900	2100	ND	2000	ND	2100		
Chrysene	1,000	3,900	500	270	ND	280	ND	310	ND	270	ND	300	ND	290	140,000	2700	ND	280	7,800	290	ND	280	ND	290		
Dibenzo(a,h)anthracene	330	330	ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	16,000	1600	ND	160	1,200	170	ND	160	ND	160		
Dibenzofuran			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	42,000	2700	ND	280	1,500	290	ND	280	ND	290		
Diethyl phthalate			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Dimethyl phthalate			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Di-n-butylphthalate			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Di-n-octylphthalate			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Fluoranthene	100,000	100,000	660	270	ND	280	ND	310	ND	270	ND	300	ND	290	420,000	2700	ND	280	22,000	290	ND	280	250	290		
Fluorene	30,000	100,000	ND	270	ND	280	300	310	ND	270	ND	300	ND	290	74,000	2700	ND	280	2,300	290	ND	280	190	290		
Hexachlorobenzene			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
Hexachlorobutadiene			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Hexachlorocyclopentadiene			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Hexachloroethane			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
Indeno(1,2,3-cd)pyrene	500	500	270	270	ND	280	ND	310	ND	270	ND	300	ND	290	50,000	2700	ND	280	3,100	290	ND	280	ND	290		
Isophorone			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
Naphthalene	12,000	100,000	ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	140,000	2700	ND	280	1,300	290	ND	280	ND	290		
Nitrobenzene			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
N-Nitrosodimethylamine			ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
N-Nitrosodi-n-propylamine			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
N-Nitrosodiphenylamine			ND	150	ND	160	ND	180	ND	160	ND	170	ND	160	ND	1600	ND	160	ND	170	ND	160	ND	160		
Pentachlorophenol	800	6,700	ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Phenanthrene	100,000	100,000	270	150	ND	160	810	180	ND	160	ND	170	ND	160	510,000	1600	ND	160	22,000	170	ND	160	210	160		
Phenol	330	100,000	ND	270	ND	280	ND	310	ND	270	ND	300	ND	290	ND	2700	ND	280	ND	290	ND	280	ND	290		
Pyrene	100,000	100,000	760	270	ND	280	ND	310	ND	270	ND	300	ND	290	380,000	2700	ND	280	22,000	290	ND	280	220	290		

COMPOUND	13SB7				13SB8				13SB9			
	(8-10') µg/Kg		(13-15') µg/Kg		(8-10') µg/Kg		(13-15') µg/Kg		(10-12') µg/Kg		(13-15') µg/Kg	
	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
1,1-Biphenyl	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
1,2,4,5-Tetrachlorobenzene	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2,3,4,6-Tetrachlorophenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2,4,5-Trichlorophenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2,4,6-Trichlorophenol	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
2,4-Dichlorophenol	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
2,4-Dimethylphenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2,4-Dinitrophenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2,4-Dinitrotoluene	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
2,6-Dinitrotoluene	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
2-Chloronaphthalene	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2-Chlorophenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2-Methylnaphthalene	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2-Methylphenol (o-cresol)	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
2-Nitroaniline	ND	2300	ND	2000	ND	2200	ND	1900	ND	2100	ND	1900
2-Nitrophenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
3&4-Methylphenol (m&p-cresol)	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
3,3'-Dichlorobenzidine	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
3-Nitroaniline	ND	2300	ND	2000	ND	2200	ND	1900	ND	2100	ND	1900
4,6-Dinitro-2-methylphenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
4-Bromophenyl phenyl ether	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
4-Chloro-3-methylphenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
4-Chloroaniline	ND	910	ND	810	ND	870	ND	750	ND	860	ND	760
4-Chlorophenyl phenyl ether	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
4-Nitroaniline	ND	2300	ND	2000	ND	2200	ND	1900	ND	2100	ND	1900
4-Nitrophenol	ND	2300	ND	2000	ND	2200	ND	1900	ND	2100	ND	1900
Acenaphthene	ND	320	ND	280	220	300	ND	260	ND	300	ND	270
Acenaphthylene	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Acetophenone	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Anthracene	ND	320	ND	280	380	300	ND	260	ND	300	ND	270
Atrazine	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Benzo(a)anthracene	ND	320	ND	280	820	300	ND	260	240	300	ND	270
Benzaldehyde	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Benzo(a)pyrene	ND	180	ND	160	740	170	ND	150	220	170	ND	150
Benzo(b)fluoranthene	ND	320	ND	280	950	300	ND	260	290	300	ND	270
Benzo(g,h,i)perylene	ND	320	ND	280	340	300	ND	260	ND	300	ND	270
Benzo(k)fluoranthene	ND	320	ND	280	350	300	ND	260	ND	300	ND	270
Butyl benzyl phthalate	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Bis(2-chloroethoxy)methane	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Bis(2-chloroethyl)ether	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Bis(2-chloroisopropyl)ether	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Bis(2-ethylhexyl)phthalate	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Caprolactam	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Carbazole	ND	2300	ND	2000	ND	2200	ND	1900	ND	2100	ND	1900
Chrysene	ND	320	ND	280	910	300	ND	260	220	300	ND	270
Dibenzo(a,h)anthracene	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Dibenzofuran	ND	320	ND	280	170	300	ND	260	ND	300	ND	270
Diethyl phthalate	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Dimethyl phthalate	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Di-n-butylphthalate	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Di-n-octylphthalate	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Fluoranthene	ND	320	ND	280	1,900	300	ND	260	510	300	ND	270
Fluorene	ND	320	ND	280	190	300	ND	260	ND	300	ND	270
Hexachlorobenzene	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Hexachlorobutadiene	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Hexachlorocyclopentadiene	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Hexachloroethane	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Indeno(1,2,3-cd)pyrene	ND	320	ND	280	330	300	ND	260	ND	300	ND	270
Isophorone	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Naphthalene	ND	320	ND	280	340	300	ND	260	ND	300	ND	270
Nitrobenzene	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
N-Nitrosodimethylamine	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
N-Nitrosodi-n-propylamine	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
N-Nitrosodiphenylamine	ND	180	ND	160	ND	170	ND	150	ND	170	ND	150
Pentachlorophenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Phenanthrene	ND	180	ND	160	1,900	170	ND	150	480	170	ND	150
Phenol	ND	320	ND	280	ND	300	ND	260	ND	300	ND	270
Pyrene	ND	320	ND	280	1,700	300	ND	260	450	300	ND	270

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

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

ND - Not-detected

NA - Not Analyzed

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

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

TABLE 6
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, NY
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*	13SB10 (7-10') µg/Kg		13SB10 (18-20') µg/Kg		13SB11 (8-10') µg/Kg		13SB11 (13-15') µg/Kg		13SB12 (7-9') µg/Kg		13SB12 (13-15') µg/Kg		13SB13 (8-10') µg/Kg		13SB13 (13-15') µg/Kg		13SB14 (8-10') µg/Kg		13SB14 (13-15') µg/Kg		13SB15 (8-10') µg/Kg		13SB15 (13-15') µg/Kg		13SB16 (8-10') µg/Kg		13SB16 (13-15') µg/Kg		Duplicate µg/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	Result	RL
1,1-Biphenyl			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
1,2,4,5-Tetrachlorobenzene			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2,3,4,6-Tetrachlorophenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2,4,5-Trichlorophenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2,4,6-Trichlorophenol			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
2,4-Dichlorophenol			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
2,4-Dimethylphenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2,4-Dinitrophenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2,4-Dinitrotoluene			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
2,6-Dinitrotoluene			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
2-Chloronaphthalene			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2-Chlorophenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2-Methylnaphthalene			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	**140**	270	ND	280	ND	320	ND	300	ND	300
2-Methylphenol (o-cresol)	330	100,000	ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
2-Nitroaniline			ND	2100	ND	2000	ND	1900	ND	2000	ND	2000	ND	2000	ND	2200	ND	2100	ND	1900	ND	2100	ND	2000	ND	2000	ND	2300	ND	2100	ND	2100
2-Nitrophenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
3&4-Methylphenol (m&p-cresol)	330	100,000	ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
3,3'-Dichlorobenzidine			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
3-Nitroaniline			ND	2100	ND	2000	ND	1900	ND	2000	ND	2000	ND	2000	ND	2200	ND	2100	ND	1900	ND	2100	ND	2000	ND	2000	ND	2300	ND	2100	ND	2100
4,6-Dinitro-2-methylphenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
4-Bromophenyl phenyl ether			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
4-Chloro-3-methylphenol			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
4-Chloroaniline			ND	820	ND	800	ND	780	ND	790	ND	790	ND	790	ND	900	ND	830	ND	760	ND	820	ND	780	ND	790	ND	910	ND	850	ND	850
4-Chlorophenyl phenyl ether			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
4-Nitroaniline			ND	2100	ND	2,000	ND	1900	ND	2000	ND	2000	ND	2000	ND	2200	ND	2,100	ND	1900	ND	2,100	ND	2000	ND	2000	ND	2300	ND	2,100	ND	2100
4-Nitrophenol			ND	2100	ND	2000	ND	1900	ND	2000	ND	2000	ND	2000	ND	2200	ND	2100	ND	1900	ND	2100	ND	2000	ND	2000	ND	2300	ND	2100	ND	2100
Acenaphthene	20,000	100,000	ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	**380**	270	ND	280	ND	320	ND	300	ND	300
Acenaphthylene	100,000	100,000	ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	**130**	160	ND	160	ND	180	ND	170	ND	170
Acetophenone			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Anthracene	100,000	100,000	ND	290	ND	280	ND	270	ND	280	**140**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**1,100**	270	ND	280	ND	320	ND	300	ND	300
Atrazine			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
Benzo(a)anthracene	1,000	1,000	ND	290	ND	280	ND	270	ND	280	**330**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**2,800**	270	ND	280	**220**	320	ND	300	ND	300
Benzaldehyde			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Benzo(a)pyrene	1,000	1,000	ND	160	ND	160	ND	160	ND	160	**310**	160	ND	160	ND	180	ND	170	ND	150	ND	160	**2,300**	160	ND	160	ND	180	ND	170	ND	170
Benzo(b)fluoranthene	1,000	1,000	ND	290	ND	280	ND	270	ND	280	**380**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**2,800**	270	ND	280	**170**	320	ND	300	ND	300
Benzo(g,h,i)perylene	100,000	100,000	ND	290	ND	280	ND	270	ND	280	**150**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**1,300**	270	ND	280	ND	320	ND	300	ND	300
Benzo(k)fluoranthene	800	3,900	ND	290	ND	280	ND	270	ND	280	**160**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**1,200**	270	ND	280	ND	320	ND	300	ND	300
Butyl benzyl phthalate			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Bis(2-chloroethoxy)methane			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Bis(2-chloroethyl)ether			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
Bis(2-chloroisopropyl)ether			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Bis(2-ethylhexyl)phthalate			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Caprolactam			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Carbazole			ND	2100	ND	2000	ND	1900	ND	2000	ND	2000	ND	2000	ND	2200	ND	2100	ND	1900	ND	2100	**700**	2000	ND	2000	ND	2300	ND	2100	ND	2100
Chrysene	1,000	3,900	ND	290	ND	280	ND	270	ND	280	**370**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**2,600**	270	ND	280	**190**	320	ND	300	ND	300
Dibenzo(a,h)anthracene	330	330	ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	**310**	160	ND	160	ND	180	ND	170	ND	170
Dibenzofuran			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	**300**	270	ND	280	ND	320	ND	300	ND	300
Diethyl phthalate			ND	290	ND	280	ND	270	ND	280	ND	280	**130**	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Dimethyl phthalate			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Di-n-butylphthalate			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Di-n-octylphthalate			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Fluoranthene	100,000	100,000	ND	290	ND	280	**130**	270	ND	280	**750**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**6,000**	270	ND	280	**350**	320	ND	300	ND	300
Fluorene	30,000	100,000	ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	**390**	270	ND	280	ND	320	ND	300	ND	300
Hexachlorobenzene			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
Hexachlorobutadiene			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Hexachlorocyclopentadiene			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Hexachloroethane			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
Indeno(1,2,3-cd)pyrene	500	500	ND	290	ND	280	ND	270	ND	280	**140**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**1,100**	270	ND	280	ND	320	ND	300	ND	300
Isophorone			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
Naphthalene	12,000	100,000	ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	**270**	270	ND	280	**140**	320	ND	300	ND	300
Nitrobenzene			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
N-Nitrosodimethylamine			ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
N-Nitrosodi-n-propylamine			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
N-Nitrosodiphenylamine			ND	160	ND	160	ND	160	ND	160	ND	160	ND	160	ND	180	ND	170	ND	150	ND	160	ND	160	ND	160	ND	180	ND	170	ND	170
Pentachlorophenol	800	6,700	ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Phenanthrene	100,000	100,000	ND	160	ND	160	**140**	160	ND	160	**690**	160	ND	160	ND	180	ND	170	ND	150	ND	160	**4,800**	160	ND	160	**460**	180	ND	170	**200**	170
Phenol	330	100,000	ND	290	ND	280	ND	270	ND	280	ND	280	ND	280	ND	310	ND	290	ND	270	ND	290	ND	270	ND	280	ND	320	ND	300	ND	300
Pyrene	100,000	100,000	ND	290	ND	280	ND	270	ND	280	**650**	280	ND	280	ND	310	ND	290	ND	270	ND	290	**5,300**	270	ND	280	**280**	320	ND	300	ND	300

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

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

ND - Not-detected

NA - Not Analyzed

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

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

TABLE 7
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, NY
Soil Analytical Results
PCBs/Pesticides

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	13SB2				13SB3				13SB4				13SB7				13SB8				13SB10				13SB14			
			(4-7') µg/Kg		(11-13') µg/Kg		(0-8') µg/Kg		(11-13') µg/Kg		(0-8') µg/Kg		(11-13') µg/Kg		(0-8') µg/Kg		(11-13') µg/Kg		(0-8') µg/Kg		(11-12') µg/Kg		(4-7') µg/Kg		(11-13') µg/Kg		(0-8') µg/Kg		(11-13') µg/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
4,4' -DDD	3	2,600	ND	3.1	ND	2.9	ND	3	ND	2.8	ND	2.6	ND	2.8	ND	2.8	ND	2.9	ND*	28	ND	2.8	ND	2.7	ND	2.8	ND	3	ND	3.2
4,4' -DDE	3	1,800	ND	3.1	ND	2.9	ND	3	ND	2.8	ND*	3.7	ND	2.8	ND	2.8	ND	2.9	ND*	37	ND	2.8	**3**	2.7	ND	2.8	**6**	3	ND	3
4,4' -DDT	3	1,700	ND	3.1	ND	2.9	ND	3	ND	2.8	ND	2.6	ND	2.8	ND	2.8	ND	2.9	ND*	28	ND	2.8	ND	2.7	ND	2.8	ND	3	ND	3
a-BHC	20	97	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
a-Chlordane			ND	4.4	ND	4	ND	4.2	ND	3.9	ND	3.7	ND	3.9	ND	3.9	ND	4	ND*	39	ND	3.9	ND	3.8	ND	3.9	ND	4.1	ND	4.2
Aldrin	5	19	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
b-BHC	36	72	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
Chlordane			ND	26	ND	24	ND	25	ND	23	ND	22	ND	23	ND	24	ND	24	ND*	240	ND	24	ND	23	ND	24	ND	25	ND	25
d-BHC	40	100,000	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
Dieldrin	5	39	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
Endosulfan I	2,400	4,800	ND	4.4	ND	4	ND	4.2	ND	3.9	ND	3.7	ND	3.9	ND	3.9	ND	4	ND*	39	ND	3.9	ND	3.8	ND	3.9	ND	4.1	ND	4.2
Endosulfan II	2,400	4,800	ND	4.4	ND	4	ND	4.2	ND	3.9	ND	3.7	ND	3.9	ND	3.9	ND	4	ND*	39	ND	3.9	ND	3.8	ND	3.9	ND	4.1	ND	4.2
Endosulfan sulfate	2,400	4,800	ND	4.4	ND	4	ND	4.2	ND	3.9	ND	3.7	ND	3.9	ND	3.9	ND	4	ND*	39	ND	3.9	ND	3.8	ND	3.9	ND	4.1	ND	4.2
Endrin	14	2,200	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
Endrin aldehyde			ND	4.4	ND	4	ND	4.2	ND	3.9	ND	3.7	ND	3.9	ND	3.9	ND	4	ND*	39	ND	3.9	ND	3.8	ND	3.9	ND	4.1	ND	4.2
Endrin ketone			ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
g-BHC	100	280	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
g-Chlordane			ND	4.4	ND	4	ND	4.2	ND	3.9	ND	3.7	ND	3.9	ND	3.9	ND	4	ND*	39	ND	3.9	ND	3.8	ND	3.9	ND	4.1	ND	4.2
Heptachlor	42	420	ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	20	ND	2	ND	1.9	ND	2	ND	2.1	ND	2.1
Heptachlor epoxide			ND	2.2	ND	2	ND	2.1	ND	2	ND	1.8	ND	1.9	ND	2	ND	2	ND*	26	ND	2	ND	1.9	ND	2	ND	3.7	ND	2.1
Methoxychlor			ND	8.7	ND	8	ND	8.4	ND	7.8	ND	7.4	ND	7.8	ND	12	ND	8	ND*	79	ND	7.8	ND	7.6	ND	7.8	ND	8.3	ND	8.3
Toxaphene			ND	42	ND	38	ND	40	ND	37	ND	35	ND	37	ND	38	ND	39	ND*	380	ND	38	ND	37	ND	38	ND	40	ND	40
PCB-1016	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1221	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1232	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1242	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1248	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1254	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1260	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1262	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42
PCB-1268	1,000	1,000	ND	44	ND	40	ND	42	ND	39	ND	37	ND	39	ND	39	ND	40	ND	39	ND	39	ND	38	ND	39	ND	41	ND	42

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

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

ND - Not-detected

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

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

TABLE 8
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, NY
Soil Analytical Results
TAL Metals

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	13SB2		13SB3		13SB4		13SB7		13SB8		13SB10		13SB14	
			(4-7')	(11-13')	(0-8')	(11-13')	(0-8')	(11-13')	(0-8')	(11-13')	(0-8')	(11-12')	(4-7')	(11-13')	(0-8')	(11-13')
			µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/Kg	µg/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
Aluminum			6,860 46	15,500 39	10,000 38	6,670 39	4,830 35	6,150 36	8,610 40	6,250 41	7,680 42	7,960 43	6,820 40	4,180 38	8,970 39	5,800 39
Antimony	2	180	1.1 2.3	BRL 1.9	BRL 1.9	BRL 1.9	BRL 1.8	BRL 1.8	BRL 2	BRL 2	6.7 2.1	BRL 2.1	BRL 2	BRL 1.9	BRL 1.9	BRL 1.9
Arsenic	13	16	4.3 0.9	2.2 0.8	12.7 0.8	2.7 0.8	3.4 0.7	0.9 0.7	5.1 0.8	BRL 0.8	18.4 0.8	1.1 0.9	6.7 0.8	BRL 0.8	5.2 0.8	1.3 0.8
Barium	350	400	110 0.9	132 0.8	844 0.8	38.1 0.8	71.3 0.7	35.7 0.7	613 0.8	35 0.8	3,170 8.4	40.5 0.9	188 0.8	30.9 0.8	300 0.8	33.9 0.8
Beryllium	7.2	72	0.65 0.4	0.85 0.3	0.47 0.3	0.36 0.3	0.22 0.3	0.27 0.3	0.4 0.3	0.28 0.3	0.45 0.3	0.31 0.3	0.32 0.3	0.2 0.3	0.42 0.3	0.38 0.3
Cadmium	2.5 c	4.3	0.45 0.5	0.26 0.4	1.58 0.4	0.31 0.4	0.31 0.4	BRL 0.4	1.2 0.4	BRL 0.4	4.94 0.4	BRL 0.4	0.4 0.4	BRL 0.4	1.07 0.4	0.19 0.4
Calcium			5,860 4.6	2,550 3.9	4,140 3.8	1,450 3.9	38,300 35	1180 3.6	16,400 40	1,790 4.1	59,400 42	1,370 4.3	54,000 40	957 3.8	2,530 3.9	1,120 3.9
Chromium	30 c	180 - trivalent	14.6 0.5	17.1 0.4	33.7 0.4	17.6 0.4	9.59 0.4	12.5 0.4	18.9 0.4	15.4 0.4	25.3 0.4	15.9 0.4	13.9 0.4	13 0.4	23.4 0.4	16.6 0.4
Cobalt			5.62 0.5	3.93 0.4	7.04 0.4	5.87 0.4	3.37 0.4	3.7 0.4	5.63 0.4	5.22 0.4	8.54 0.4	6.3 0.4	3.19 0.4	3.94 0.4	6.44 0.4	6.23 0.4
Copper	50	270	25.5 0.5	16.2 0.4	164 3.8	11.7 0.4	40.9 0.4	6.59 0.4	442 4	11.3 0.4	314 4.2	8.79 0.4	33.3 0.4	8.13 0.4	56.6 0.4	10.8 0.4
Iron			11,300 4.6	13,800 39	21,100 38	19,700 39	10,900 35	9820 36	13,100 40	10,500 41	33,400 42	9,090 43	13,300 40	9,580 38	23,100 39	13,600 39
Lead	63 c	400	225 9.3	10.8 0.8	1,000 7.6	6.5 0.8	123 0.7	3.6 0.7	438 8.1	6.4 0.8	8,100 84	5.9 0.9	176 8	4.8 0.8	286 7.7	5.3 0.8
Magnesium			1,900 4.6	1,260 3.9	1,470 3.8	2,800 3.9	2,390 3.5	1950 3.6	2,470 4	2,650 4.1	3,150 4.2	1,800 4.3	4,220 4	1,740 3.8	1,940 3.9	2,630 3.9
Manganese	1,600 c	2,000	130 4.6	25.3 0.4	300 3.8	284 3.9	160 3.5	110 0.4	191 4	113 0.4	884 4.2	98.3 0.4	300 4	59.6 0.4	136 0.4	128 0.4
Mercury	0.18 c	0.81	3.17 0.1	BRL 0.1	1.88 0.1	BRL 0.1	2.27 0.1	BRL 0.1	1.2 0.1	BRL 0.1	3.57 0.1	BRL 0.1	2.03 0.1	BRL 0.1	3.53 0.1	BRL 0.1
Nickel	30	310	12.5 0.5	13.5 0.4	18.3 0.4	15 0.4	10.6 0.4	9.82 0.4	20.3 0.4	12.7 0.4	18.6 0.4	11 0.4	11.2 0.4	10.5 0.4	14.8 0.4	13.7 0.4
Potassium			1,160 9	1,010 8	898 8	1,520 8	1,040 7	1110 7	1,180 8	1,290 8	1,590 8	803 9	769 8	834 8	931 8	1,170 8
Selenium	3.9c	180	BRL 1.9	BRL 1.5	BRL 1.5	BRL 1.5	BRL 1.4	BRL 1.5	BRL 1.6	BRL 1.6	BRL 1.7	BRL 1.7	BRL 1.6	BRL 1.5	BRL 1.5	6.6 1.5
Silver	2	180	BRL 0.5	BRL 0.4	0.43 0.4	BRL 0.4	BRL 0.4	BRL 0.4	BRL 0.4	BRL 0.4	0.54 0.4	BRL 0.4	BRL 0.4	BRL 0.4	BRL 0.4	BRL 0.4
Sodium			253 9	104 8	4,510 8	95 8	510 7	148 7	412 81	144 8	897 84	91 9	420 8	87 8	4,120 8	97 8
Thallium			BRL 1.9	BRL 1.5	BRL 1.5	BRL 1.5	BRL 1.4	BRL 1.5	BRL 1.6	BRL 1.6	BRL 1.7	BRL 1.7	BRL 1.6	BRL 1.5	BRL 1.5	BRL 1.5
Vanadium			19.5 0.5	12.6 0.4	41.7 0.4	22.7 0.4	16.8 0.4	16.4 0.4	25.5 0.4	19.1 0.4	27.2 0.4	15.2 0.4	18.2 0.4	17.6 0.4	23 0.4	21.5 0.4
Zinc	109 c	10,000	70.5 0.9	18.6 0.8	667 7.6	33.7 0.8	72.4 0.7	24.8 0.7	1,090 8.1	30.3 0.8	2,550 84	24.2 0.9	180 8	19.9 0.8	478 7.7	31.5 0.8

Notes:

* - NYSDEC Technical and Administative Guidance Memorandum 4046, 1994

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

ND - Not-detected

NA - Not analyzed

RL - Reporting Limit

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 9
Former Pfizer Co. Site
407 Marcy Avenue, Brooklyn, NY
Parameters Detected Above Track 1 Soil Cleanup Objectives

COMPOUND	Range in Exceedances	Frequency of Detection	13SB1		13SB2				13SB3				13SB4				13SB5		13SB6	13SB7			
			(7-10')	(18-20')	(4-7')	(7-10')	(11-13')	(13-15')	(0-8')	(8-10')	(11-13')	(13-15')	(0-8')	(8-10')	(11-13')	(13-15')	(10-12')	(13-15')	(10-12')	(0-8')	(8-10')	(11-13')	(13-15')
Sample Results in µg/kg																							
Acetone	54-380	7				62															69		
m&p-Xylenes	480	1												480									
Methylene chloride	1,400	1												1,400									
Sample Results in µg/kg																							
3&4-Methylphenol (m&p-cresol)	3,900	1												3,900									
Acenaphthene	50,000	1												50,000									
Anthracene	120,000	1												120,000									
Benzo(a)anthracene	2,800-170,000	3												170,000			8,700						
Benzo(a)pyrene	2,300-120,000	3												120,000			6,600						
Benzo(b)fluoranthene	2,800-150,000	3												150,000			8,300						
Benzo(k)fluoranthene	1,200-46,000	3												46,000			2,800						
Chrysene	2,600-140,000	3												140,000			7,800						
Dibenzo(a,h)anthracene	1,200-16,000	2												16,000			1,200						
Fluoranthene	420,000	1												420,000									
Fluorene	74,000	1												74,000									
Indeno(1,2,3-cd)pyrene	1,100-50,000	3												50,000			3,100						
Naphthalene	140,000	1												140,000									
Phenanthrene	510,000	1												510,000									
Pyrene	380,000	1												380,000									
Sample Results in µg/kg																							
4,4-DDE	6	1																					
Sample Results in µg/kg																							
Arsenic	18	1																					
Barium	613-3,170	3							844											613			
Cadmium	4.94	1																					
Chromium	33.7	1							33.7														
Copper	56.6-442	4							164											442			
Lead	123-8,100	7			225				1,000				123							438			
Mercury	1.88-3.57	7			3.17				1.88				2.27							1.2			
Selenium	6.6	1																					
Zinc	180-2,550	5							667											1,090			

COMPOUND	Range in Exceedances	Frequency of Detection	13SB8				13SB9		13SB10				13SB11		13SB12		13SB13		13SB14				13SB15		13SB16	
			(0-8')	(8-10')	(11-13')	(13-15')	(10-12')	(13-15')	(4-7')	(7-10')	(11-13')	(18-20')	(8-10')	(13-15')	(7-9')	(13-15')	(8-10')	(13-15')	(0-8')	(8-10')	(11-13')	(13-15')	(8-10')	(13-15')	(8-10')	(13-15')
Sample Results in µg/kg																										
Acetone	54-380	7		150				77																54	380	210
m&p-Xylenes	480	1																								
Methylene chloride	1,400	1																								
Sample Results in µg/kg																										
3&4-Methylphenol (m&p-cresol)	3,900	1																								
Acenaphthene	50,000	1																								
Anthracene	120,000	1																								
Benzo(a)anthracene	2,800-170,000	3																					2,800			
Benzo(a)pyrene	2,300-120,000	3																					2,300			
Benzo(b)fluoranthene	2,800-150,000	3																					2,800			
Benzo(k)fluoranthene	1,200-46,000	3																					1,200			
Chrysene	2,600-140,000	3																					2,600			
Dibenzo(a,h)anthracene	1,200-16,000	2																								
Fluoranthene	420,000	1																								
Fluorene	74,000	1																								
Indeno(1,2,3-cd)pyrene	1,100-50,000	3																					1,100			
Naphthalene	140,000	1																								
Phenanthrene	510,000	1																								
Pyrene	380,000	1																								
Sample Results in µg/kg																										
4,4-DDE	6	1																	6							
Sample Results in µg/kg																										
Arsenic	18	1	18.4																							
Barium	613-3,170	3	3,170																							
Cadmium	4.94	1	4.94																							
Chromium	33.7	1																								
Copper	56.6-442	4	314																56.6							
Lead	123-8,100	7	8,100						176										286							
Mercury	1.88-3.57	7	3.57						2.03										3.53							
Selenium	6.6	1																			6.6					
Zinc	180-2,550	5	2,550						180										478							

TABLE 10
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, NY
Groundwater Analytical Results
Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards	MW1		MW2		MW3		MW4		MW5		MW6		MW7		MW8		MW9		MW10		Duplicate	
	µg/L	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
		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-Trichloroethane	5	**0.27**	2	**0.72**	2	**140**	20	**9.1**	2	ND	2	**6.5**	2	**0.36**	2	ND	2	ND	10	ND	10	**0.72**	2
1,1,2,2-Tetrachloroethane	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
1,1,2-Trichloroethane	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	15	ND	15	ND	1
1,1-Dichloroethane	5	ND	2	**0.29**	2	**4.1**	2	**1.5**	2	ND	2	**0.81**	2	ND	2	**0.42**	2	ND	10	ND	10	**0.29**	2
1,1-Dichloroethene	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	**0.77**	1	ND	5	ND	5	ND	1
1,2,3-Trichlorobenzene		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
1,2,4-Trichlorobenzene		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
1,2-Dibromo-3-chloropropane	0.04	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
1,2-Dibromoethane		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
1,2-Dichlorobenzene	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
1,2-Dichloroethane	0.6	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	10	ND	10	ND	1
1,2-Dichloropropane	0.94	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
1,3-Dichlorobenzene	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
1,4-Dichlorobenzene	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
2-Hexanone (Methyl Butyl Ketone)		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
4-Methyl-2-Pentanone		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Acetone		**3.9**	5	**3.4**	5	**4.1**	5	**7.5**	5	**7.7**	5	**4.2**	5	**10**	5	**10**	5	**16**	25	**14**	25	**5.2**	5
Benzene	1	ND	1	ND	1	ND	1	ND	1	**0.42**	1	ND	1	ND	1	ND	1	ND	4	ND	4	ND	1
Bromochloromethane	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Bromodichloromethane		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Bromoform		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Bromomethane	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
Carbon Disulfide	60	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Carbon tetrachloride	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Chlorobenzene	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
Chloroethane	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
Chloroform	7	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
Chloromethane	60	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	**0.31**	2	**0.3**	2	ND	10	ND	10	ND	2
cis-1,2-Dichloroethene	5	**5.6**	1	ND	1	ND	1	ND	1	ND	1	**0.38**	1	**14**	1	**99**	10	**45**	5	ND	5	ND	1
cis-1,3-Dichloropropene		ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	5	ND	5	ND	0
Cyclohexane		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	10	ND	10	ND	5
Dibromochloromethane		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Dichlorodifluoromethane	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Ethylbenzene	5	ND	1	ND	1	ND	1	ND	1	**0.8**	1	ND	1	ND	1	ND	1	ND	10	ND	10	ND	1
Isopropylbenzene	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
m&p-Xylenes	5	ND	1	ND	1	ND	1	ND	1	**1.4**	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Methyl Ethyl Ketone (2-Butanone)		ND	1	ND	1	ND	1	**0.65**	1	**0.73**	1	ND	1	**1.3**	1	ND	1	ND	5	ND	5	ND	1
Methyl t-butyl ether (MTBE)	10	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Methylacetate		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	25	ND	25	ND	5
Methylcyclohexane		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	25	ND	25	ND	5
Methylene chloride	5	ND	3	ND	3	ND	3	ND	3	ND	3	ND	3	ND	3	ND	3	ND	15	ND	15	ND	3
o-Xylene	5	ND	1	ND	1	ND	1	ND	1	**1**	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Styrene	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Tetrachloroethene	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Toluene	5	ND	2	ND	2	ND	2	ND	2	**1.1**	2	ND	2	ND	2	ND	2	ND	10	ND	10	ND	2
Total Xylenes	5	ND	1	ND	1	ND	1	ND	1	**2.4**	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
trans-1,2-Dichloroethene	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2	**3.7**	2	ND	10	ND	10	ND	2
trans-1,3-Dichloropropene	0.4	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	0	ND	5	ND	5	ND	0
Trichloroethene	5	**1.4**	1	ND	1	ND	1	ND	1	ND	1	ND	1	**0.8**	1	**0.4**	1	ND	5	ND	5	ND	1
Trichlorofluoromethane	5	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Trichlorotrifluoroethane		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	5	ND	5	ND	1
Vinyl Chloride	2	**0.37**	1	ND	1	ND	1	ND	1	ND	1	ND	1	**0.98**	1	**3.5**	1	ND	5	ND	5	ND	1

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

TABLE 11
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, New York
Groundwater Analytical Results
Semi-Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 µg/L		MW2 µg/L		MW3 µg/L		MW4 µg/L		MW5 µg/L		MW6 µg/L		MW7 µg/L		MW8 µg/L		MW9 µg/L		MW10 µg/L		Duplicate µg/L	
1,1-Biphenyl		ND	0.9	ND	0.9	ND	0.9	ND	0.9	ND	0.9	ND	0.95	ND	0.9	ND	0.9	ND	0.9	ND	0.9	ND	0.9
1,2,4,5-Tetrachlorobenzene		ND	2	ND	2	ND	2	ND	2	ND	2	ND	2.1	ND	2	ND	2	ND	2	ND	2	ND	2
2,3,4,6-Tetrachlorophenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2,4,5-Trichlorophenol	3	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2,4,6-Trichlorophenol	3	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2,4-Dichlorophenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2,4-Dimethylphenol		ND	1	ND	1	ND	1	ND	1	**30**	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2,4-Dinitrophenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2,4-Dinitrotoluene	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
2,6-Dinitrotoluene	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
2-Chloronaphthalene	10	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
2-Chlorophenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2-Methylnaphthalene		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
2-Methylphenol (o-cresol)		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2-Nitroaniline	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
2-Nitrophenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
3&4-Methylphenol (m&p-cresol)		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
3,3'-Dichlorobenzidine	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
3-Nitroaniline	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
4,6-Dinitro-2-methylphenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
4-Bromophenyl phenyl ether		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
4-Chloro-3-methylphenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
4-Chloroaniline	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
4-Chlorophenyl phenyl ether		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
4-Nitroaniline	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
4-Nitrophenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Acenaphthene	20	ND	5	ND	5	ND	5	ND	5	**11**	5	**1.7**	5	ND	5	ND	5	ND	5	**3.7**	5	ND	5
Acenaphthylene		ND	0.3	ND	0.3	ND	0.3	**0.55**	0.3	**0.6**	0.3	ND	0.32	ND	0.3	ND	0.3	ND	0.3	**1**	0.3	ND	0.3
Acetophenone		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Anthracene	50	ND	5	ND	5	ND	5	**4.1**	5	**3.2**	5	**3.1**	5	ND	5	ND	5	ND	5	**2.2**	5	ND	5
Atrazine		ND	3	ND	3	ND	3	ND	3	ND	3	ND	3.2	ND	3	ND	3	ND	3	ND	3	ND	3
Benzo(a)anthracene	0.002	**0.09**	0.02	**0.07**	0.02	**0.09**	0.02	**11**	0.02	**2.5**	0.02	**7.9**	0.021	**0.15**	0.02	**0.28**	0.02	**0.03**	0.02	**7.9**	0.02	**0.11**	0.02
Benzaldehyde		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Benzo(a)pyrene		**0.05**	0.02	ND	0.02	**0.06**	0.02	**11**	0.02	**2**	0.02	**7.8**	0.021	**0.02**	0.02	**0.23**	0.02	ND	0.02	**7.8**	0.02	**0.08**	0.02
Benzo(b)fluoranthene	0.002	**0.08**	0.02	**0.11**	0.02	**0.11**	0.02	**15**	0.02	**2.8**	0.02	**9.8**	0.021	**0.32**	0.02	**0.31**	0.02	**0.04**	0.02	**9.9**	0.02	**0.11**	0.02
Benzo(k)fluoranthene	0.002	**0.04**	0.02	**0.03**	0.02	**0.05**	0.02	**5.9**	0.02	**0.93**	0.02	**4.1**	0.021	**0.06**	0.02	**0.11**	0.02	ND	0.02	**4**	0.02	**0.05**	0.02
Benzo(ghi)perylene		ND	5	ND	5	ND	5	**6.2**	5	ND	5	**3.9**	5	ND	5	ND	5	ND	5	**3.6**	5	ND	5
Benzyl Butyl phthalate		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Bis(2-chloroethoxy)methane	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Bis(2-chloroethyl)ether	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Bis(2-chloroisopropyl)ether		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Bis(2-ethylhexyl)phthalate	5	ND	2	ND	2	ND	2	ND	2	ND	2	ND	2.1	ND	2	ND	2	ND	2	ND	2	ND	2
Caprolactam		ND	10	ND	10	ND	10	ND	10	ND	10	ND	10	ND	10	ND	10	ND	10	ND	10	ND	10
Carbazole		ND	25	ND	25	ND	25	ND	25	ND	25	ND	25	ND	25	ND	25	ND	25	ND	25	ND	25
Chrysene	0.002	**0.08**	0.02	**0.12**	0.02	**0.09**	0.02	**11**	0.02	**2.2**	0.02	**7.4**	0.021	**0.25**	0.02	**0.3**	0.02	**0.03**	0.02	**7**	0.02	**0.1**	0.02
Dibenzo(a,h)anthracene		ND	0.02	ND	0.02	ND	0.02	**1.9**	0.02	**0.29**	0.02	**1.2**	0.021	**0.04**	0.02	**0.03**	0.02	ND	0.02	**1.3**	0.02	**0.02**	0.02
Dibenzofuran		ND	5	ND	5	ND	5	ND	5	**4.1**	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Diethylphthalate	50	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Dimethylphthalate	50	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Di-n-butylphthalate	50	ND	5	ND	5	ND	5	ND	5	ND	5	**2.1**	5	ND	5	ND	5	ND	5	ND	5	ND	5
Di-n-octylphthalate	50	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Fluoranthene	50	ND	5	ND	5	ND	5	**22**	5	**7.3**	5	**16**	5	ND	5	ND	5	ND	5	**15**	5	ND	5
Hexachlorobenzene	0.04	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.021	ND	0.02	ND	0.02	ND	0.02	ND	0.02	ND	0.02
Fluorene	50	ND	5	ND	5	ND	5	ND	5	**5.5**	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Hexachlorobutadiene	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.53	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5
Hexachlorocyclopentadiene	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Hexachloroethane	5	ND	3	ND	3	ND	3	ND	3	ND	3	ND	3.2	ND	3	ND	3	ND	3	ND	3	ND	3
Indeno(1,2,3-cd)pyrene	0.002	**0.03**	0.02	ND	0.02	**0.04**	0.02	**6.8**	0.02	**1.2**	0.02	**4.4**	0.021	**0.05**	0.02	**0.13**	0.02	ND	0.02	**4.6**	0.02	**0.06**	0.02
Isophorone	50	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Naphthalene	10	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Nitrobenzene	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4	ND	0.4
N-Nitrosodimethylamine		ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.84	ND	0.8	ND	0.8	ND	0.8	ND	0.8	ND	0.8
N-Nitrosodi-n-propylamine		ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
N-Nitrosodiphenylamine	50	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5	ND	5
Pentachlorophenol		ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.32	ND	0.3	ND	0.3	ND	0.3	ND	0.3	ND	0.3
Phenanthrene	50	**0.1**	0.077	**0.18**	0.077	**0.11**	0.077	**14**	0.077	**6.4**	0.077	**13**	0.081	**0.31**	0.077	**0.51**	0.077	ND	0.077	**7.7**	0.077	**0.16**	0.077
Phenol		ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Pyrene	50	ND	5	ND	5	ND	5	**20**	5	**5.9**	5	**14**	5	ND	5	ND	5	ND	5	**13**	5	ND	5

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

TABLE 12
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, New York
Groundwater Analytical Results
Pesticides/PCBs

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 µg/L		MW2 µg/L		MW3 µg/L		MW4 µg/L		MW5 µg/L		MW6 µg/L		MW7 µg/L		MW8 µg/L		MW9 µg/L		MW10 µg/L		Duplicate µg/L	
PCB-1016	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1221	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1232	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1242	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1248	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1254	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1260	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1262	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
PCB-1268	0.09	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.072	ND	0.073	ND	0.072	ND	0.075	ND	0.072
4,4-DDD	0.3	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
4,4-DDE	0.2	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
4,4-DDT	0.11	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
a-BHC	0.94	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
a-Chlordane		ND	0.01	ND	0.01	ND	0.01	ND	0.025	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Alachlor		ND	0.075	ND	0.075	ND	0.075	ND	0.075	ND	0.075	ND	0.075	ND	0.075	ND	0.076	ND	0.075	ND	0.078	ND	0.075
Aldrin		ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002
b-BHC	0.04	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Chlordane	0.05	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1
d-BHC	0.04	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Dieldrin	0.004	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002	ND	0.002
Endosulfan I		ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Endosulfan II		ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Endosulfan Sulfate		ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Endrin		ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Endrin aldehyde	5	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Endrin ketone		ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
gamma-BHC	0.05	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
g-Chlordane		ND	0.01	ND	0.025	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Heptachlor	0.04	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Heptachlor epoxide	0.03	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Methoxychlor	35	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1
Toxaphene		ND	0.75	ND	0.75	ND	0.75	ND	0.75	ND	0.75	ND	0.75	ND	0.75	ND	0.76	ND	0.75	ND	0.78	ND	0.75

Notes:
ND - Non-Detect

Table 13
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, New York
Groundwater Analytical Results
TAL Metals

Compound	NYSDEC Groundwater Quality Standards	MW1		MW2		MW3		MW4		MW5		MW6		MW7		MW8		MW9		MW10		Duplicate	
	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Aluminum	0.1	0.801	0.01	8.84	0.01	2.45	0.01	1.97	0.01	2.78	0.01	13.1	0.01	17.3	0.01	32.4	0.01	0.513	0.01	31.5	0.01	9.63	0.01
Antimony	0.003	BRL	0.003	BRL	0.003	BRL	0.003	BRL	0.003	BRL	0.003	0.009	0.003	BRL	0.003	BRL	0.003	BRL	0.003	0.013	0.003	BRL	0.003
Arsenic	0.025	0.008	0.004	0.008	0.004	0.007	0.004	0.009	0.004	0.005	0.004	0.009	0.004	0.008	0.004	0.009	0.004	0.008	0.004	0.025	0.004	0.006	0.004
Barium	1	0.254	0.01	0.224	0.01	0.142	0.01	0.292	0.01	0.262	0.01	0.289	0.01	0.289	0.01	0.352	0.01	0.15	0.01	1.02	0.01	0.218	0.01
Beryllium	0.003	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	0.001	0.001	BRL	0.001	BRL	0.001	BRL	0.001
Cadmium	0.005	BRL	0.004	0	0.004	BRL	0.004	BRL	0.004	BRL	0.004	0.001	0.004	BRL	0.004	0.001	0.004	BRL	0.004	0.004	0.004	0	0.004
Calcium	NS	453	0.1	401	0.1	266	0.1	473	0.1	348	0.1	405	0.1	216	0.1	212	0.1	261	0.1	169	0.01	407	0.1
Chromium	0.05	0.002	0.001	0.021	0.001	0.005	0.001	0.004	0.001	0.007	0.001	0.031	0.001	0.036	0.001	0.06	0.001	0.002	0.001	0.063	0.001	0.022	0.001
Cobalt	NS	0.002	0.005	0.008	0.005	0.002	0.005	0.003	0.005	0.006	0.005	0.01	0.005	0.012	0.005	0.077	0.005	0.001	0.005	0.027	0.005	0.008	0.005
Copper	0.2	0.002	0.005	0.018	0.005	0.006	0.005	0.007	0.005	0.009	0.005	0.087	0.005	0.041	0.005	0.088	0.005	0.002	0.005	0.55	0.005	0.017	0.005
Iron	0.3	11.8	0.01	16.8	0.01	5.87	0.01	4.15	0.01	6.63	0.01	23.4	0.01	24.5	0.01	41.4	0.01	5.45	0.01	60.9	0.01	16.1	0.01
Lead	0.025	BRL	0.002	0.018	0.002	0.006	0.002	0.028	0.002	0.002	0.002	0.284	0.002	0.042	0.002	0.133	0.002	0.003	0.002	3.52	0.02	0.016	0.002
Magnesium	35	40.2	0.01	54	0.01	35.7	0.01	68.6	0.01	52.3	0.01	69	0.01	51.9	0.01	51.6	0.01	46.2	0.01	29	0.01	53.7	0.01
Manganese	0.3	0.842	0.005	2.97	0.05	1.18	0.005	0.381	0.005	3.3	0.05	0.687	0.005	0.953	0.005	1.55	0.005	0.779	0.005	1.88	0.005	3.16	0.05
Mercury	0.0007	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002
Nickel	0.1	0.006	0.004	0.021	0.004	0.006	0.004	0.007	0.004	0.01	0.004	0.029	0.004	0.03	0.004	0.075	0.004	0.005	0.004	0.087	0.004	0.02	0.004
Potassium	NS	14.7	0.1	12	0.1	15.2	0.1	17	0.1	20.8	0.1	20.1	0.1	18.4	0.1	13.1	0.1	22.1	0.1	69.2	1	12.9	0.1
Selenium	0.01	BRL	0.004	BRL	0.004	0.009	0.004	BRL	0.004	BRL	0.004	BRL	0.004	BRL	0.004	0.019	0.008	BRL	0.004	BRL	0.004	BRL	0.004
Silver	0.05	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005
Sodium	2	77.5	1	142	1	83.8	1	77.5	1	302	1	183	1	103	1	206	1	233	1	112	1	151	1
Thallium	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005					BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005
Vanadium	NS	0	0.01	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.01	0.04	0.01	0.08	0.01	0	0.01	0.08	0.01	0.03	0.01
Zinc	5	0.082	0.01	0.157	0.01	0.024	0.01	0.081	0.01	0.012	0.01	0.359	0.01	0.13	0.01	0.131	0.01	0.005	0.01	2.3	0.1	0.143	0.01

Notes:
BRL - Below Reporting Limit
NS - No Standard
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 14
Former Pfizer Co. Site
407 Marcy Avenue
Brooklyn, New York
Groundwater Analytical Results
TAL Dissolved Metals

Compound	NYSDEC Groundwater Quality Standards	MW1		MW2		MW3		MW4		MW5		MW6		MW7		MW8		MW9		MW10		Duplicate	
	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L	
		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Aluminum	**0.1**	**0.16**	0.01	**0.18**	0.01	**0.32**	0.05	**0.27**	0.01	**0.27**	0.01	**0.54**	0.01	**0.03**	0.01	**0.46**	0.01	BRL	0.01	**0.31**	0.01	**0.25**	0.01
Antimony	**0.003**	BRL	0.003	BRL	0.003	BRL	0.003	BRL	0.003	BRL	0.003	**0.005**	0.003	BRL	0.003	BRL	0.003	BRL	0.003	**0.004**	0.003	BRL	0.003
Arsenic	**0.025**	**0.007**	0.003	**0.008**	0.003	**0.001**	0.003	**0.005**	0.003	BRL	0.003	**0.003**	0.003	BRL	0.003	**0.004**	0.003	**0.004**	0.003	**0.003**	0.003	**0.004**	0.003
Barium	**1**	**0.231**	0.011	**0.145**	0.011	**0.12**	0.011	**0.229**	0.011	**0.235**	0.011	**0.15**	0.011	**0.17**	0.011	**0.146**	0.011	**0.135**	0.011	**0.16**	0.011	**0.144**	0.011
Beryllium	**0.003**	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001
Cadmium	**0.005**	BRL	0.004	BRL	0.004	BRL	0.004	BRL	0.004	BRL	0.004	**0**	0.004	BRL	0.004	BRL	0.004	BRL	0.004	BRL	0.004	BRL	0.004
Calcium	**NS**	**447**	0.11	**456**	0.11	**272**	0.11	**489**	0.11	**354**	0.11	**420**	0.11	**220**	0.11	**209**	0.11	**248**	0.11	**143**	0.01	**439**	0.11
Chromium	**0.05**	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	BRL	0.001	**0.001**	0.001	BRL	0.001	**0.001**	0.001	BRL	0.001	BRL	0.001	BRL	0.001
Cobalt	**NS**	**0.001**	0.005	**0.002**	0.005	**0**	0.005	**0.001**	0.005	**0.003**	0.005	**0.001**	0.005	BRL	0.005	**0.014**	0.005	**0**	0.005	**0.001**	0.005	**0.002**	0.005
Copper	**0.2**	**0.002**	0.005	**0.006**	0.005	**0.003**	0.005	**0.004**	0.005	**0.005**	0.005	**0.013**	0.005	**0.005**	0.005	**0.006**	0.005	**0.002**	0.005	**0.035**	0.005	**0.005**	0.005
Iron	**0.3**	**0.13**	0.01	**0.09**	0.01	**0.14**	0.01	**0.25**	0.01	**0.16**	0.01	**0.68**	0.01	**0.12**	0.01	**0.67**	0.01	**0.12**	0.01	**0.61**	0.01	**0.19**	0.01
Lead	**0.025**	BRL	0.002	BRL	0.002	BRL	0.002	BRL	0.002	BRL	0.002	**0.013**	0.002	BRL	0.002	**0.002**	0.002	BRL	0.002	**0.057**	0.002	BRL	0.002
Magnesium	**35**	**39**	0.01	**54**	0.01	**36**	0.01	**68**	0.01	**50**	0.01	**66**	0.01	**48**	0.01	**46**	0.01	**44**	0.01	**25**	0.01	**53**	0.01
Manganese	**0.3**	**0.799**	0.005	**2.780**	0.053	**0.99**	0.005	**0.352**	0.005	**3.140**	0.053	**0.29**	0.005	**0.46**	0.005	**1.270**	0.005	**0.676**	0.005	**0.09**	0.005	**2.750**	0.053
Mercury	**0.0007**	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002	BRL	0.0002
Nickel	**0.1**	**0.004**	0.004	**0.008**	0.004	**0.002**	0.004	**0.004**	0.004	**0.005**	0.004	**0.006**	0.004	**0.002**	0.004	**0.008**	0.004	**0.004**	0.004	**0.007**	0.004	**0.008**	0.004
Potassium	**NS**	**14**	1.1	**11**	1.1	**15**	1.1	**17**	1.1	**20**	1.1	**17**	1.1	**16**	1.1	**8**	1.1	**21**	1.1	**68**	1.1	**11**	1.1
Selenium	**0.01**	BRL	0.004	BRL	0.004	**0.01**	0.004	BRL	0.004	BRL	0.004	**0.007**	0.004	BRL	0.004	**0.023**	0.004	BRL	0.004	BRL	0.004	BRL	0.004
Silver	**0.05**	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005	BRL	0.005
Sodium	**20**	**77**	1.1	**125**	1.1	**86**	1.1	**82**	1.1	**316**	1.1	**196**	1.1	**101**	1.1	**209**	1.1	**227**	1.1	**116**	1.1	**124**	1.1
Thallium	**0.0005**	BRL	0.0005			BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005	BRL	0.0005
Vanadium	**NS**	BRL	0.01	**0**	0.01	**0**	0.01	**0**	0.01	BRL	0.01	**0**	0.01	**0**	0.01	**0**	0.01	BRL	0.01	**0**	0.01	BRL	0.01
Zinc	**5**	**0.056**	0.011	**0.082**	0.011	**0.003**	0.011	**0.038**	0.011	BRL	0.011	**0.069**	0.011	**0.012**	0.011	**0.007**	0.011	**0.002**	0.011	**0.069**	0.011	**0.088**	0.011

Notes:
BRL - Below Reporting Limit
NS - No Standard
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 9
Former Pfizer Co. Site
407 Marcy Avenue, Brooklyn NY
Parameters Detected Above Ambient Water Quality Standards

VOCs / SVOCs

COMPOUND	Range in Detections	MW1	MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10
Sample Results in (µg/L)											
1,1,1,-Trichloroethane	6.5-140			140	9.1		6.5				
cis-1,2-Dichloroethene	5.6-99	5.6						14	99	45	
Vinyl Chloride	3.5								3.5		
Benzo(a)anthracene	0.03-11	0.09	0.07	0.09	11	2.5	7.9	0.15	0.28	0.03	7.9
Benzo(b)fluoranthene	0.04-15	0.08	0.11	0.11	15	2.8	9.8	0.32	0.31	0.04	9.9
Benzo(k)fluoranthene	0.03-5.9	0.04	0.03	0.05	5.9	0.93	4.1	0.06	0.11		4
Chyrsene	0.03-11	0.08	0.12	0.09	11	2.2	7.4	0.25	0.3	0.03	7
Indeno(1,2,3-cd)pyrene	0.03-6.8	0.03		0.04	6.8	1.2	4.4	0.05	0.13		4.6

Metals (dissolved)

COMPOUND	Range in Detections	MW1	MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10
Sample Results in (µg/L)											
Aluminum	0.16-0.57	0.16	0.18	0.32	0.27	0.27	0.54		0.46		0.31
Antimony	0.004-0.005						0.005				0.004
Iron	0.61-0.68						0.68		0.67		0.61
Magnesium	36-68	39	54	36	68	50	66	48	46	44	
Manganese	0.352-1.27	0.799	2.78	0.99	0.352	3.14		0.46	1.27	0.676	
Selenium	0.023-0.01			0.01					0.023		
Sodium	77-316	77	125	86	82	316	196	101	209	227	116

Metals (total)

COMPOUND	Range in Detections	MW1	MW2	MW3	MW4	MW5	MW6	MW7	MW8	MW9	MW10
Sample Results in (mg/L)											
Aluminum	0.513-17.3	0.801	8.84	2.45	1.97	2.78	13.1	17.3	32.4	0.513	31.5
Antimony	0.009						0.009				
Arsenic	0.025										0.025
Barium	1.02										1.02
Chromium	0.06-0.063								0.06		0.063
Copper	0.55										0.55
Iron	4.2-60.9	11.8	16.8	5.9	4.2	6.6	23.4	24.5	41.4	5.5	60.9
Lead	0.028-3.52				0.028		0.284	0.042	0.133		3.52
Magnesium	35.7-69	40.2	54.0	35.7	68.6	52.3	69.0	51.9	51.6	46.2	
Manganese	0.38-3.3	0.84	2.97	1.18	0.38	3.30	0.69	0.95	1.55	0.78	1.88
Selenium	0.019								0.019		
Sodium	77.5-302	77.5	142	83.8	77.5	302	183	103	206	233	112

TABLE 16
Former Pfizer Co. Site
407 Marcy Avenue
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)		SG-4 (µg/m3)		SG-5 (µg/m3)		SG-6 (µg/m3)		SG-7 (µg/m3)		SG-8 (µg/m3)		SG-9 (µg/m3)	
			Result	RL	Result	RL	Result	RL	Result	RL	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	ND	1	ND	1	ND	1	ND	1
1,1,1-Trichloroethane	100	<2.0 - 2.8	**812**	1	**32,200**	1	**260**	1	**1,780**	1	**889**	1	**461**	1	**840**	1	**270**	1	**190**	1
1,1,2,2-Tetrachloroethane		<1.5	ND	1	ND	1	ND	1	ND	1	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	ND	1	ND	1	ND	1	ND	1
1,1-Dichloroethane		<1.0	**2.99**	1	**14.5**	1	**9.55**	1	ND	1	ND	1	ND	1	ND	1	ND	1	**68.8**	1
1,1-Dichloroethene		<1.0	ND	1	**11.4**	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
1,2,4-Trichlorobenzene		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
1,2,4-Trimethylbenzene		<1.0	**19.7**	1	**10.2**	1	**11.7**	1	**20.4**	1	**18.4**	1	**6.88**	1	**7.07**	1	**30.1**	1	**14.1**	1
1,2-Dibromoethane		<1.5	ND	1	ND	1	ND	1	ND	1	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	ND	1	ND	1	ND	1	ND	1
1,2-Dichloroethane		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	**7.28**	1
1,2-Dichloropropane			ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
1,2-Dichlorotetrafluoroethane			ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
1,3,5-Trimethylbenzene		<1.0	**7.86**	1	**3.83**	1	**7.12**	1	**8.25**	1	**7.52**	1	**3.05**	1	**2.55**	1	**14**	1	**8.35**	1
1,3-Butadiene		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
1,3-Dichlorobenzene		<2.0	**35.3**	1	**38**	1	**16.4**	1	**6.97**	1	**23**	1	**12.6**	1	**27.9**	1	**55.2**	1	**35.3**	1
1,4-Dichlorobenzene		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
1,4-Dioxane			ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
2-Hexanone			ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
4-Ethyltoluene		NA	**4.62**	1	**10.5**	1	**4.22**	1	**4.67**	1	**5.36**	1	ND	1	ND	1	**8.16**	1	**5.16**	1
4-Isopropyltoluene			ND	1	ND	1	ND	1	ND	1	ND	1	**2.96**	1	ND	1	ND	1	ND	1
4-Methyl-2-pentanone			**2.17**	1	**2.46**	1	**5.48**	1	ND	1	**2.58**	1	**4.34**	1	ND	1	**2.82**	1	**10.2**	1
Acetone		NA	**354**	1	**207**	1	**646**	1	**232**	1	**196**	1	**631**	1	**194**	1	**477**	1	**1,950**	1
Acrylonitrile			ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Benzene		<1.6 - 4.7	**12.1**	1	**428**	1	**1,670**	1	**9.29**	1	**9.61**	1	**12.2**	1	**3.96**	1	**35.1**	1	**222**	1
Benzyl Chloride		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Bromodichloromethane		<5.0	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Bromoform		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Bromomethane		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Carbon Disulfide		NA	**28.1**	1	**13.9**	1	**93.7**	1	**18.7**	1	**18.2**	1	**46.4**	1	**9.12**	1	**46.7**	1	**96.2**	1
Carbon Tetrachloride	5	<3.1	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chlorobenzene		<2.0	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Chloroethane		NA	ND	1	ND	1	**2.61**	1	ND	1	ND	1	ND	1	ND	1	ND	1	**2.35**	1
Chloroform		<2.4	**9.03**	1	**16.7**	1	ND	1	ND	1	ND	1	ND	1	ND	1	**2.83**	1	**11.6**	1
Chloromethane		<1.0 - 1.4	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
cis-1,2-Dichloroethene		<1.0	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
cis-1,3-Dichloropropene		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Cyclohexane		NA	**7.74**	1	**4.23**	1	**48.8**	1	**4.51**	1	**4.68**	1	ND	1	**2.86**	1	**15.1**	1	**104**	1
Dibromochloromethane		<5.0	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Dichlorodifluromethane		NA	**2.96**	1	**2.62**	1	**2.77**	1	**2.57**	1	**ND**	1	**2.67**	1	**2.92**	1	**2.96**	1	**2.72**	1
Ethanol			**184**	1	**157**	1	**118**	1	**64.4**	1	**112**	1	**113**	1	**186**	1	**172**	1	**213**	1
Ethyl Acetate		NA	**22.9**	1	**21.1**	1	ND	1	**5.54**	1	**17**	1	ND	1	**17.6**	1	**27**	1	ND	1
Ethylbenzene		<4.3	**30.2**	1	**43.8**	1	**122**	1	**34.2**	1	**21.4**	1	**23.3**	1	**15.4**	1	**64.7**	1	**54.2**	1
Heptane		NA	**25.7**	1	**10.2**	1	**265**	1	**30**	1	**53.2**	1	**153**	1	**9.3**	1	**51.2**	1	**99.1**	1
Hexachlorobutadiene		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Hexane		<1.5	**53.2**	1	**12**	1	**556**	1	**69.7**	1	**64.5**	1	**352**	1	**8.14**	1	**112**	1	**1,810**	1
Isopropylalcohol		NA	**134**	1	**125**	1	**78.6**	1	**47.9**	1	**95.3**	1	**83.3**	1	**119**	1	**134**	1	**178**	1
Isopropylbenzene			ND	1	ND	1	**10.2**	1	**3.1**	1	**3.34**	1	ND	1	ND	1	**3.1**	1	**2.5**	1
Xylene (m&p)		<4.3	**104**	1	**143**	1	**212**	1	**91.1**	1	**63.8**	1	**66**	1	**47.3**	1	**201**	1	**145**	1
Methyl Ethyl Ketone			**37.7**	1	ND	1	**117**	1	**23.8**	1	**19.5**	1	**47.2**	1	**20.4**	1	**48.3**	1	**214**	1
MTBE		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Methylene Chloride		<3.4	**6.7**	1	**3.26**	1	**5.73**	1	**11.4**	1	**7.64**	1	**5.55**	1	**4.16**	1	**4.24**	1	**5.48**	1
n-Butylbenzene			**3.56**	1	**3.13**	1	**5.1**	1	**6.25**	1	ND	1	**3.35**	1	**3.56**	1	**2.85**	1	**3.35**	1
Xylene (o)		<4.3	**21.2**	1	**32.2**	1	**27.5**	1	**14.7**	1	**17.3**	1	**8.64**	1	ND	1	**33.3**	1	**9.29**	1
Propylene		NA	**37.2**	1	**6.93**	1	**292**	1	**47.8**	1	**37.3**	1	**33.5**	1	**2.84**	1	**96**	1	**105**	1
sec-Butylbenzene			ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Styrene		<1.0	ND	1	**9.15**	1	**2.21**	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Tetrachloroethene	100		ND	0.25	**23.8**	0.25	ND	0.25	**14.2**	0.25	**3.59**	0.25	**57.4**	0.25	**78**	0.25	ND	0.25	ND	0.25
Tetrahydrofuran		NA	**3.45**	1	**1.83**	1	ND	1	ND	1	**2**	1	ND	1	**1.92**	1	**2.56**	1	**2.45**	1
Toluene		1.0 - 6.1	**61**	1	**926**	1	**1,180**	1	**54.6**	1	**45.2**	1	**55.4**	1	**31.4**	1	**174**	1	**245**	1
trans-1,2-Dichloroethene		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
trans-1,3-Dichloropropene		NA	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1	ND	1
Trichloroethene	5	<1.7	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Trichlorofluoromethane		NA	**2.92**	1	**10.2**	1	ND	1	ND	1	ND	1	ND	1	ND	1	**3.09**	1	ND	1
Trichlorotrifluoroethane			**97.3**	1	**48.6**	1	**4.14**	1	ND	1	ND	1	ND	1	**4.6**	1	**153**	1	**12.1**	1
Vinyl Chloride		<1.0	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	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, monitoring.

TABLE 17

Project Permit Listing

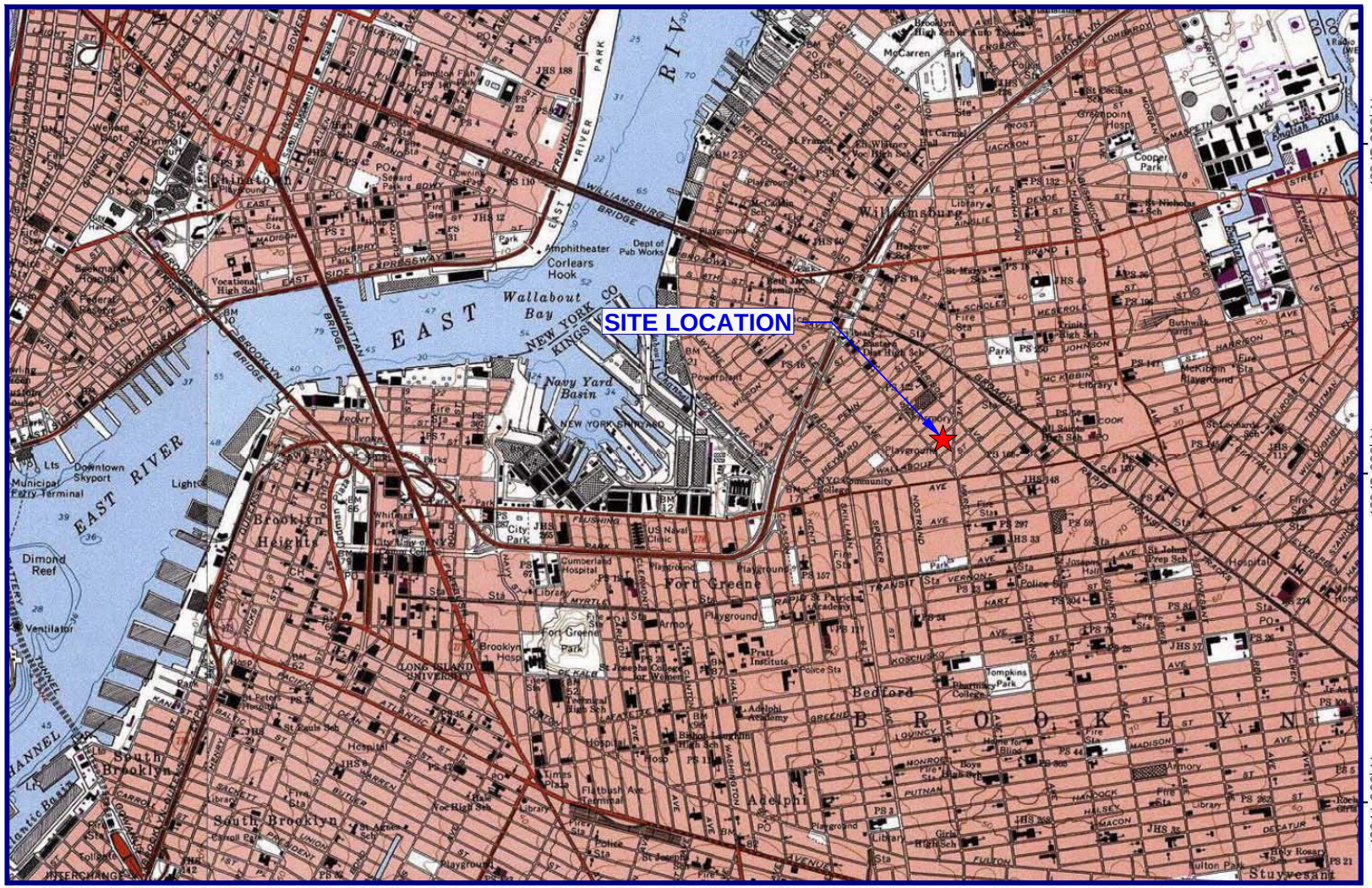
To Be Updated as Project Progresses

Permit	*Permit Number*	*Originating Agency*	*Pursuant to*	*Issued*	*Expires*	*Contact Phone*
No Permits Issued as of July 2013						

Table 18
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	1-718-246-4726

FIGURES

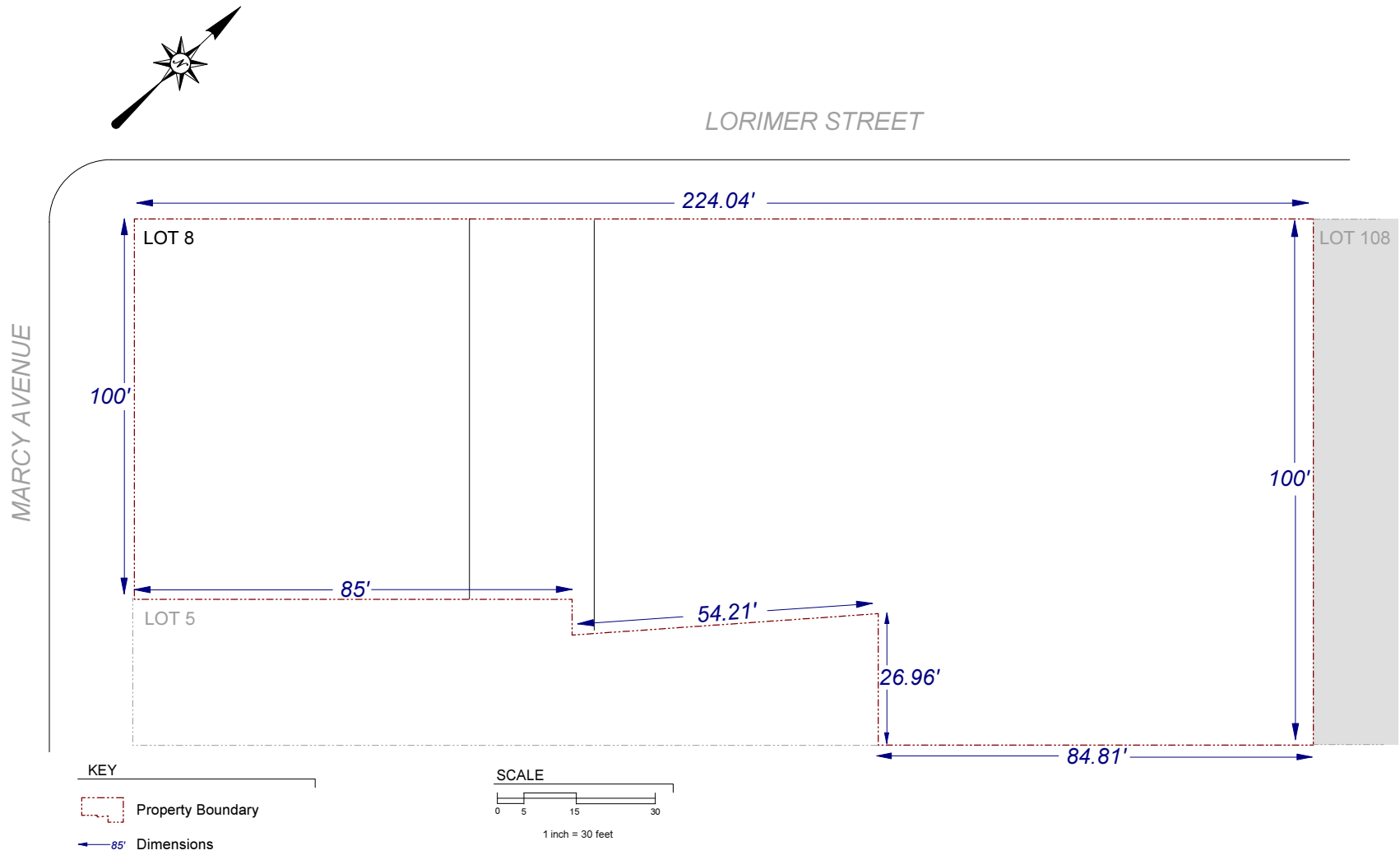


USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD. RIDGE. NY 11961
Phone 631.504.6000
Fax 631.924.2780

407 MARCY AVENUE
BROOKLYN, NY

FIGURE 1 SITE LOCATION MAP



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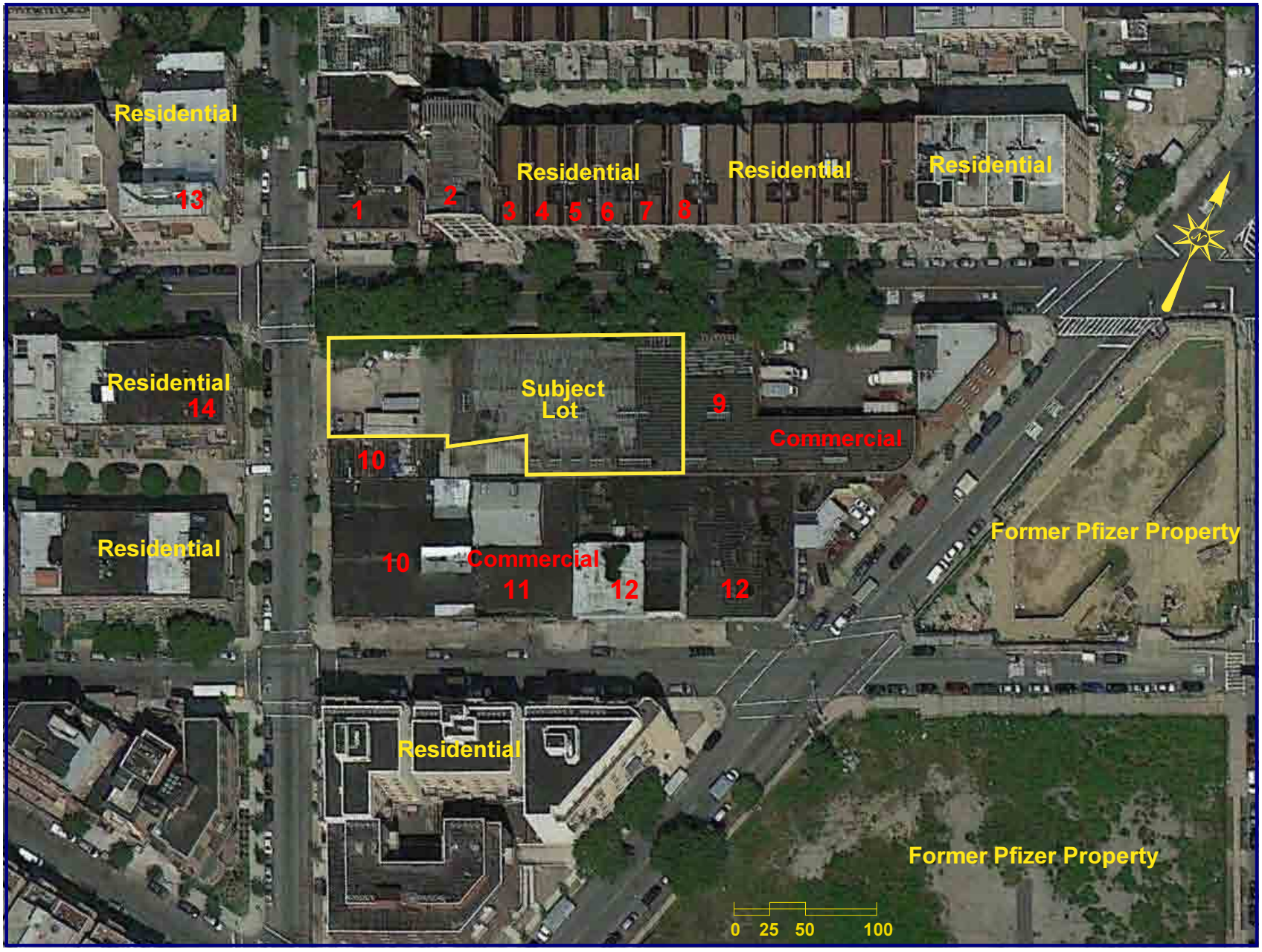
Fax 631. 924 .2870

Figure No. 2

Site Name:	FORMER CHARLES PFIZER & CO. SITE
Site Address:	407 MARCY AVENUE, BROOKLYN, NY
Drawing Title:	SITE PLAN



EBC
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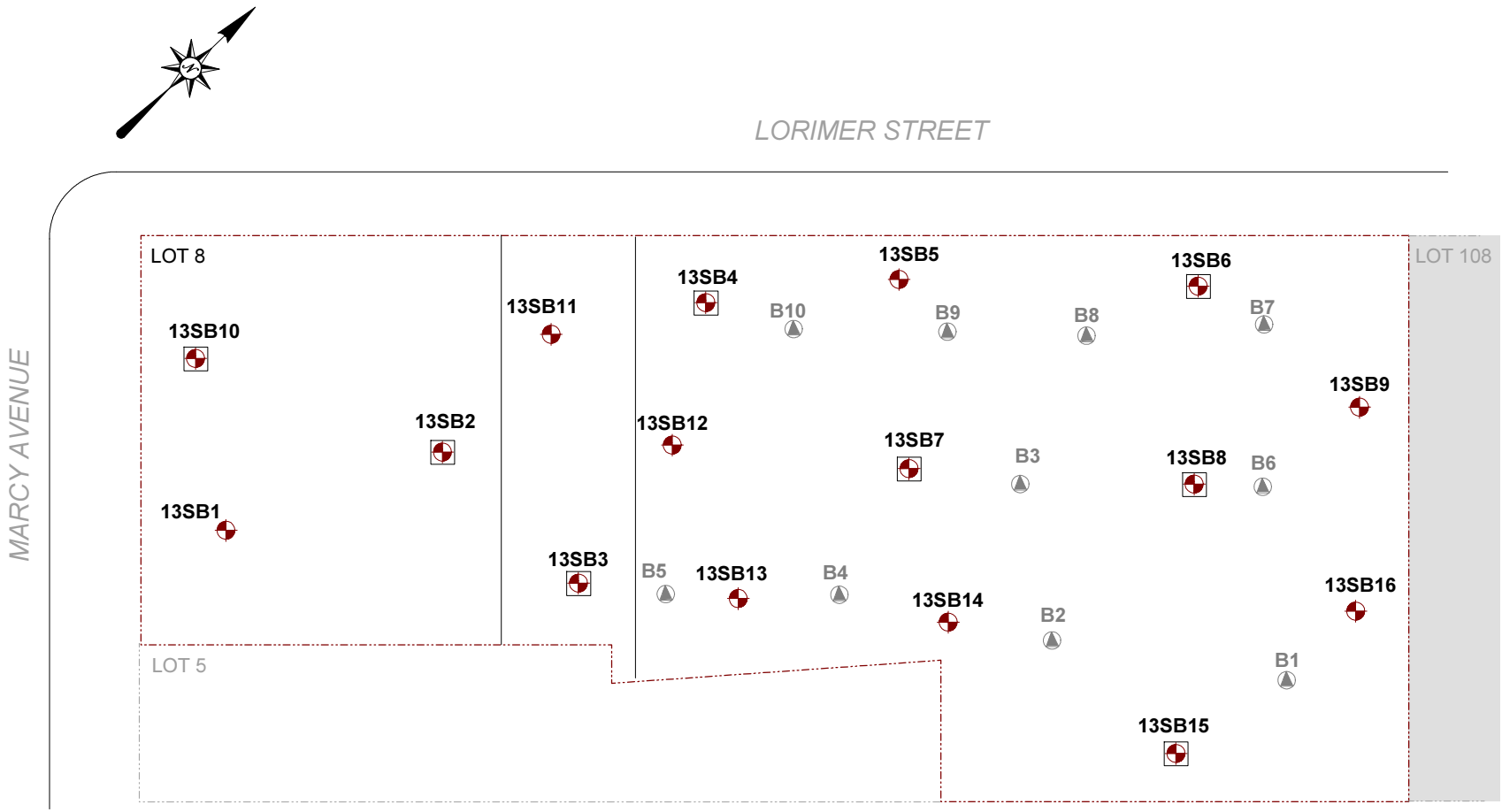
Phone: 631.504.6000
Fax: 631.924.2780

407 Marcy Avenue
Brooklyn, NY 11206

FIGURE 3 Project Site and Adjacent Properties



KEY

13SBx Soil Boring Location

Location includes analysis of additional parameters

Bx Previous Soil Boring Location

Property Boundary

SCALE

0 5 15 30

1 inch = 30 feet

EBC Environmental Business Consultants
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Figure No. 4

Site Name: FORMER CHARLES PFIZER & CO. SITE

Site Address: 407 MARCY AVENUE, BROOKLYN, NY

Drawing Title: SOIL BORING LOCATIONS

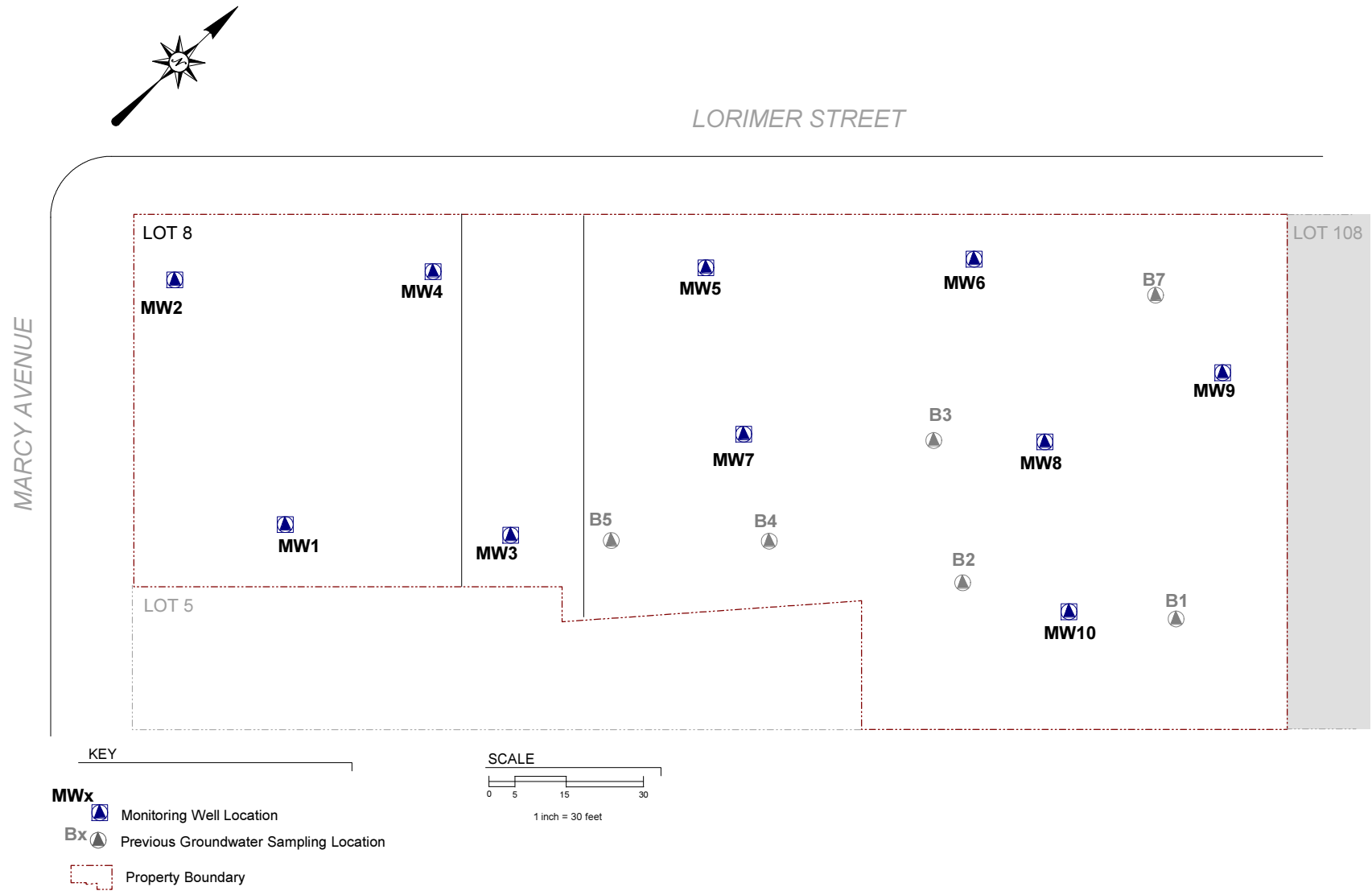

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Figure No. 5

Site Name: FORMER CHARLES PFIZER & CO. SITE
Site Address: 407 MARCY AVENUE, BROOKLYN, NY
Drawing Title: MONITORING WELL LOCATIONS

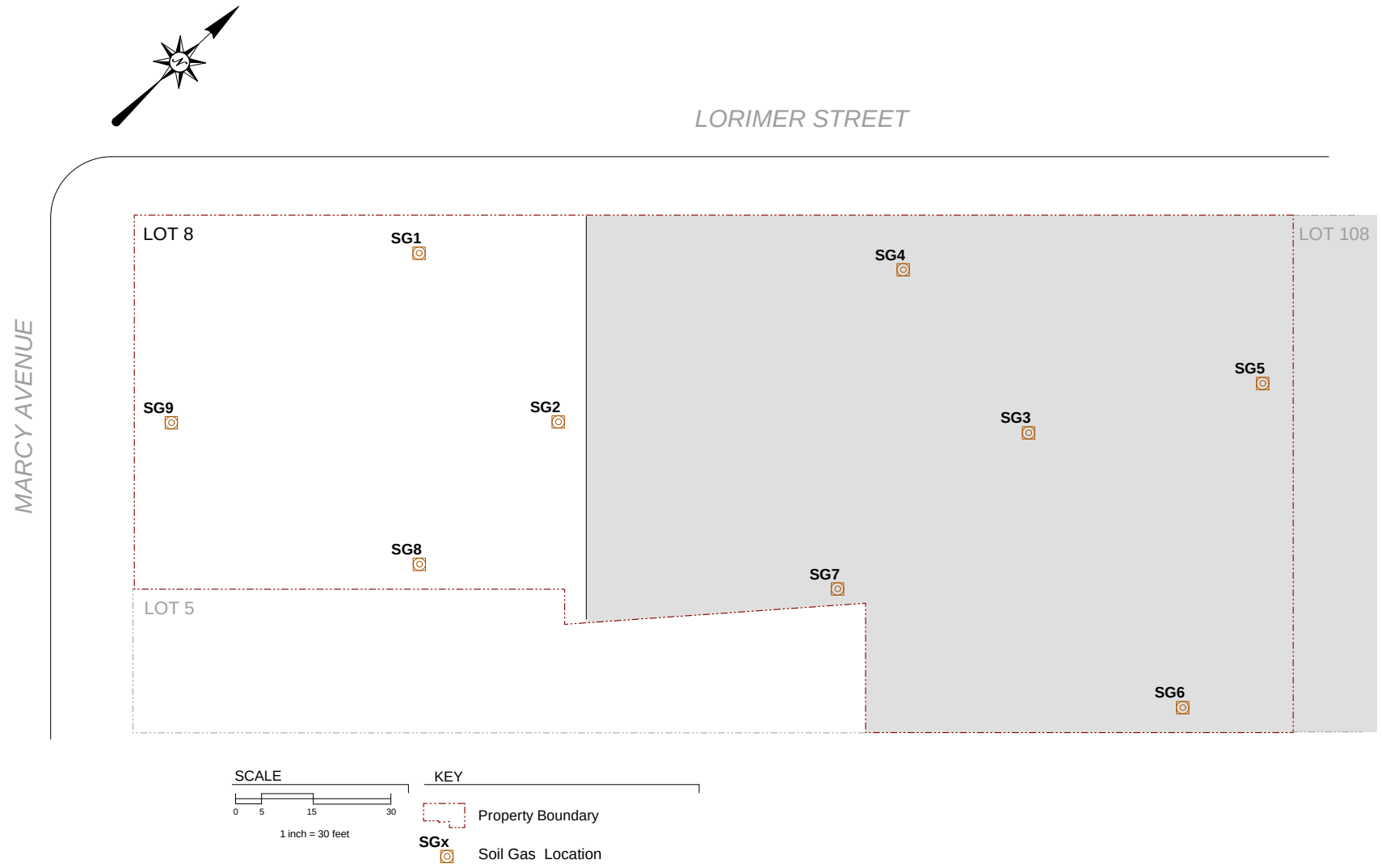

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Figure No. 6

Site Name: FORMER CHARLES PFIZER & CO. SITE
Site Address: 407 MARCY AVENUE, BROOKLYN, NY
Drawing Title: SOIL GAS LOCATIONS

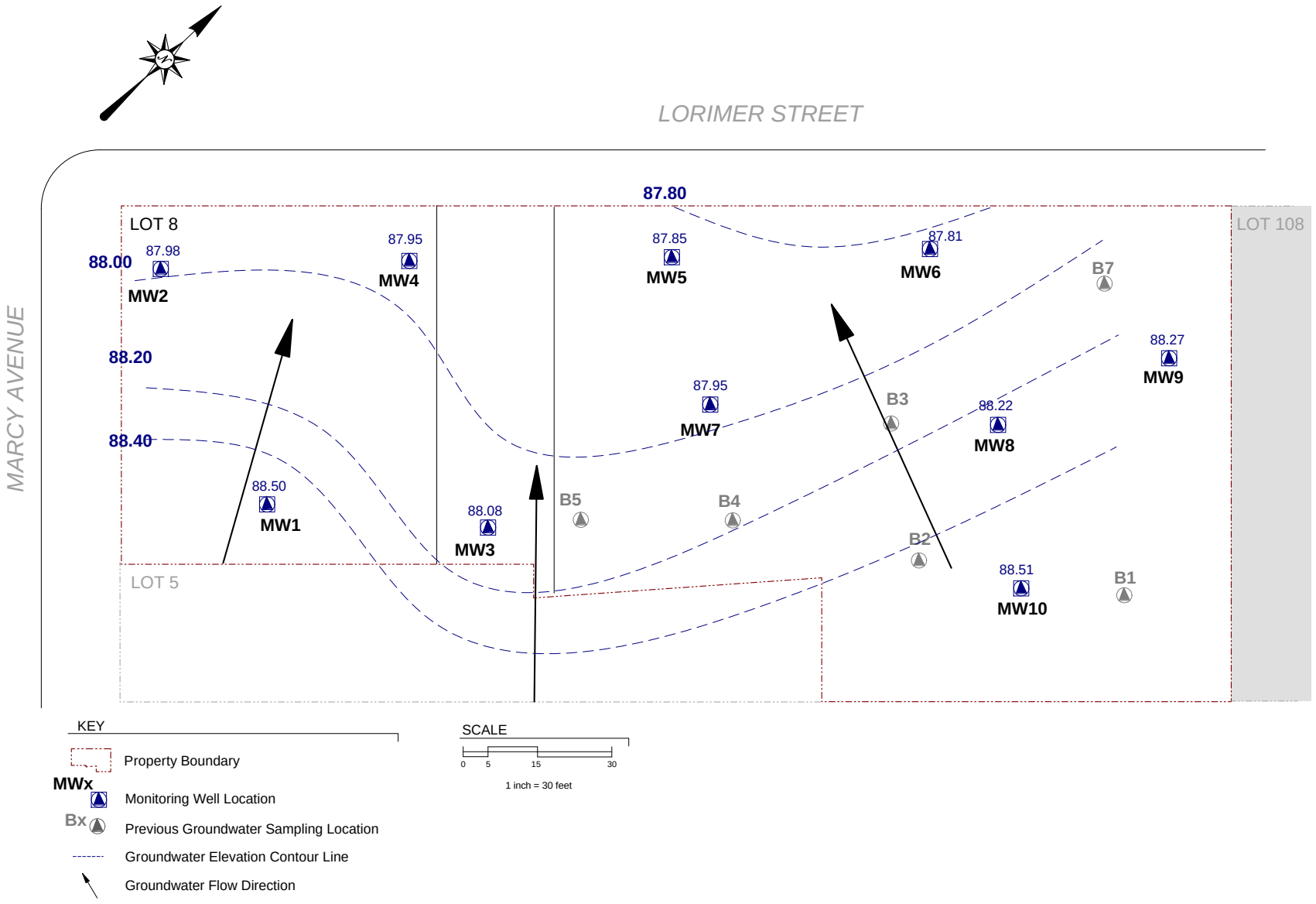

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Figure No. 7

Site Name: FORMER CHARLES PFIZER & CO. SITE
Site Address: 407 MARCY AVENUE, BROOKLYN, NY
Drawing Title: GROUNDWATER ELEVATION MAP

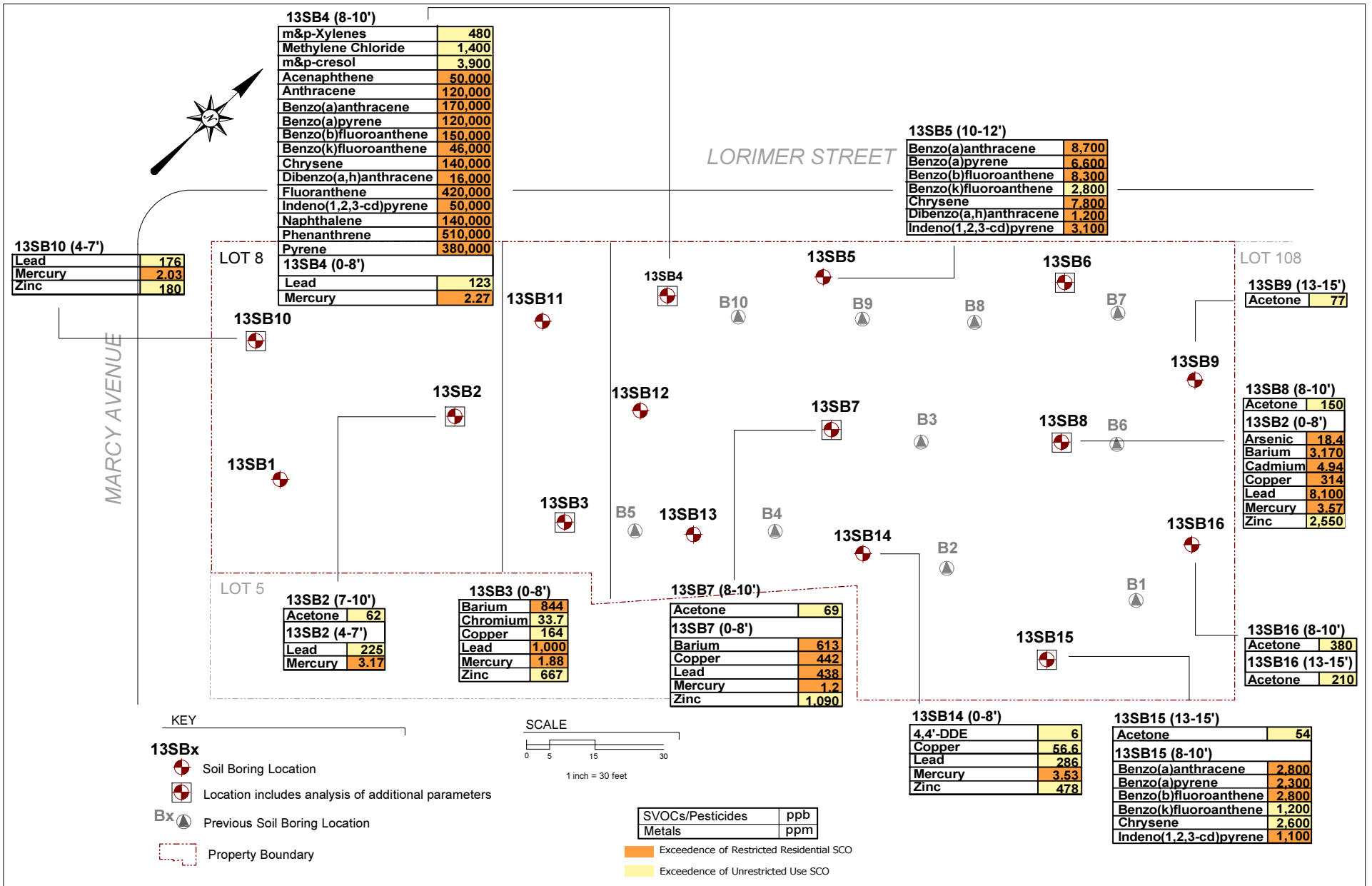

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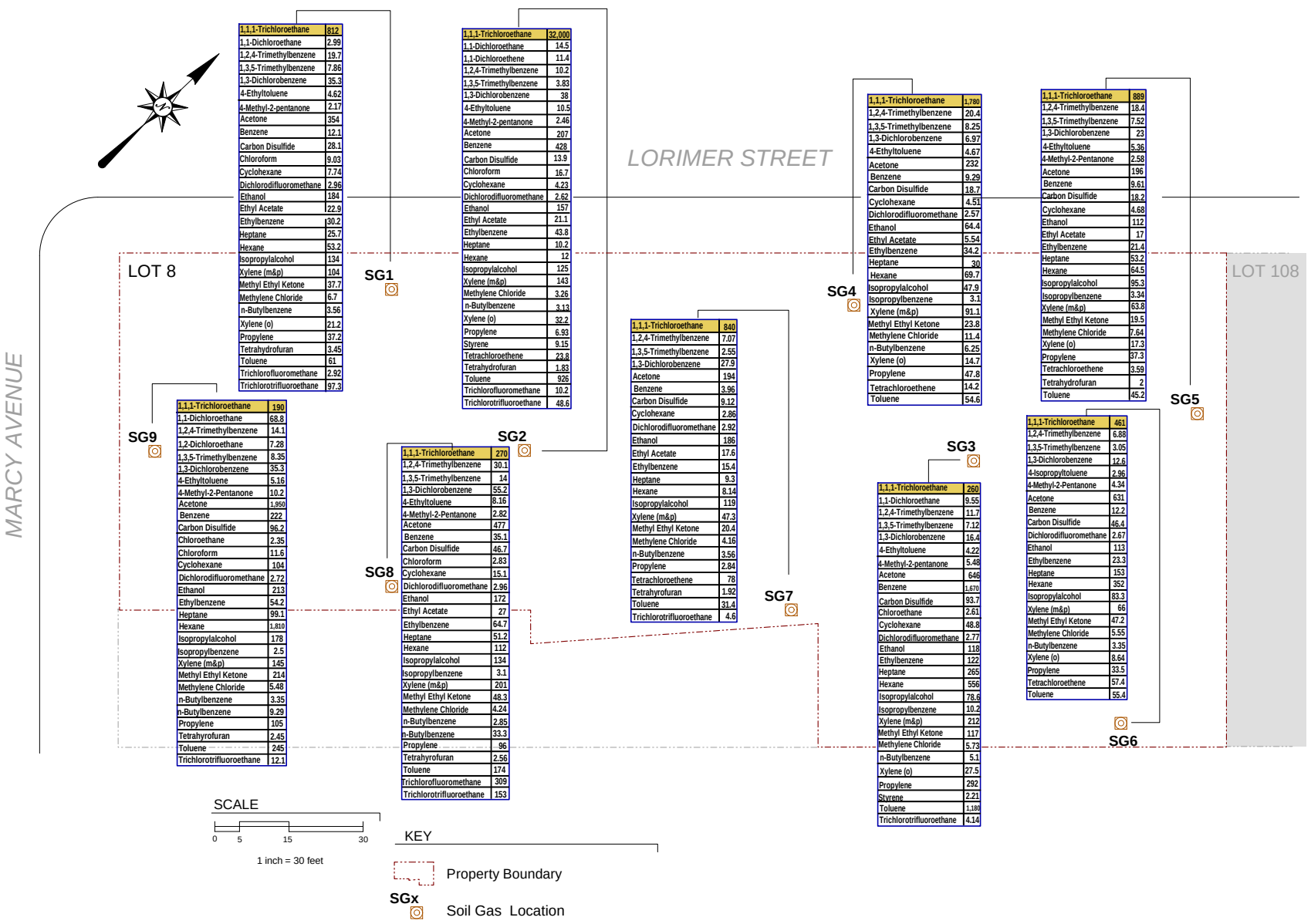
Figure No. 8

Site Name: FORMER CHARLES PFIZER & CO. SITE
Site Address: 407 MARCY AVENUE, BROOKLYN, NY
Drawing Title: SOIL EXCEEDENCES



SG1	
1,1,1-Trichloroethane	812
1,1-Dichloroethane	2.99
1,2,4-Trimethylbenzene	19.7
1,3,5-Trimethylbenzene	7.86
1,3-Dichlorobenzene	35.3
4-Ethyltoluene	4.62
4-Methyl-2-pentanone	2.17
Acetone	354
Benzene	12.1
Carbon Disulfide	28.1
Chloroform	9.03
Cyclohexane	7.74
Dichlorodifluoromethane	2.96
Ethanol	184
Ethyl Acetate	22.9
Ethylbenzene	30.2
Heptane	25.7
Hexane	53.2
Isopropylalcohol	134
Xylene (m&p)	104
Methyl Ethyl Ketone	37.7
Methylene Chloride	6.7
n-Butylbenzene	3.56
Xylene (o)	21.2
Propylene	37.2
Tetrahydrofuran	3.45
Toluene	61
Trichlorofluoromethane	2.92
Trichlorotrifluoroethane	97.3

SG2	
1,1,1-Trichloroethane	32,000
1,1-Dichloroethane	14.5
1,1-Dichloroethene	11.4
1,2,4-Trimethylbenzene	10.2
1,3,5-Trimethylbenzene	3.83
1,3-Dichlorobenzene	38
4-Ethyltoluene	10.5
4-Methyl-2-pentanone	2.46
Acetone	207
Benzene	428
Carbon Disulfide	13.9
Chloroform	16.7
Cyclohexane	4.23
Dichlorodifluoromethane	2.62
Ethanol	157
Ethyl Acetate	21.1
Ethylbenzene	43.8
Heptane	10.2
Hexane	12
Isopropylalcohol	125
Xylene (m&p)	143
Methylene Chloride	3.26
n-Butylbenzene	3.13
Xylene (o)	32.2
Propylene	6.93
Styrene	9.15
Tetrachloroethene	23.8
Tetrahydrofuran	1.83
Toluene	926
Trichlorofluoromethane	10.2
Trichlorotrifluoroethane	48.6

SG3	
1,1,1-Trichloroethane	260
1,1-Dichloroethane	9.55
1,2,4-Trimethylbenzene	11.7
1,3,5-Trimethylbenzene	7.12
1,3-Dichlorobenzene	16.4
4-Ethyltoluene	4.22
4-Methyl-2-pentanone	5.48
Acetone	646
Benzene	1,670
Carbon Disulfide	93.7
Chloroethane	2.61
Cyclohexane	48.8
Dichlorodifluoromethane	2.77
Ethanol	118
Ethylbenzene	122
Heptane	265
Hexane	556
Isopropylalcohol	78.6
Isopropylbenzene	10.2
Xylene (m&p)	212
Methyl Ethyl Ketone	117
Methylene Chloride	5.73
n-Butylbenzene	5.1
Xylene (o)	27.5
Propylene	292
Styrene	2.21
Toluene	1,180
Trichlorotrifluoroethane	4.14

SG4	
1,1,1-Trichloroethane	1,780
1,2,4-Trimethylbenzene	20.4
1,3,5-Trimethylbenzene	8.25
1,3-Dichlorobenzene	6.97
4-Ethyltoluene	4.67
Acetone	232
Benzene	9.29
Carbon Disulfide	18.7
Cyclohexane	4.51
Dichlorodifluoromethane	2.57
Ethanol	64.4
Ethyl Acetate	5.54
Ethylbenzene	34.2
Heptane	30
Hexane	69.7
Isopropylalcohol	47.9
Isopropylbenzene	3.1
Xylene (m&p)	91.1
Methyl Ethyl Ketone	23.8
Methylene Chloride	11.4
n-Butylbenzene	6.25
Xylene (o)	14.7
Propylene	47.8
Tetrachloroethene	14.2
Toluene	54.6

SG5	
1,1,1-Trichloroethane	889
1,2,4-Trimethylbenzene	16.4
1,3,5-Trimethylbenzene	7.52
1,3-Dichlorobenzene	23
4-Ethyltoluene	5.36
4-Methyl-2-Pentanone	2.58
Acetone	196
Benzene	9.61
Carbon Disulfide	18.2
Cyclohexane	4.68
Ethanol	112
Ethyl Acetate	17
Ethylbenzene	21.4
Heptane	53.2
Hexane	64.5
Isopropylalcohol	95.3
Isopropylbenzene	3.34
Xylene (m&p)	63.8
Methyl Ethyl Ketone	19.5
Methylene Chloride	7.64
Xylene (o)	17.3
Propylene	37.3
Tetrachloroethene	3.59
Tetrahydrofuran	2
Toluene	45.2

SG6	
1,1,1-Trichloroethane	461
1,2,4-Trimethylbenzene	6.88
1,3,5-Trimethylbenzene	3.05
1,3-Dichlorobenzene	12.6
4-Isopropyltoluene	2.96
4-Methyl-2-Pentanone	4.34
Acetone	631
Benzene	12.2
Carbon Disulfide	46.4
Dichlorodifluoromethane	2.67
Ethanol	113
Ethylbenzene	23.3
Heptane	153
Hexane	352
Isopropylalcohol	83.3
Xylene (m&p)	66
Methyl Ethyl Ketone	47.2
Methylene Chloride	5.55
n-Butylbenzene	3.35
Xylene (o)	8.64
Propylene	33.5
Tetrachloroethene	57.4
Toluene	55.4

SG7	
1,1,1-Trichloroethane	840
1,2,4-Trimethylbenzene	7.07
1,3,5-Trimethylbenzene	2.55
1,3-Dichlorobenzene	27.9
Acetone	194
Benzene	3.96
Carbon Disulfide	9.12
Cyclohexane	2.86
Dichlorodifluoromethane	2.92
Ethanol	186
Ethyl Acetate	17.6
Ethylbenzene	15.4
Heptane	9.3
Hexane	8.14
Isopropylalcohol	119
Xylene (m&p)	47.3
Methyl Ethyl Ketone	20.4
Methylene Chloride	4.16
n-Butylbenzene	3.56
Propylene	2.84
Tetrachloroethene	78
Tetrahyrofuran	1.92
Toluene	31.4
Trichlorotrifluoroethane	4.6

SG8	
1,1,1-Trichloroethane	270
1,2,4-Trimethylbenzene	30.1
1,3,5-Trimethylbenzene	14
1,3-Dichlorobenzene	55.2
4-Ethyltoluene	8.16
4-Methyl-2-Pentanone	2.82
Acetone	477
Benzene	35.1
Carbon Disulfide	46.7
Chloroform	2.83
Cyclohexane	15.1
Dichlorodifluoromethane	2.96
Ethanol	172
Ethyl Acetate	27
Ethylbenzene	64.7
Heptane	51.2
Hexane	112
Isopropylalcohol	134
Isopropylbenzene	3.1
Xylene (m&p)	201
Methyl Ethyl Ketone	48.3
Methylene Chloride	4.24
n-Butylbenzene	2.85
n-Butylbenzene	33.3
Propylene	96
Tetrahyrofuran	2.56
Toluene	174
Trichlorofluoromethane	309
Trichlorotrifluoroethane	153

SG9	
1,1,1-Trichloroethane	190
1,1-Dichloroethane	68.8
1,2,4-Trimethylbenzene	14.1
1,2-Dichloroethane	7.28
1,3,5-Trimethylbenzene	8.35
1,3-Dichlorobenzene	35.3
4-Ethyltoluene	5.16
4-Methyl-2-Pentanone	10.2
Acetone	1,950
Benzene	222
Carbon Disulfide	96.2
Chloroethane	2.35
Chloroform	11.6
Cyclohexane	104
Dichlorodifluoromethane	2.72
Ethanol	213
Ethylbenzene	54.2
Heptane	99.1
Hexane	1,810
Isopropylalcohol	178
Isopropylbenzene	2.5
Xylene (m&p)	145
Methyl Ethyl Ketone	214
Methylene Chloride	5.48
n-Butylbenzene	3.35
n-Butylbenzene	9.29
Propylene	105
Tetrahyrofuran	2.45
Toluene	245
Trichlorotrifluoroethane	12.1

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Figure No. 10

Site Name: FORMER CHARLES PFIZER & CO. SITE
Site Address: 407 MARCY AVENUE, BROOKLYN, NY
Drawing Title: SOIL GAS DECTECTIONS

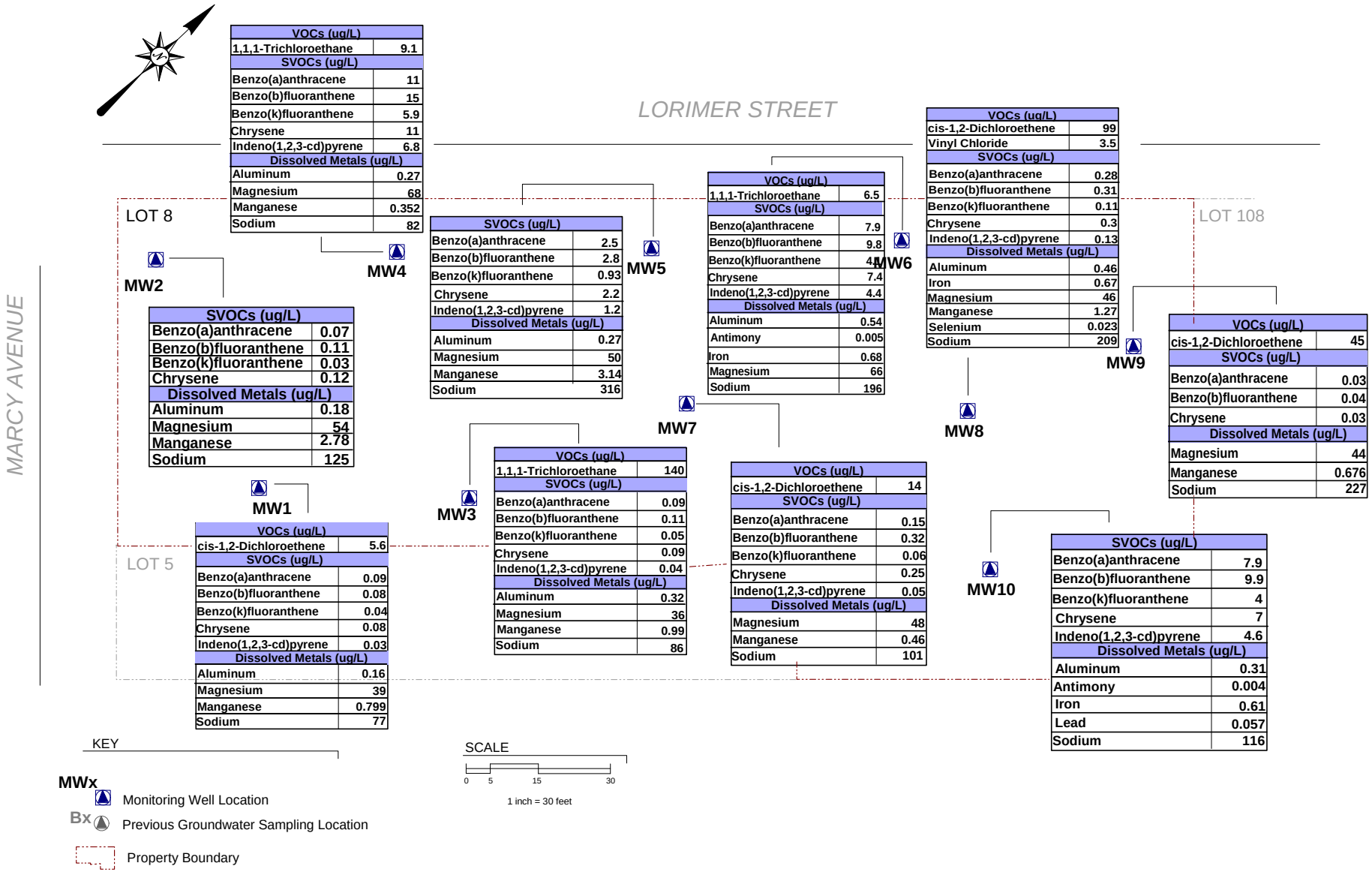

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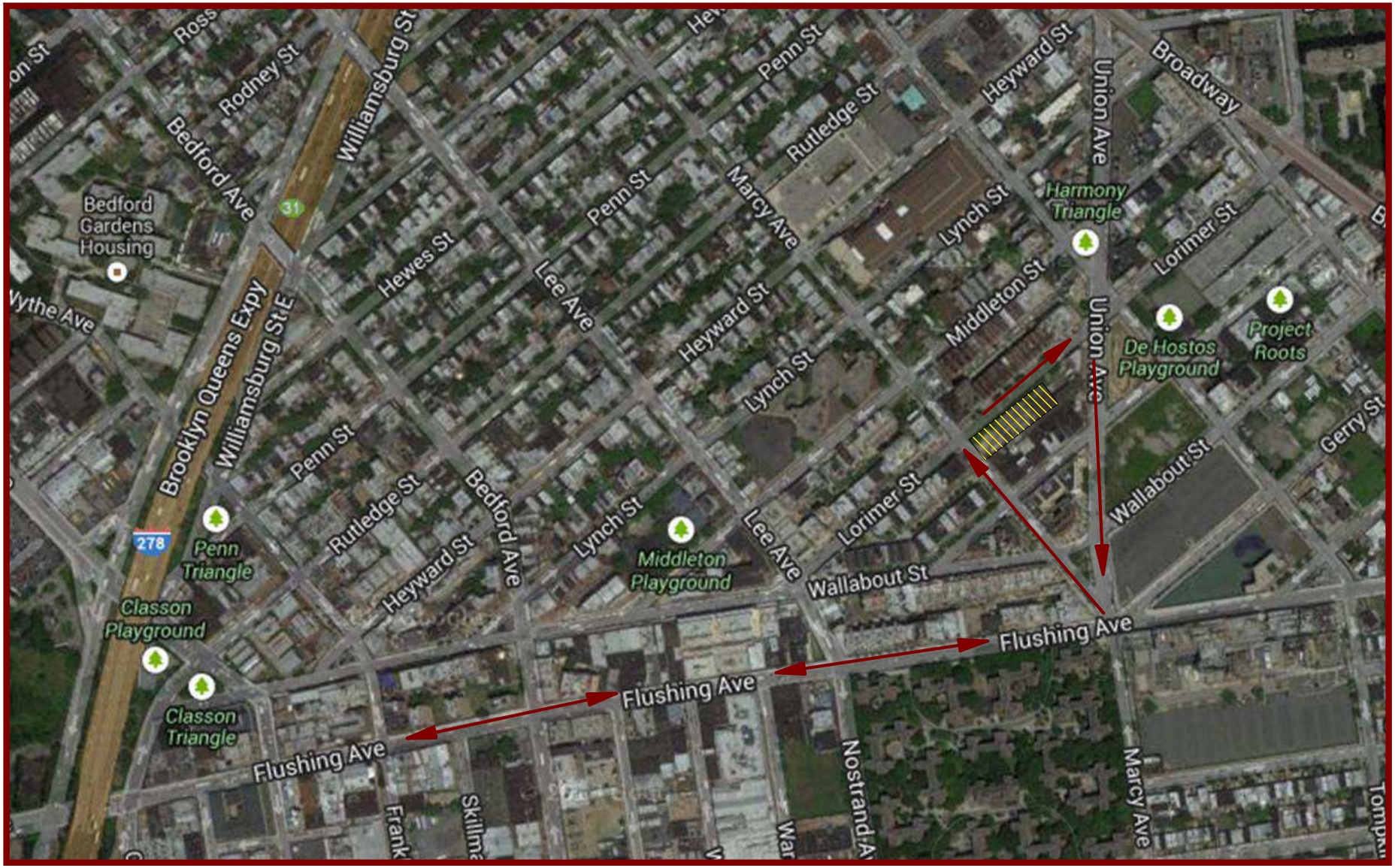
Figure No. 9

Site Name: FORMER CHARLES PFIZER & CO. SITE
Site Address: 407 MARCY AVENUE, BROOKLYN, NY
Drawing Title: GROUNDWATER EXCEEDENCES



SITE LOCATION

IN-BOUND / OOUT-BOUND ROUTE

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Figure No. 11

Site Name:	FORMER CHARLES PFIZER & CO. SITE
Site Address:	407 MARCY AVENUE, BROOKLYN, NY
Drawing Title:	TRUCK ROUTE MAP

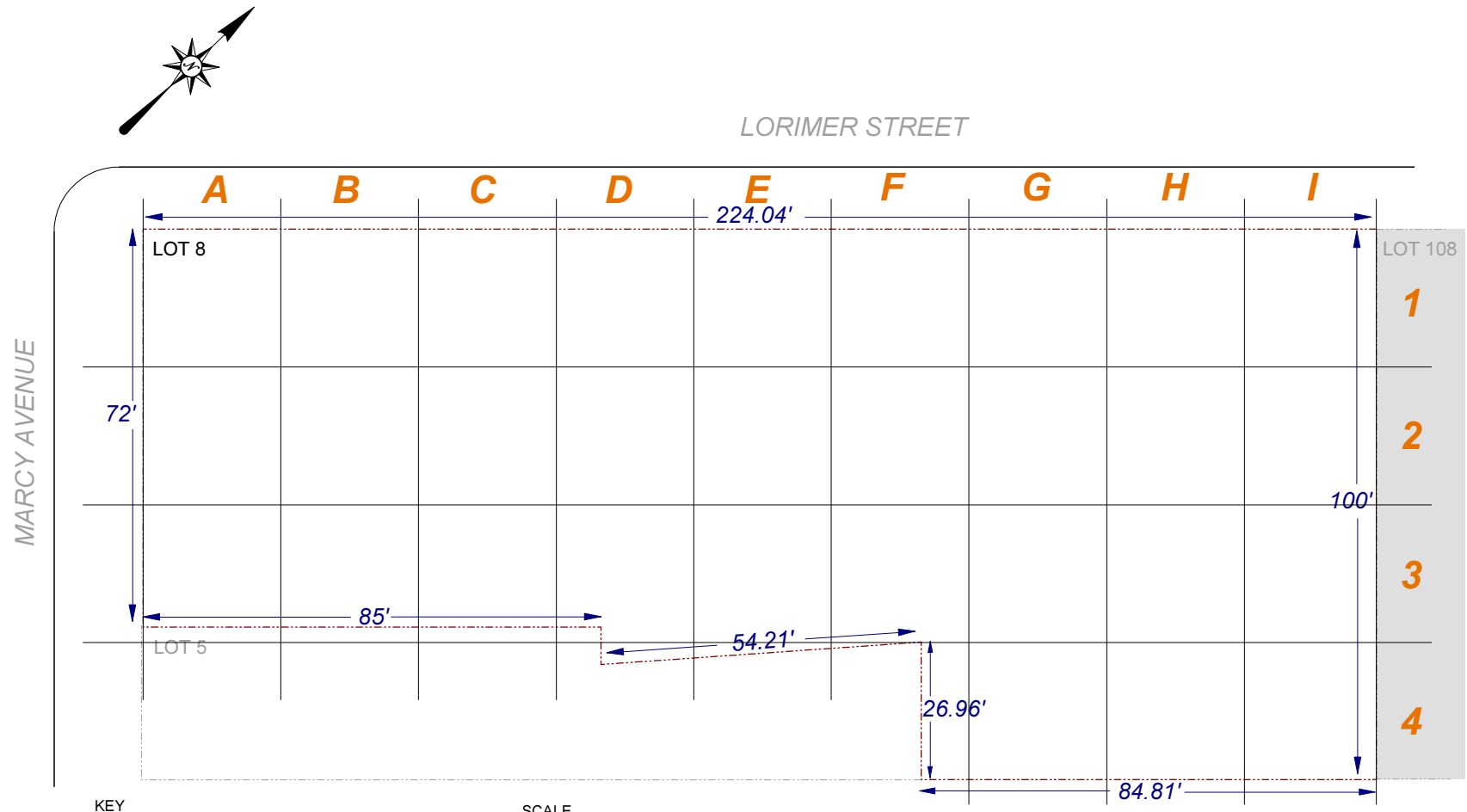

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Figure No. 12

Site Name:	FORMER CHARLES PFIZER & CO. SITE
Site Address:	407 MARCY AVENUE, BROOKLYN, NY
Drawing Title:	ALPHA NUMERIC GRID

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:

BEGINNING at the intersection of the southeasterly side of Lorimer Street with the northeasterly side of Marcy Avenue as said streets are laid down on the city map;

RUNNING THENCE southeasterly along the northeasterly side of Marcy Avenue, 72 feet;

THENCE northeasterly parallel with Lorimer Street, 85 feet;

THENCE southeasterly parallel with Marcy Avenue *5* feet 4 inches to the division line between land now or formerly of A. Remsen and land formerly of Jeremiah Johnson;

THENCE northeasterly along said division line 40 feet 2 3/8 inches to an angle point therein distant 73 feet 3 inches southeasterly from Lorimer Street and 125 feet northeasterly from the northeasterly side of Marcy Avenue;

THENCE still northeasterly along said division line 14 feet to a point distant 73 feet 0 1/4 inches southeasterly from the southeasterly side of Lorimer Street and 139 feet northeasterly from the northeasterly side of Marcy Avenue;

THENCE southeasterly parallel with Marcy Avenue and 139 feet northeasterly therefrom 26 feet 11 3/4 inches to the center line of the block;

THENCE northeasterly along the center line of the block 260 feet 11 7/8 inches to the westerly side of Union Avenue;

THENCE northerly along the westerly side of Union Avenue 17 feet 0 1/4 inches to a line drawn parallel with Harrison Avenue and 213 feet 9 inches southwesterly therefrom;

THENCE northwesterly parallel with Harrison Avenue 87 feet 2 7/8 inches to the southeasterly side of Lorimer Street; THENCE southwesterly along the southeasterly side of Lorimer Street 411 feet 3 inches to the point or place of BEGINNING.

ATTACHMENT B
Sanborn Maps

407 Marcy Avenue
407-413 MARCY AVE, 62-96 Lorimer Street
Brooklyn, NY 11206

Inquiry Number: 3457485.3
November 19, 2012

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

11/19/12

Site Name:
407 Marcy Avenue
407-413 MARCY AVE, 62-96
Brooklyn, NY 11206

Client Name:
Env. Business Consultants
1808 Middle Country Road
Ridge, NY 11961

EDR Inquiry # 3457485.3

Contact: Dominick Mosca

EDR® Environmental Data Resources Inc

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Env. Business Consultants were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name: 407 Marcy Avenue
Address: 407-413 MARCY AVE, 62-96 Lorimer Street
City, State, Zip: Brooklyn, NY 11206
Cross Street:
P.O. # NA
Project: TRG
Certification # 3A42-43F8-A78E

Maps Provided:

2007	2001	1989	1980	1935
2006	1996	1987	1979	1918
2005	1995	1986	1977	1904
2004	1993	1984	1965	1887
2003	1992	1982	1950	
2002	1991	1981	1947	

Sanborn® Library search results
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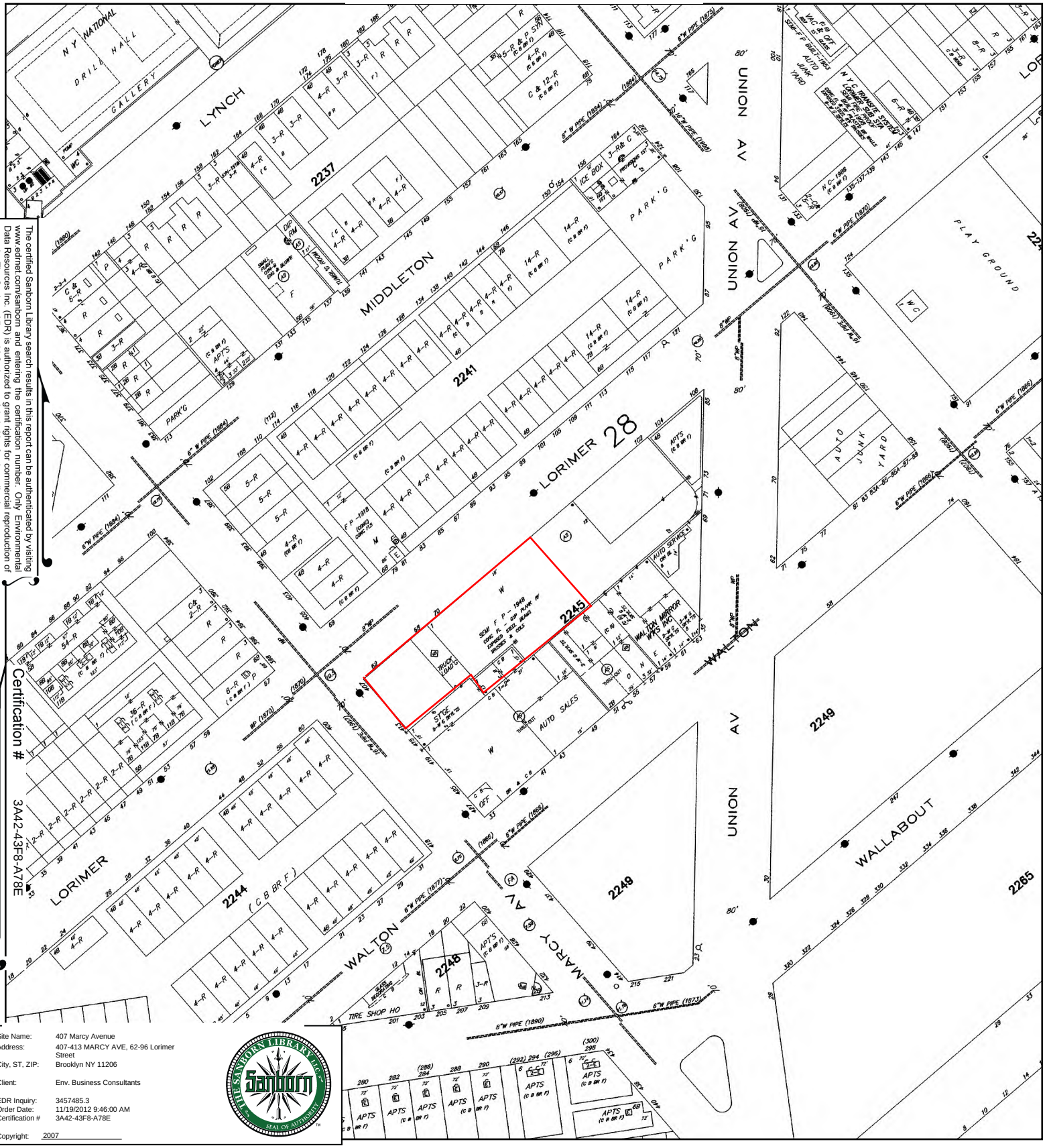

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Address:	407-413 MARCY AVE, 62-96 Lorimer Street
City, ST, ZIP:	Brooklyn NY 11206
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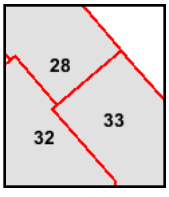

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Volume 3, Sheet 33

0 Feet 150 300 600

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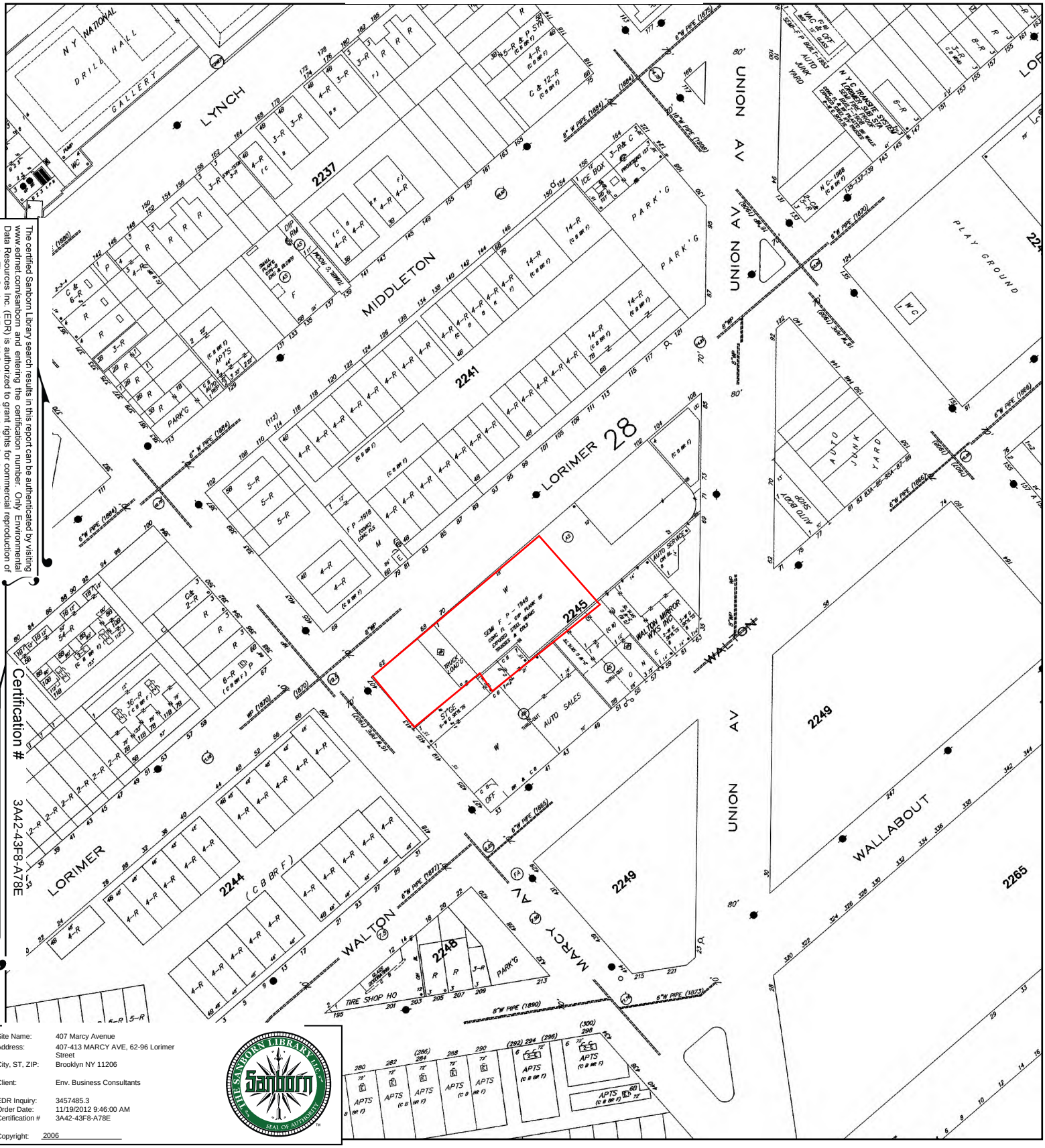

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City, ST, ZIP:	Brooklyn NY 11206
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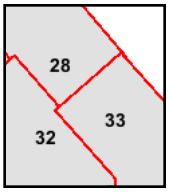

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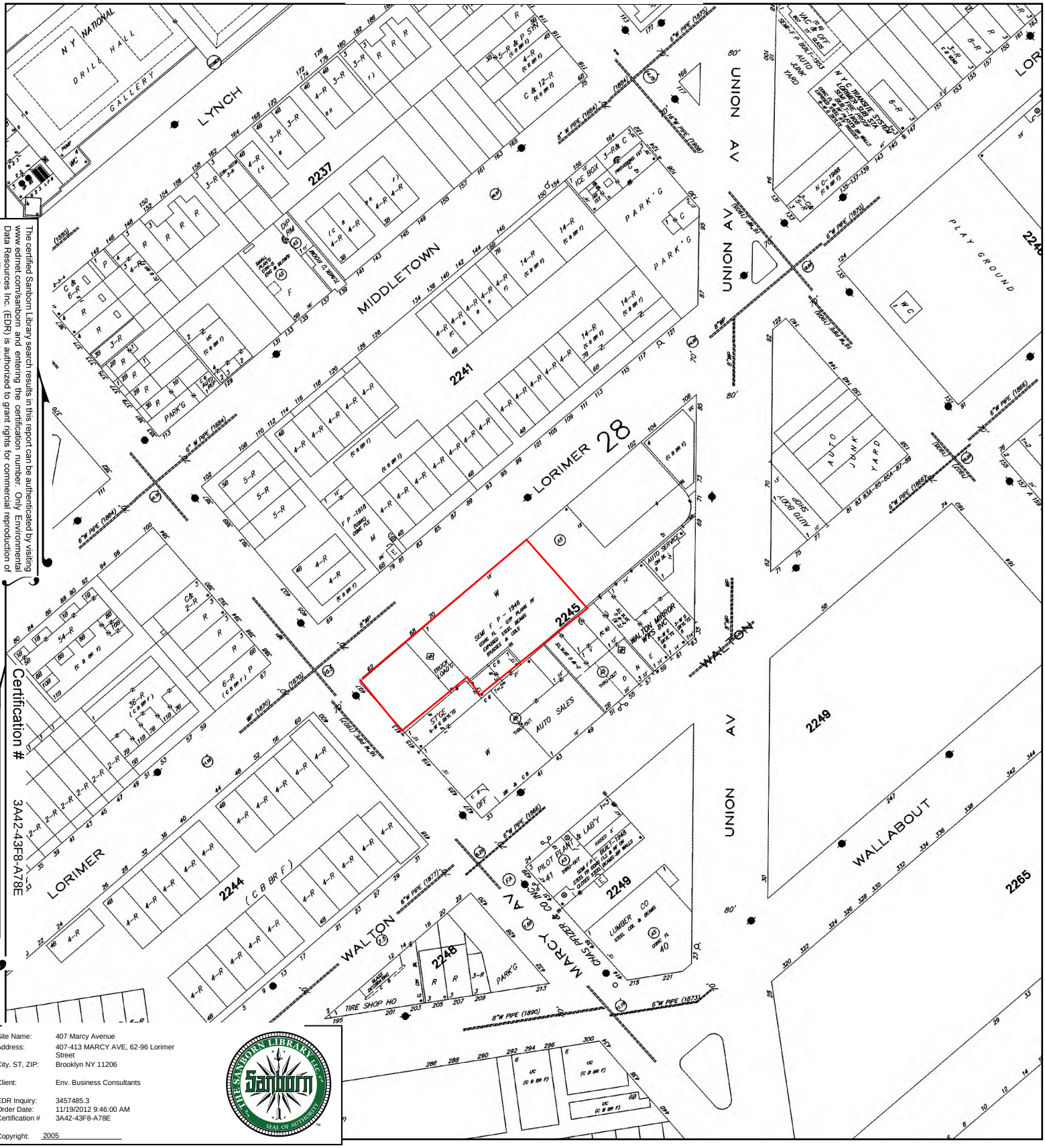

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Site Name:	407 Marcy Avenue
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City, ST, ZIP:	Brooklyn NY 11206
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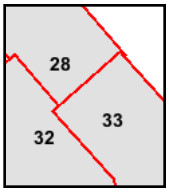

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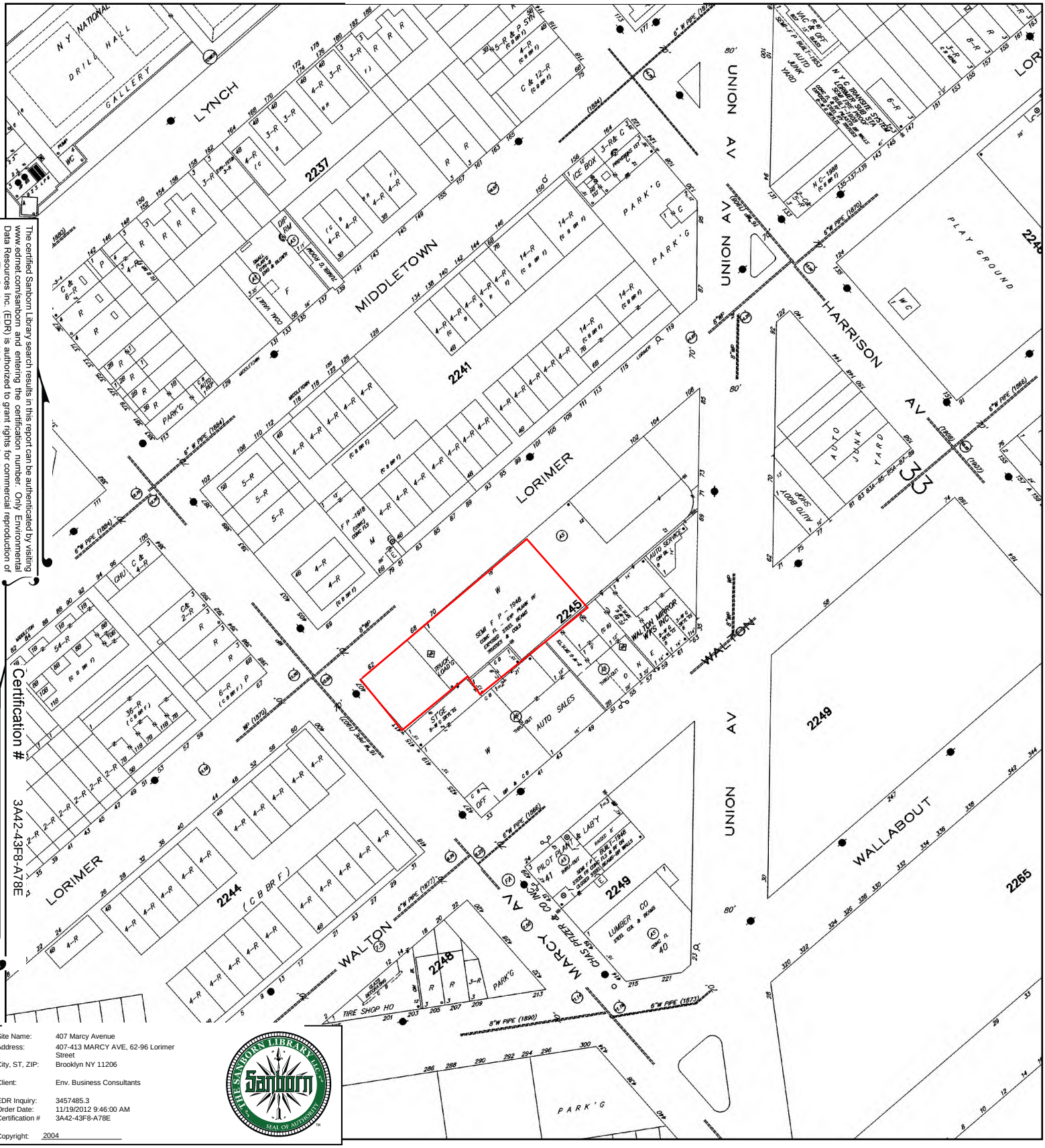

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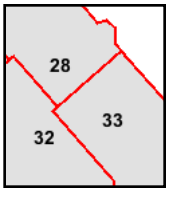

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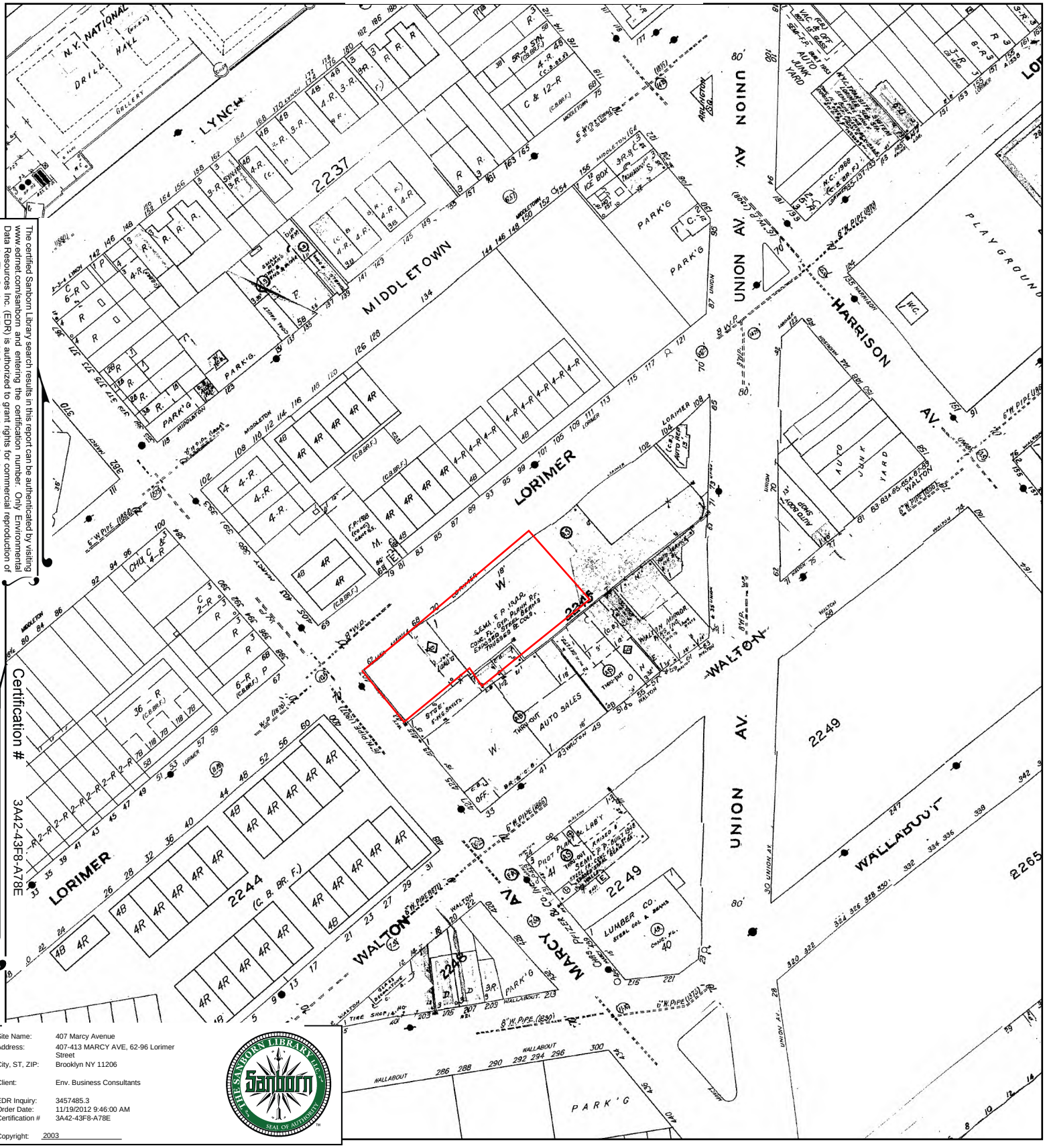

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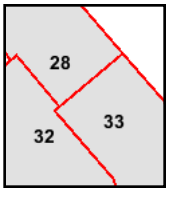

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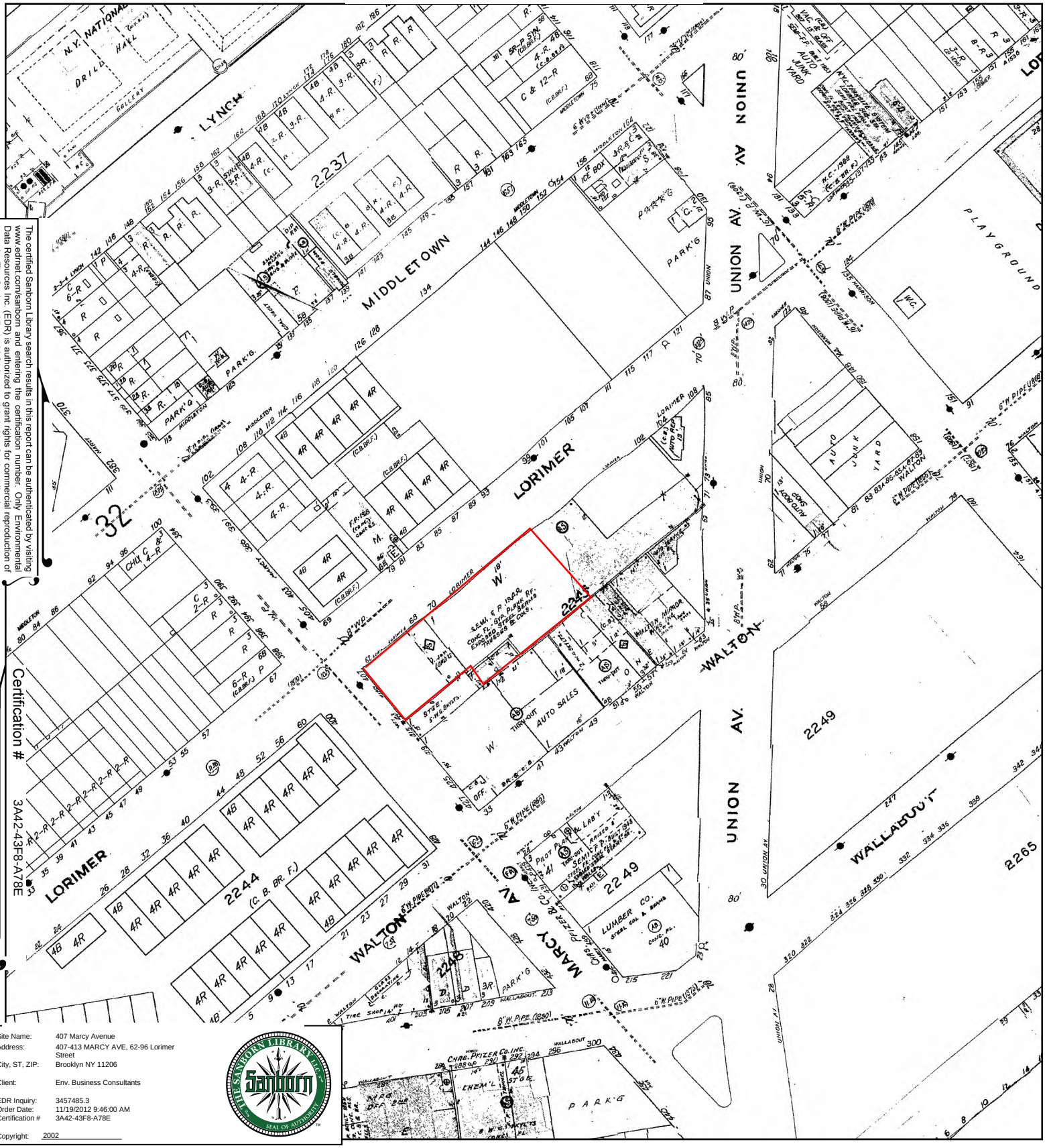

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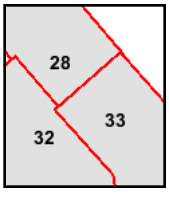

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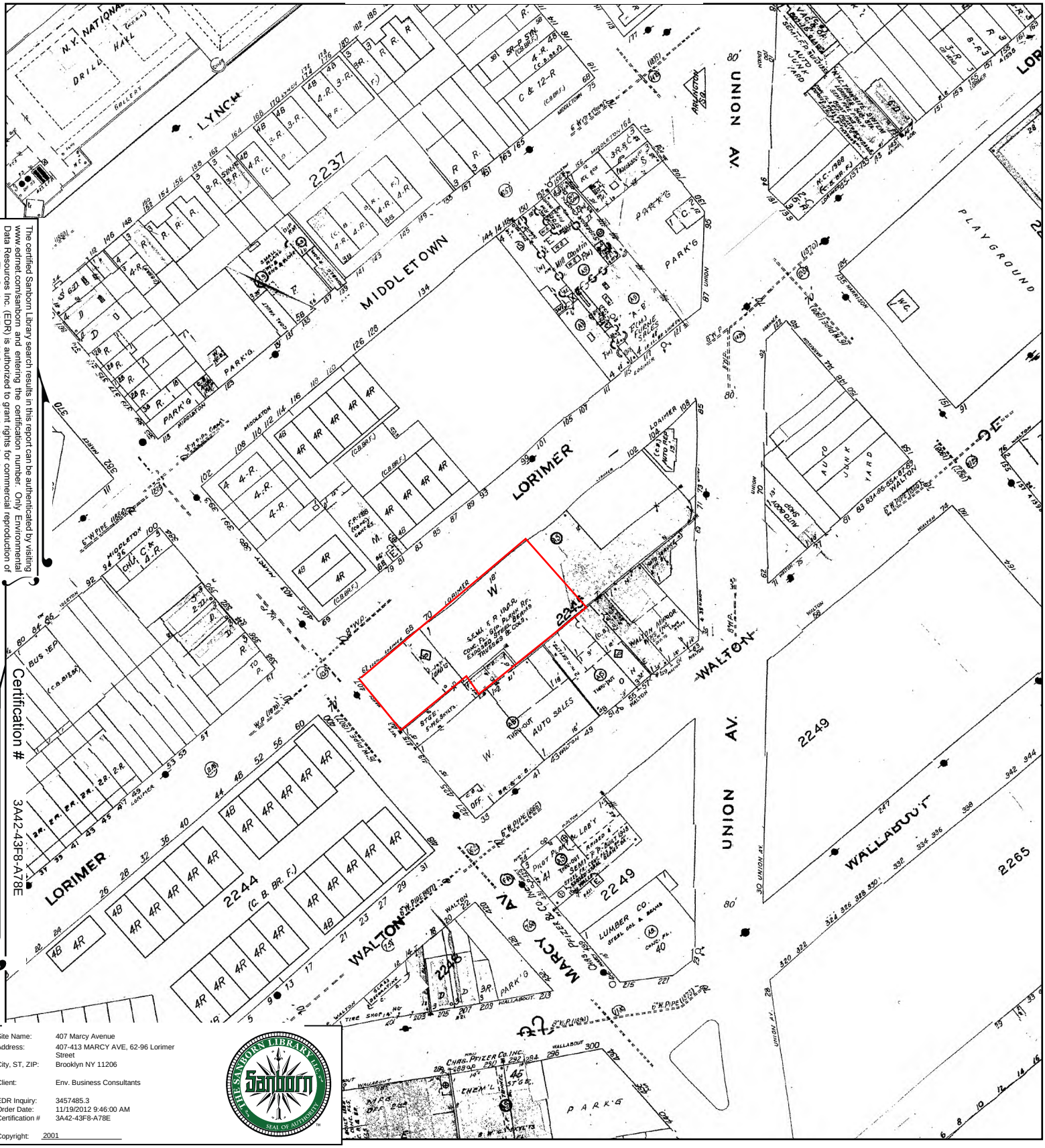
2001 Certified Sanborn Map



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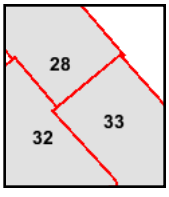

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Volume 3, Sheet 28

0 Feet 150 300 600

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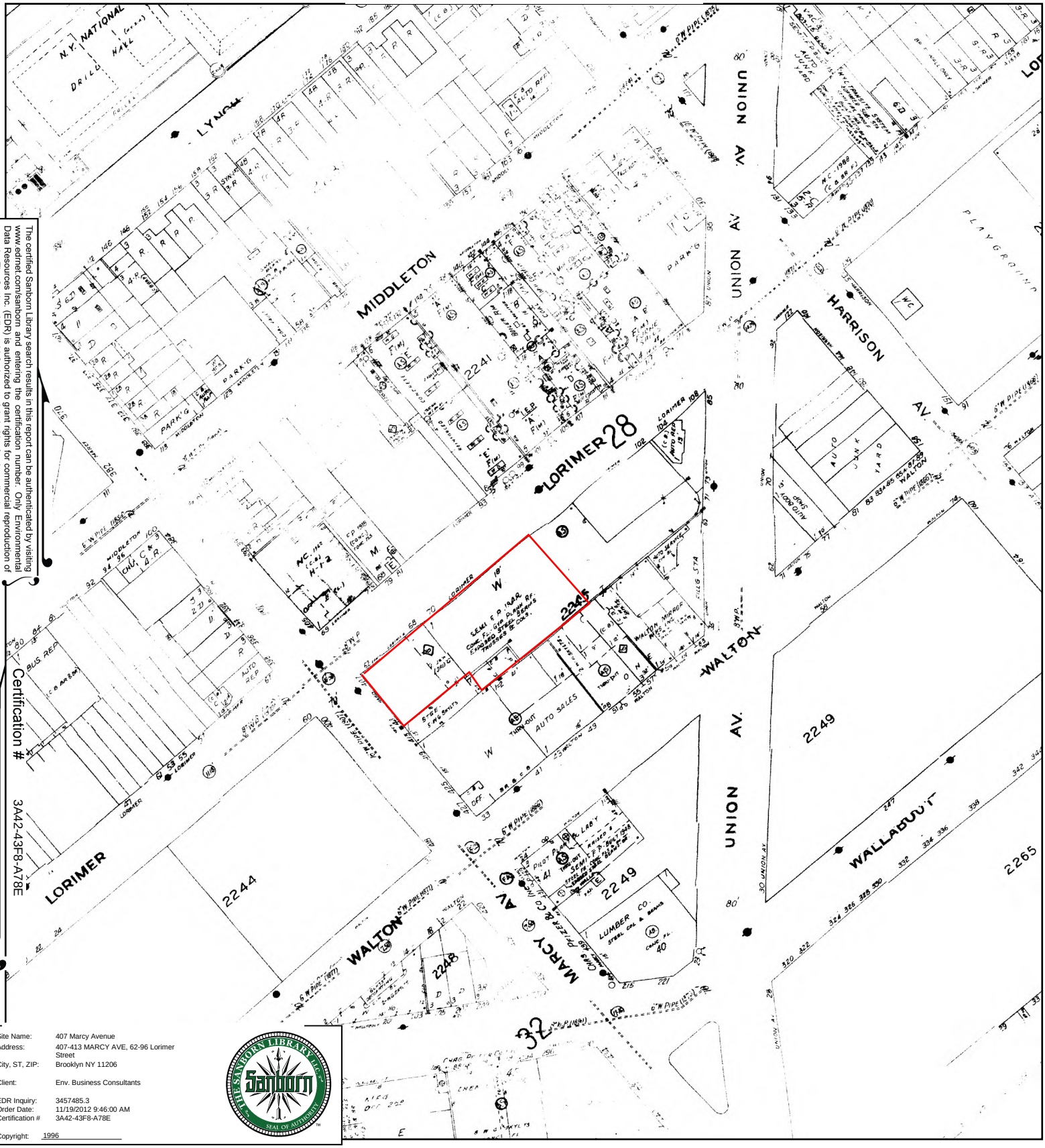
1996 Certified Sanborn Map



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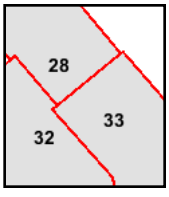

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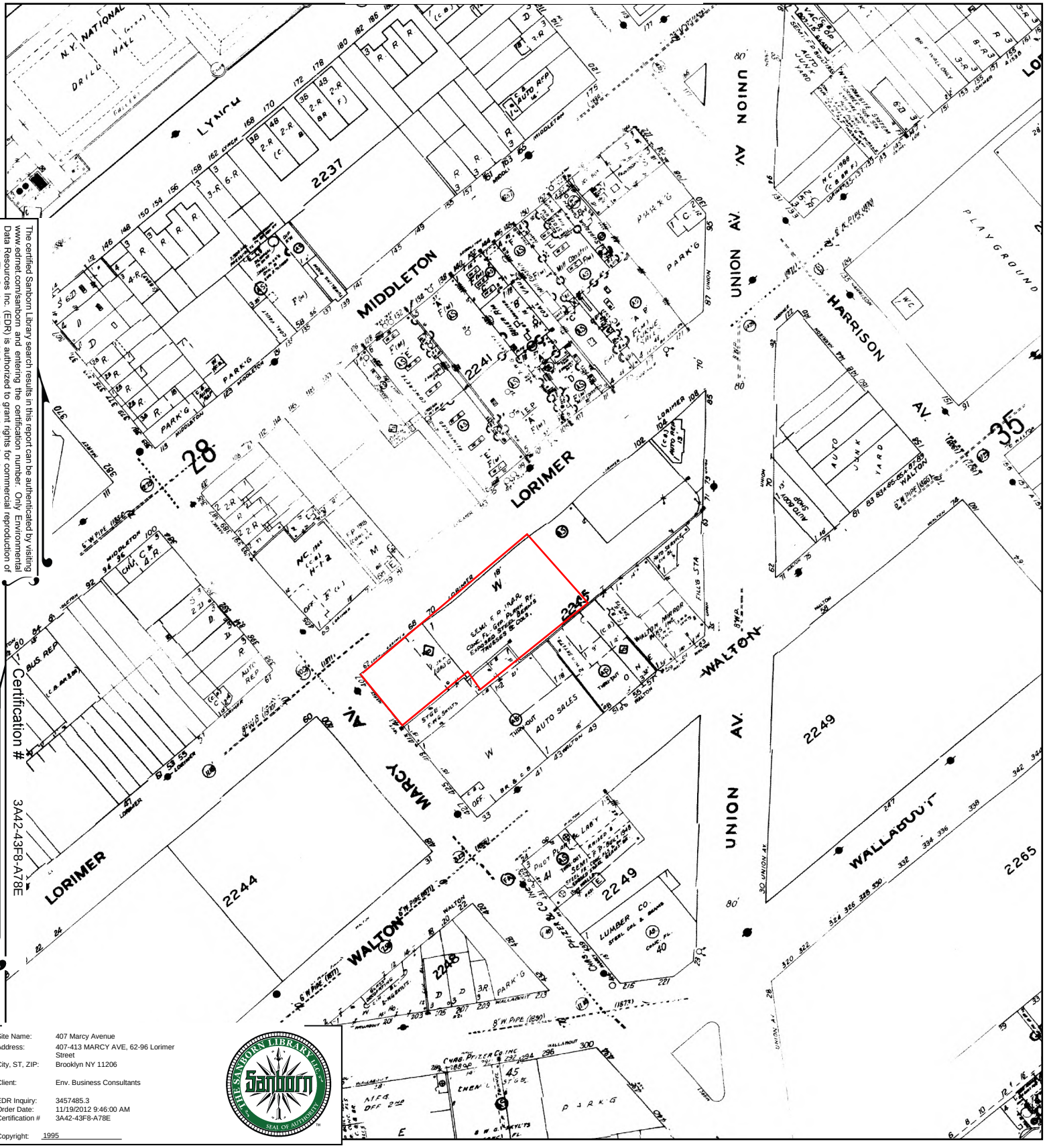

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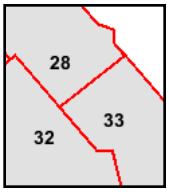

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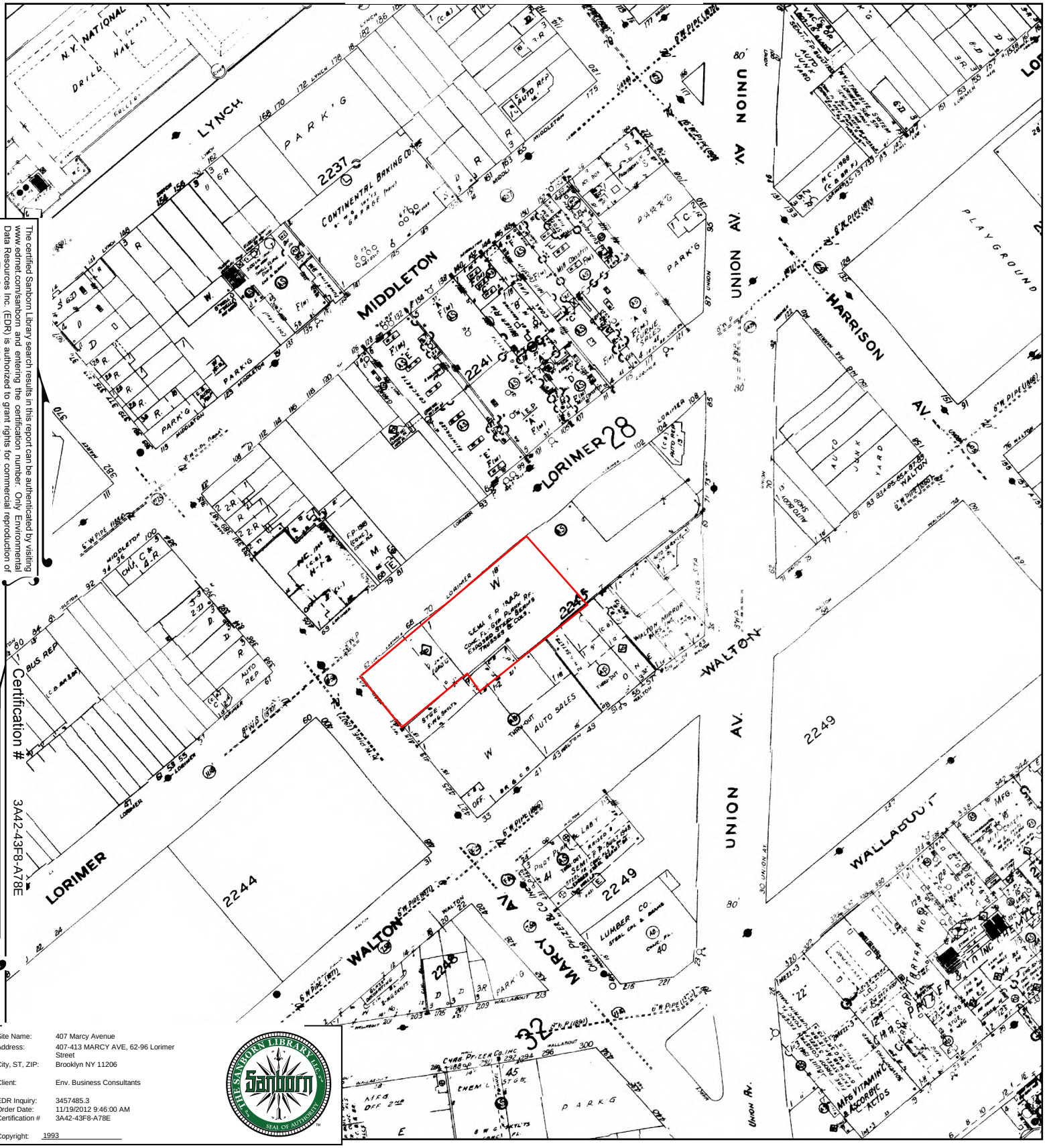

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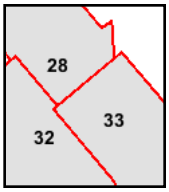

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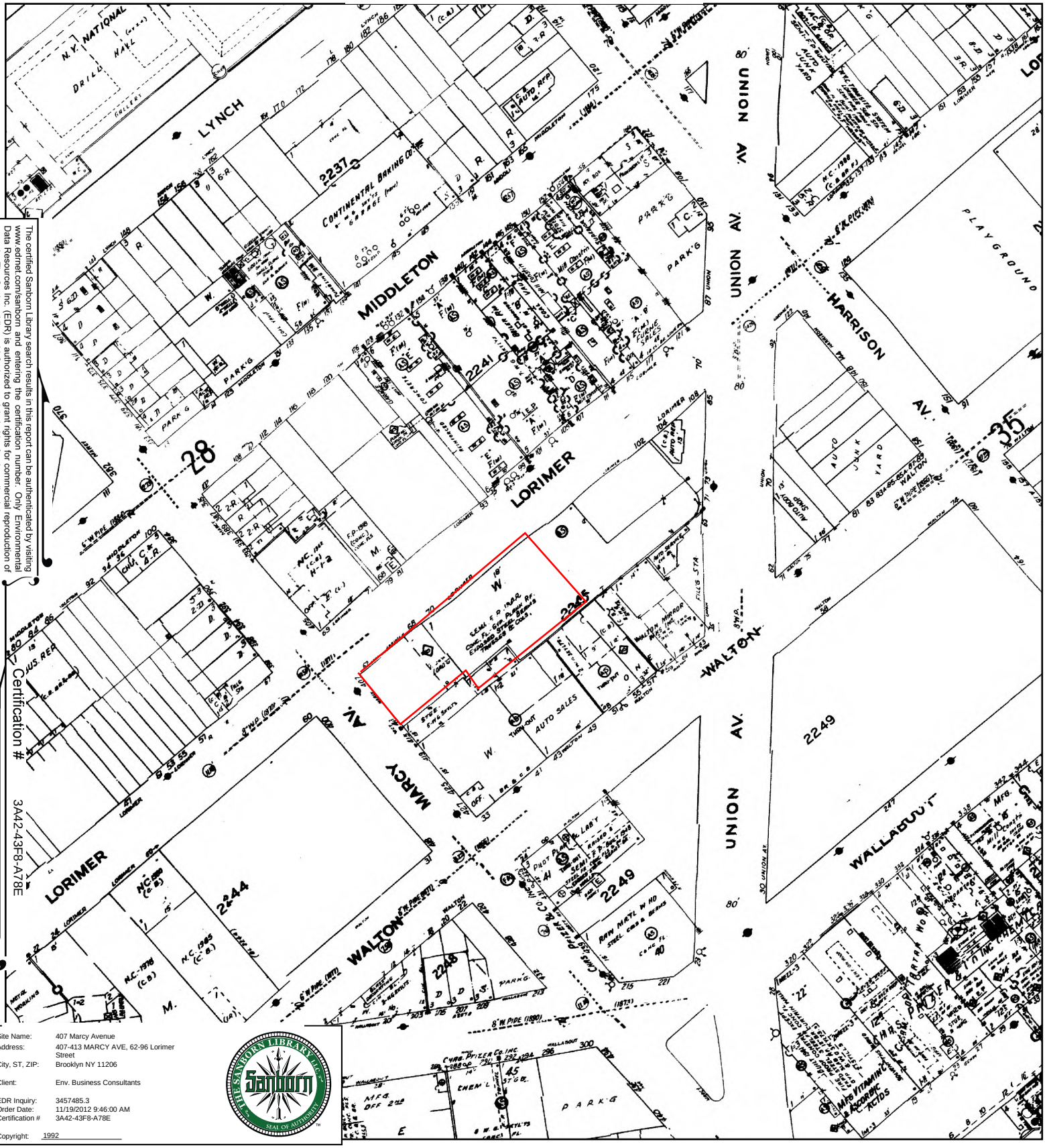

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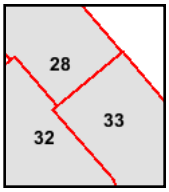

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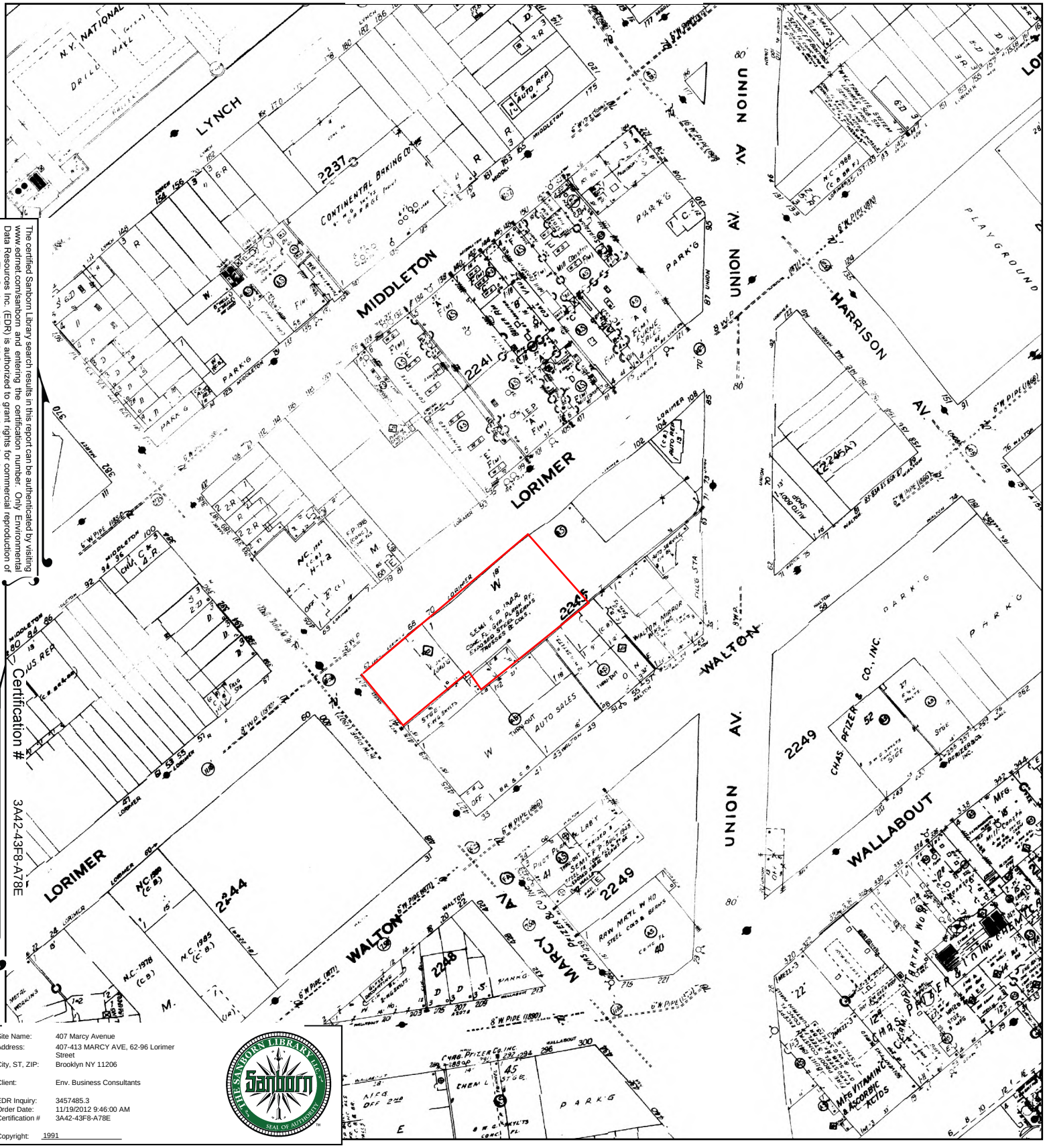

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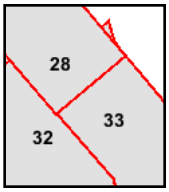

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Volume 3, Sheet 28
Volume 6, Sheet 28

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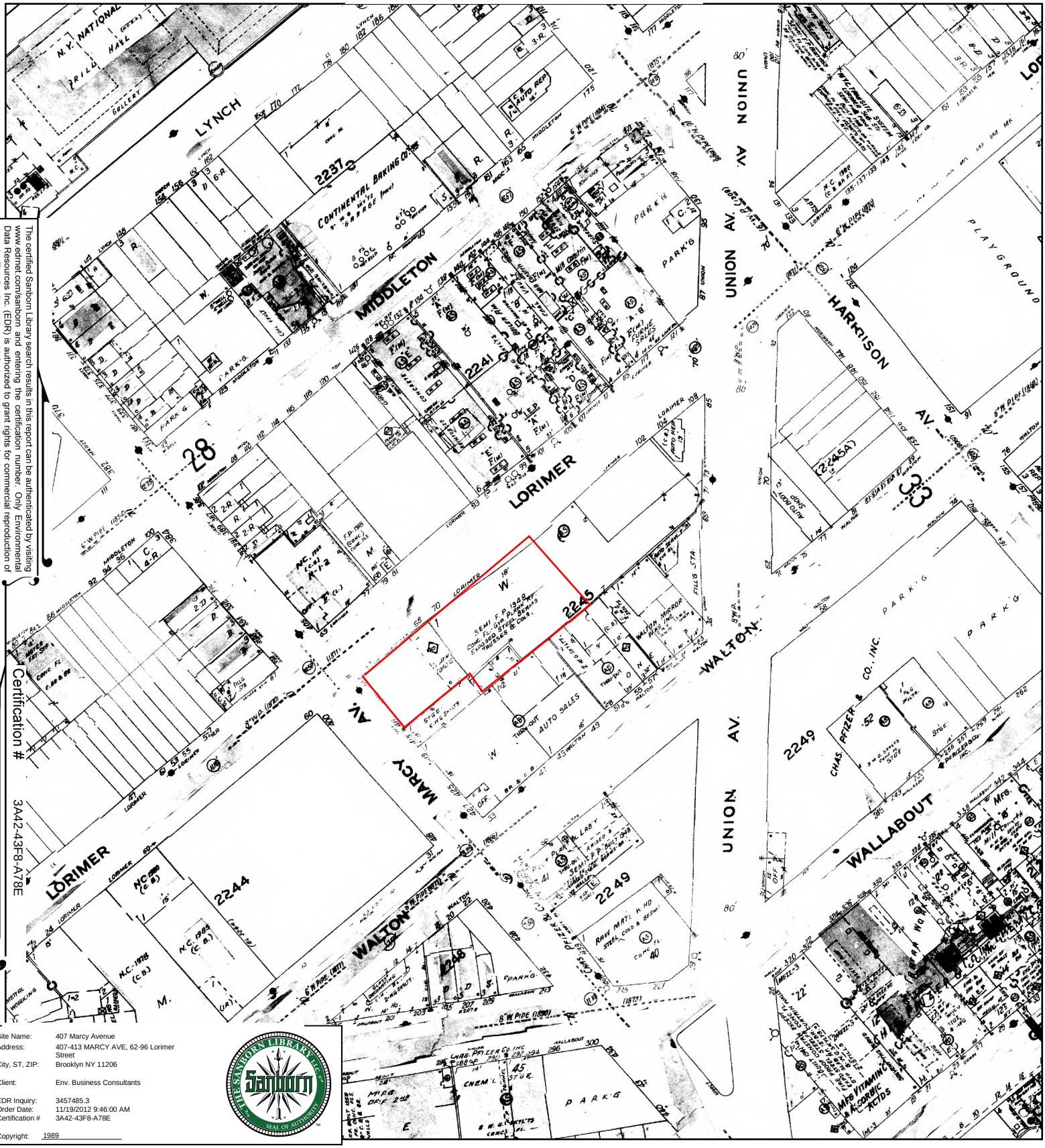
1989 Certified Sanborn Map



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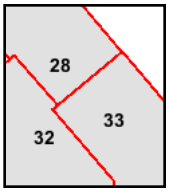

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Volume 3, Sheet 33

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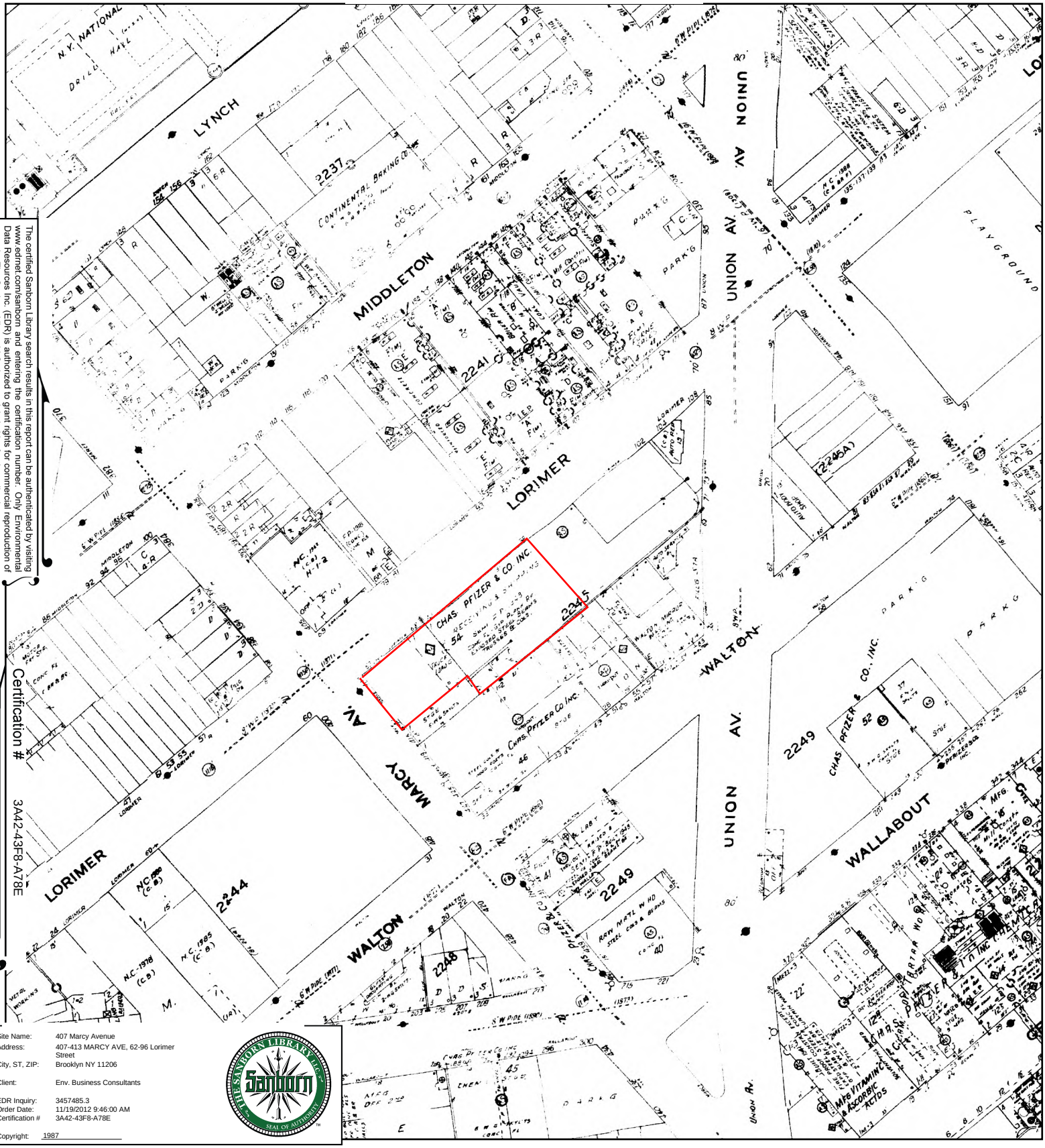

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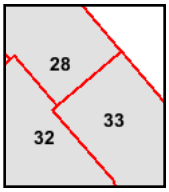

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Volume 3, Sheet 32

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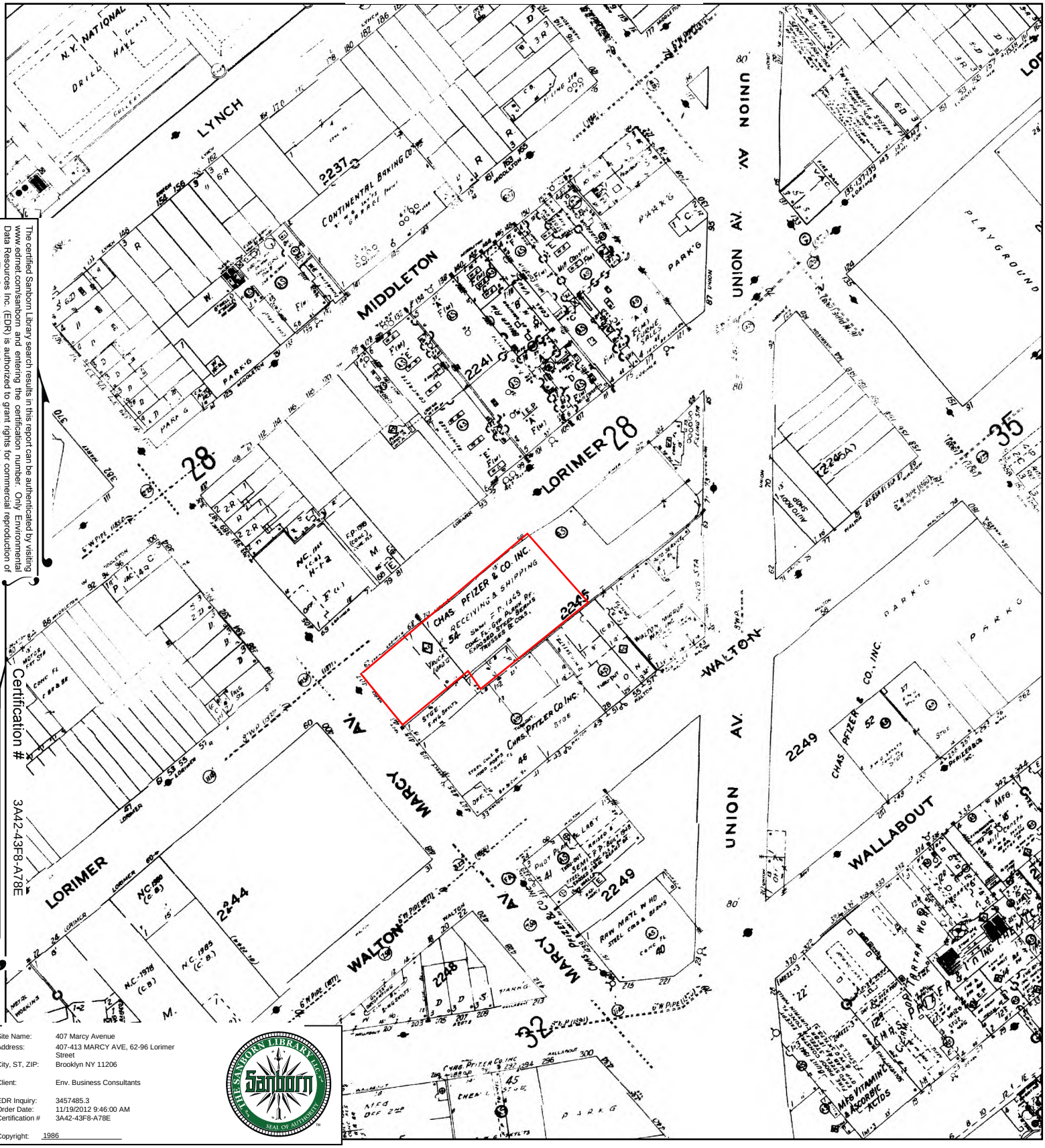

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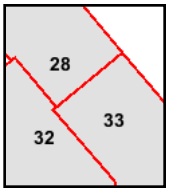

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Volume 3, Sheet 28
Volume 3, Sheet 32
Volume 2, Sheet 32

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1984 Certified Sanborn Map

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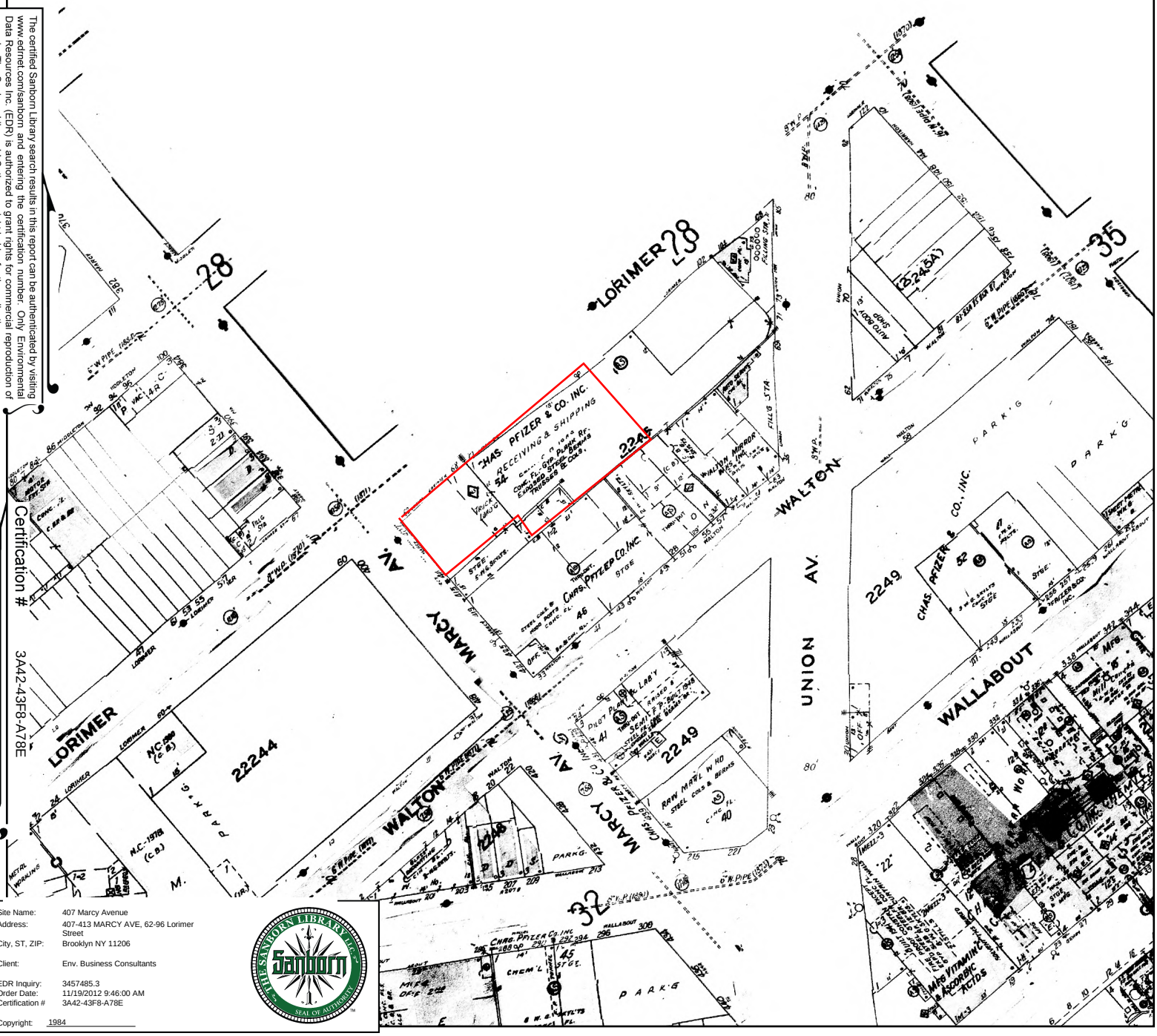

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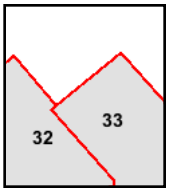

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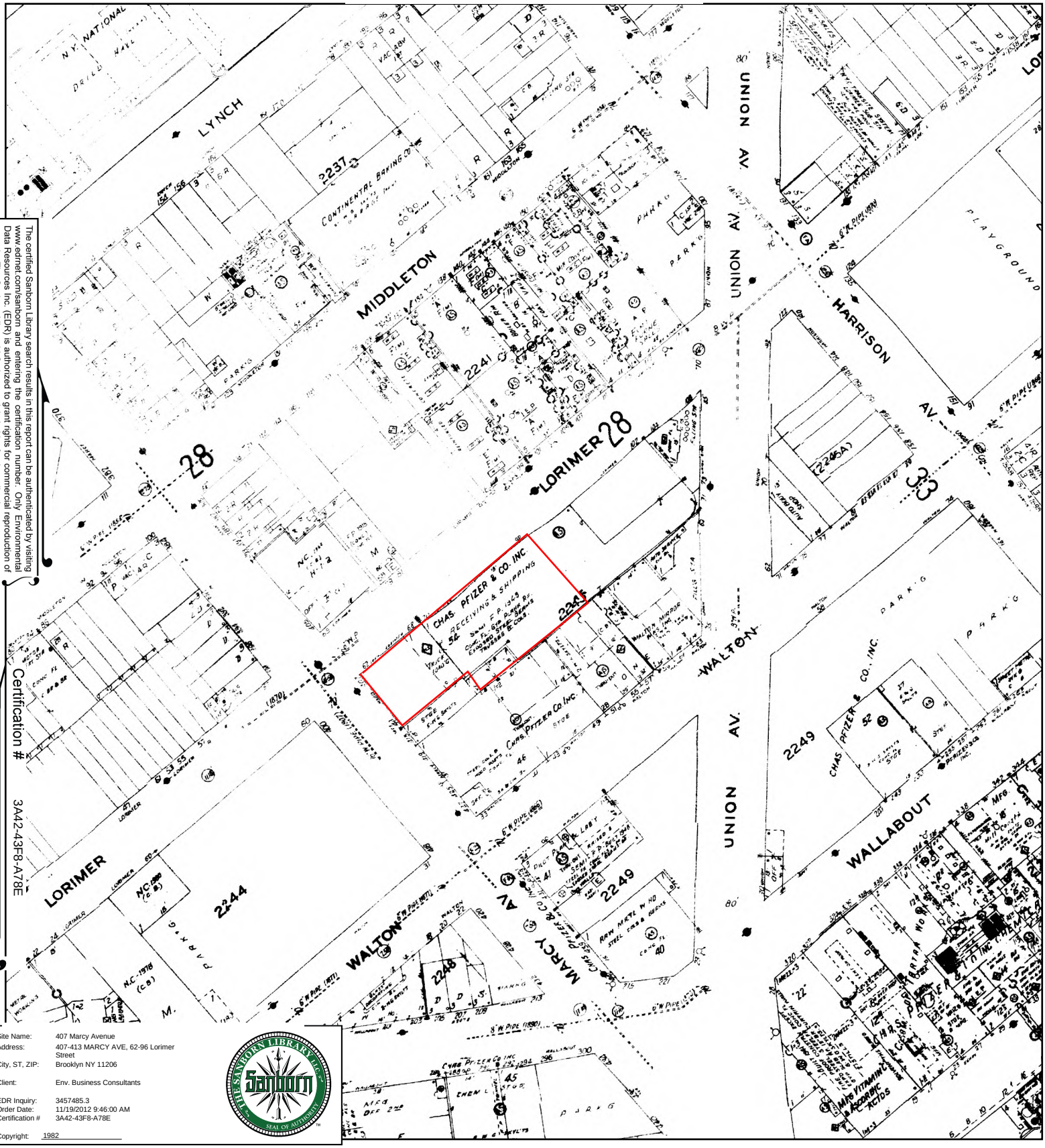
1982 Certified Sanborn Map



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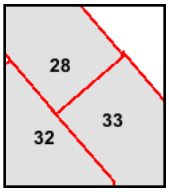

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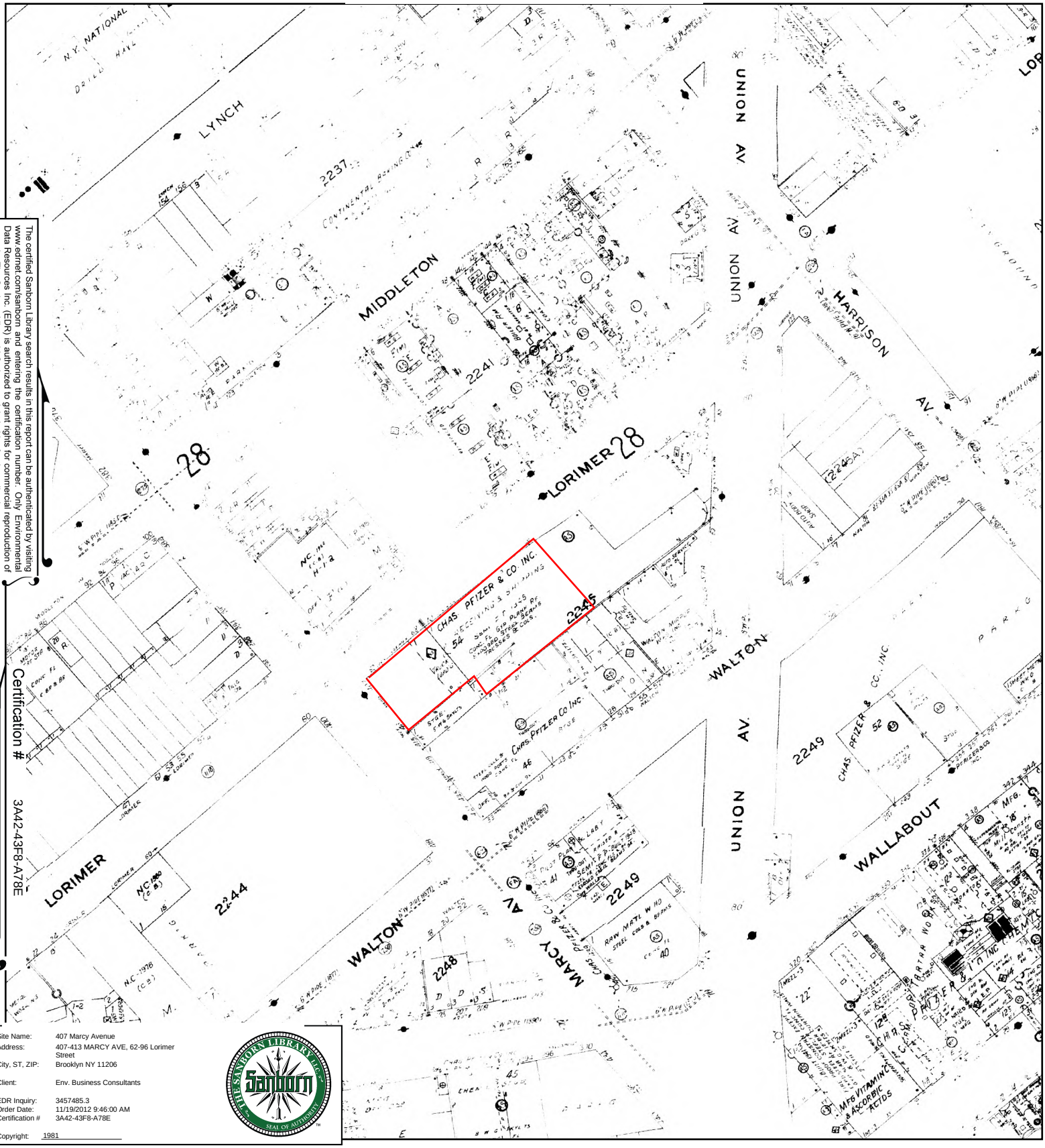
1981 Certified Sanborn Map



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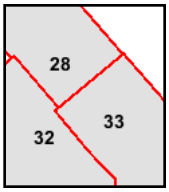

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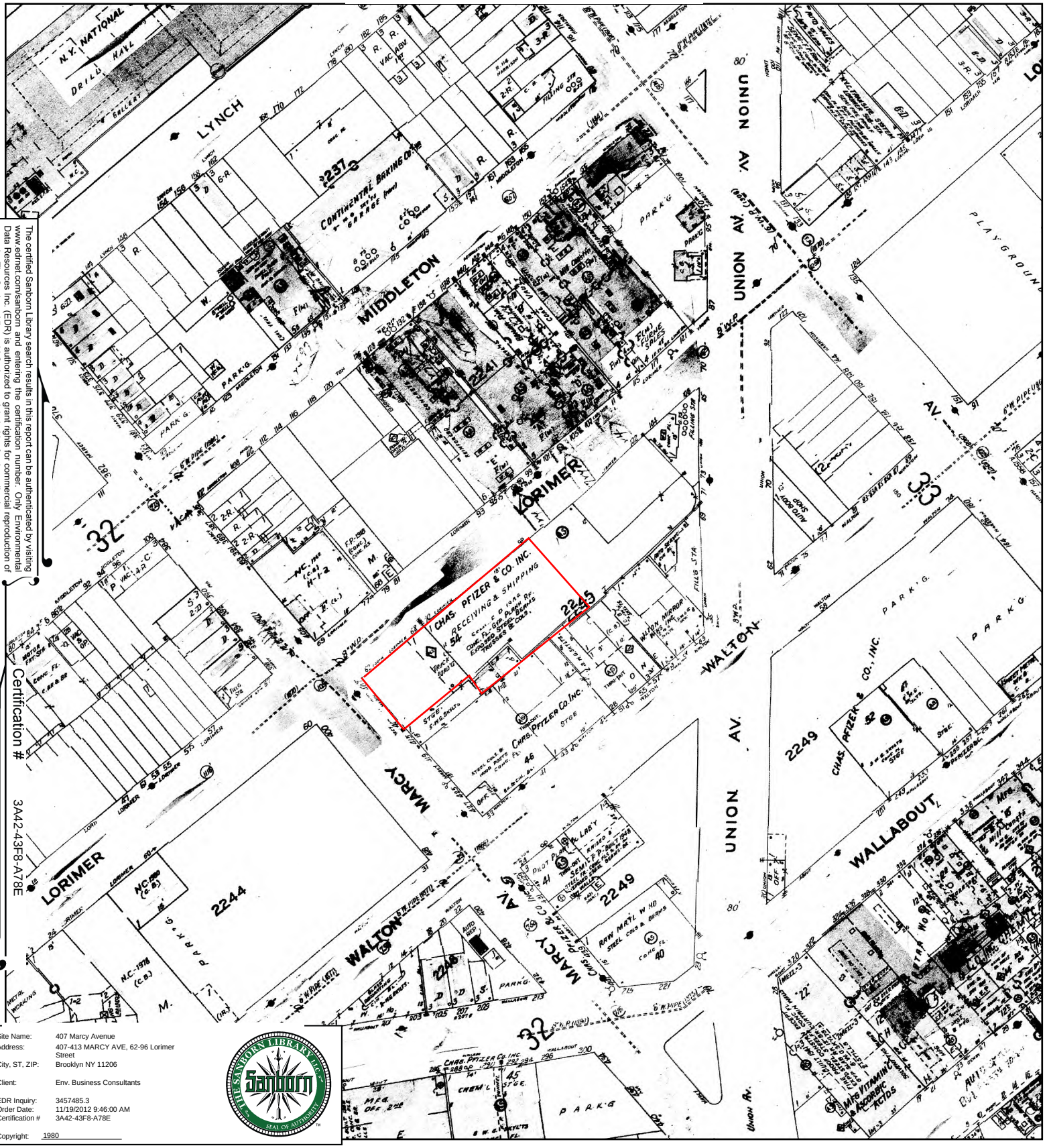

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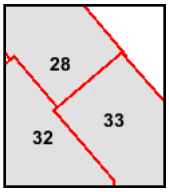

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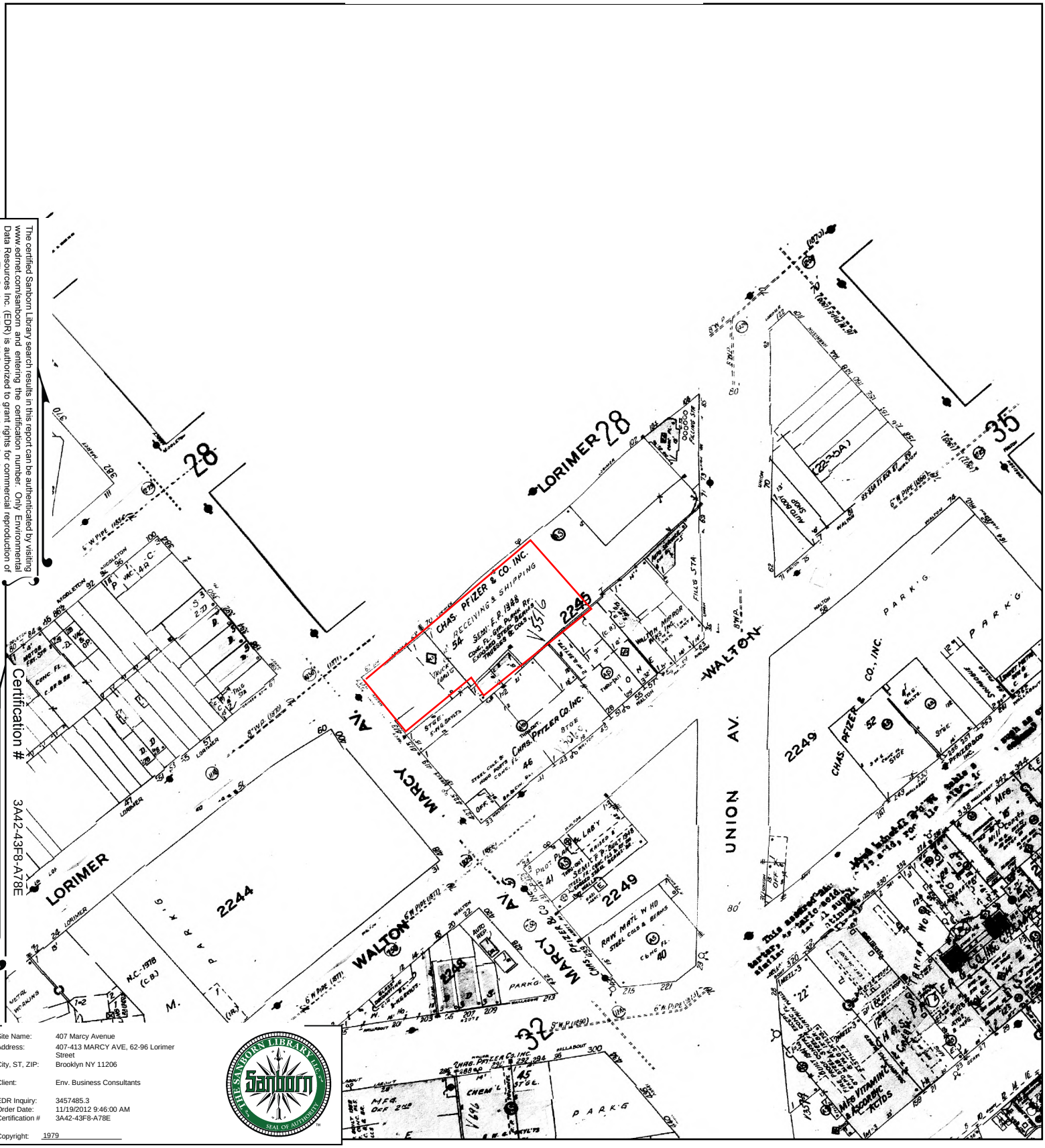

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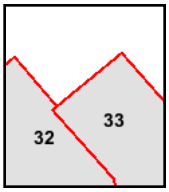

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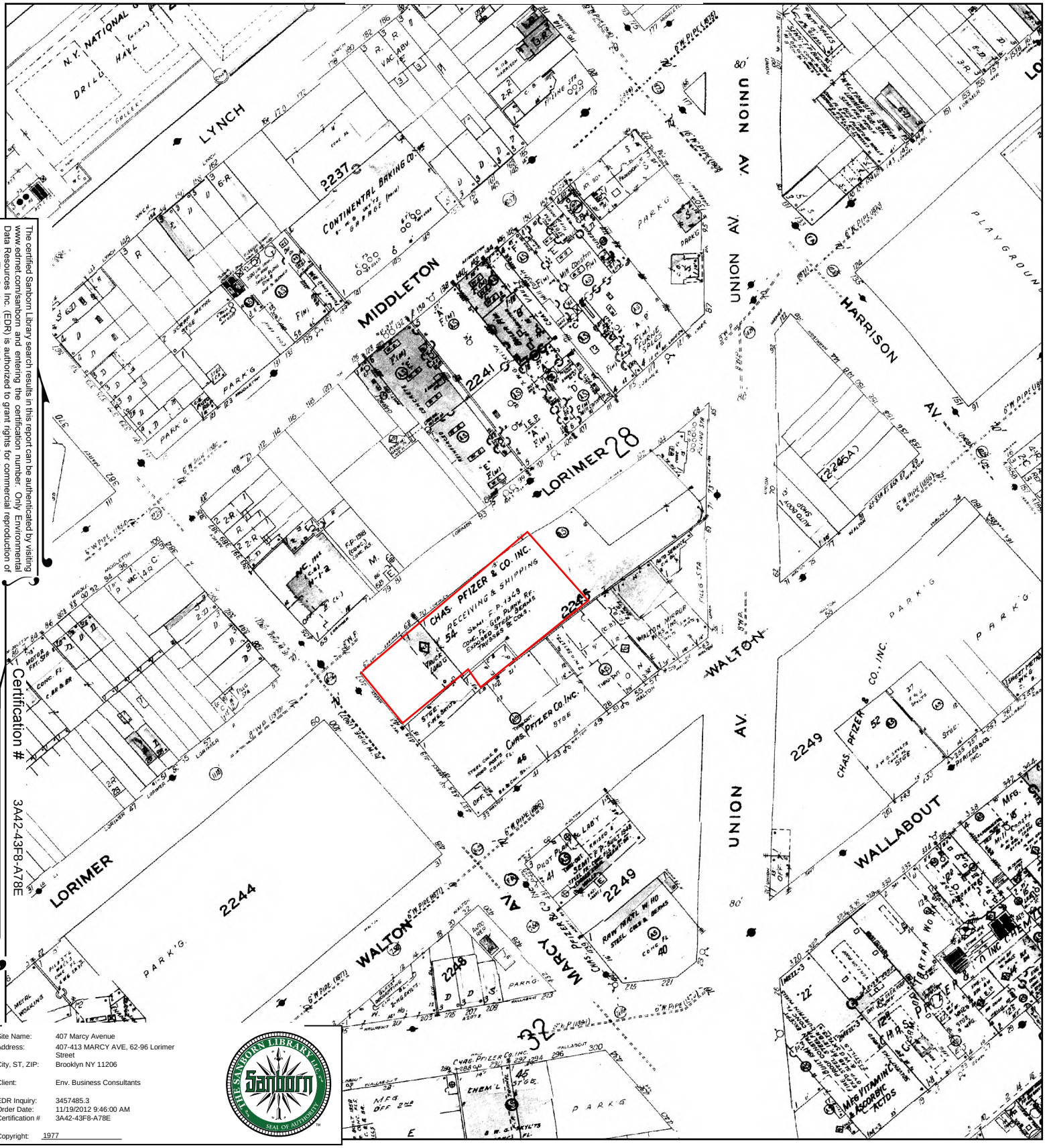

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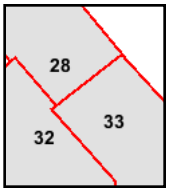

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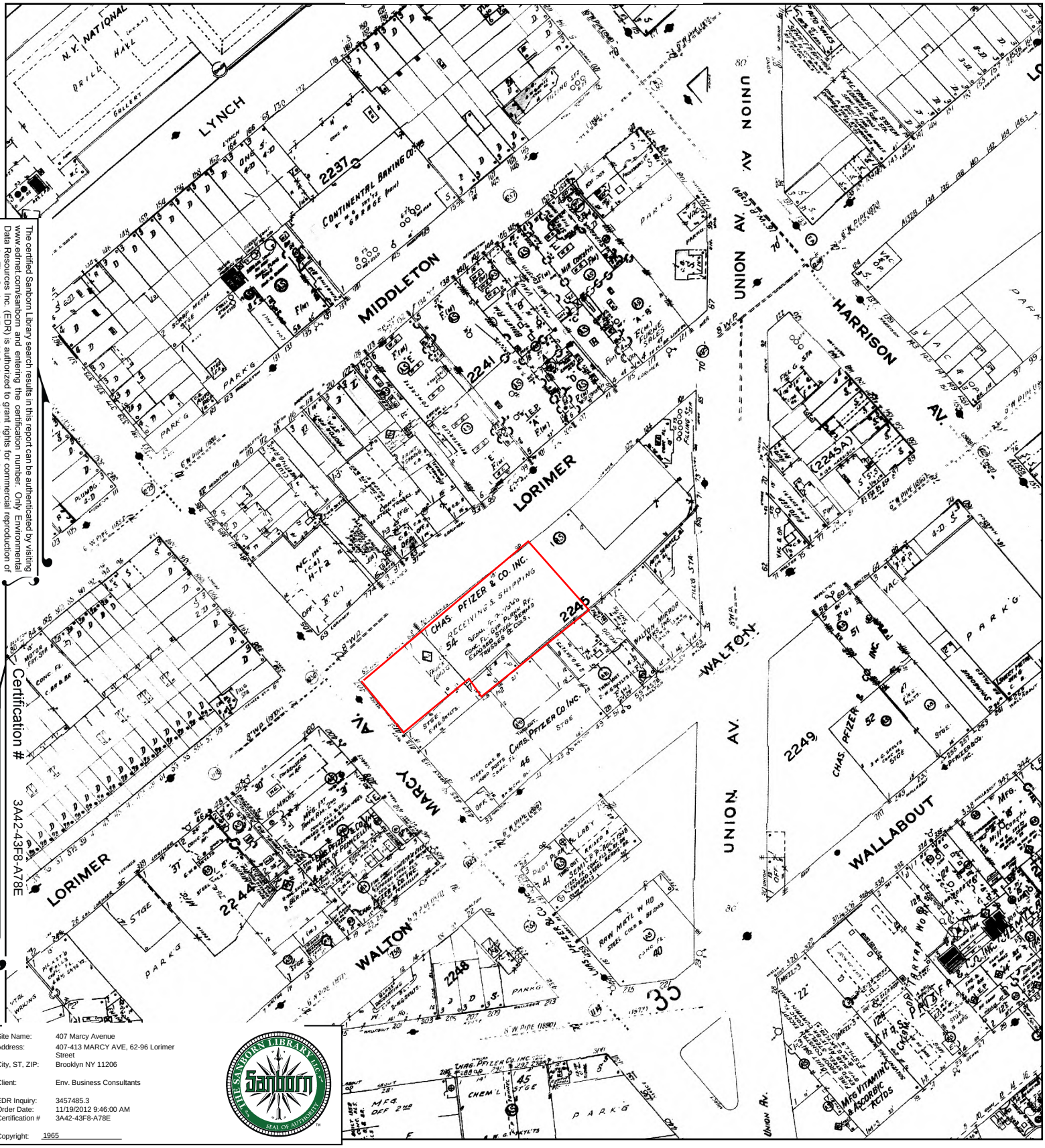

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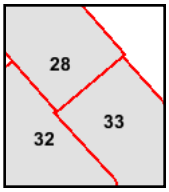

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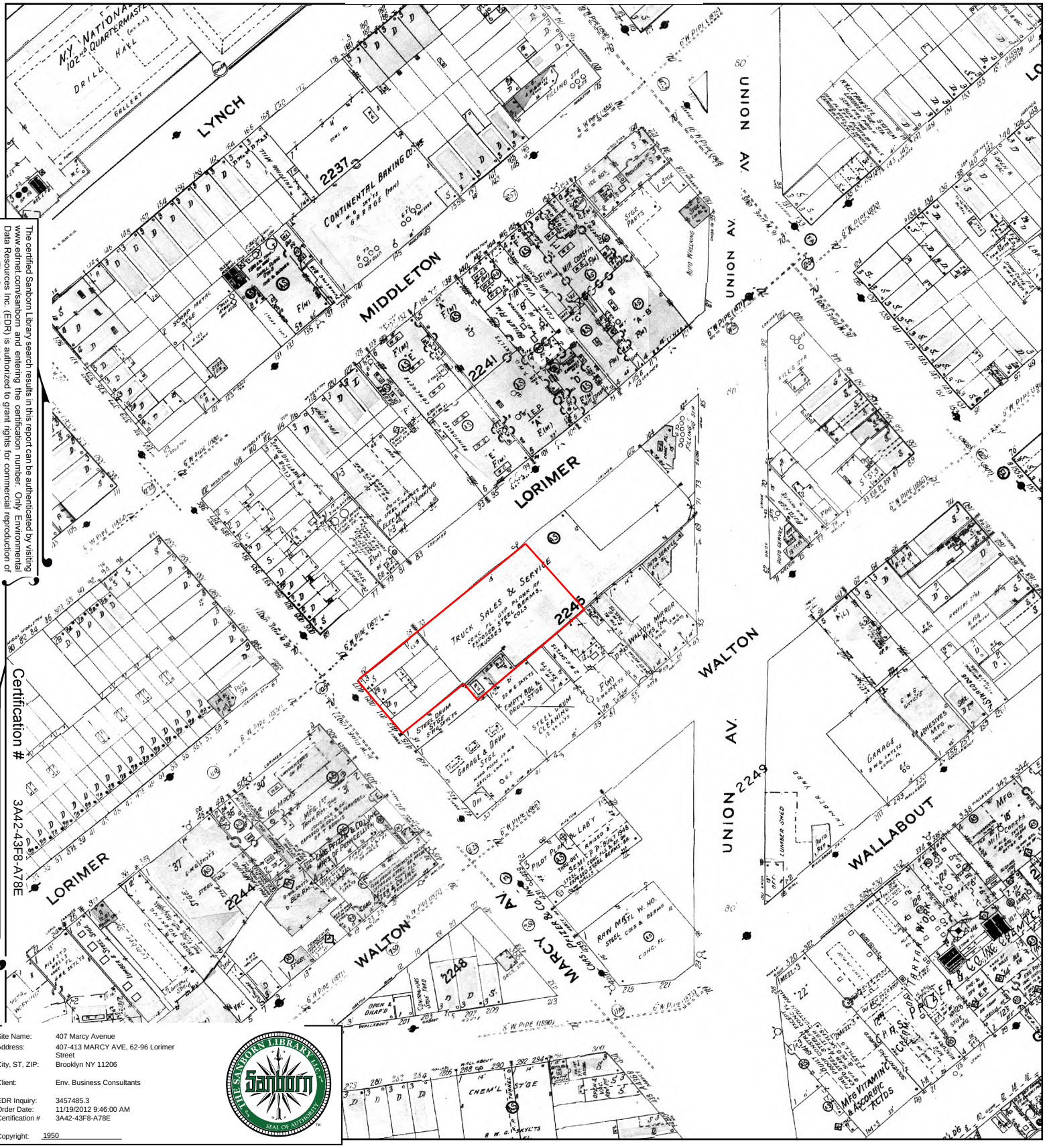

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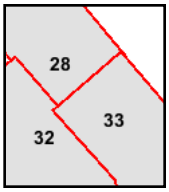

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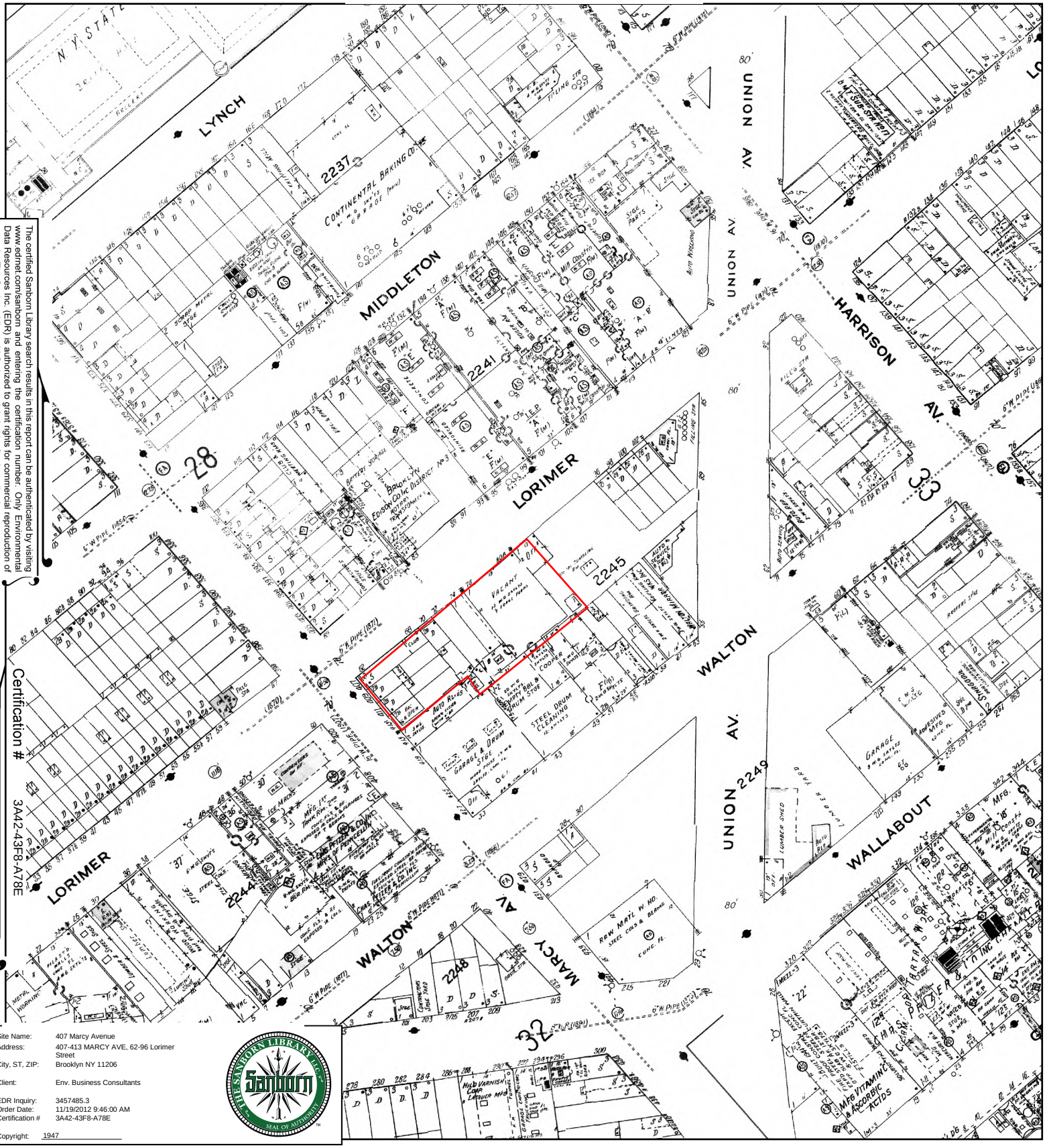
1947 Certified Sanborn Map



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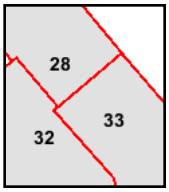

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1935 Certified Sanborn Map

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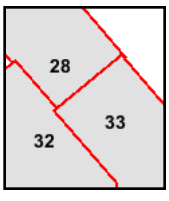

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Site Name:	407 Marcy Avenue
Address:	407-413 MARCY AVE, 62-96 Lorimer Street
City, ST, ZIP:	Brooklyn NY 11206
Client:	Env. Business Consultants
EDR Inquiry:	3457485.3
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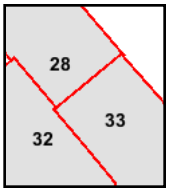

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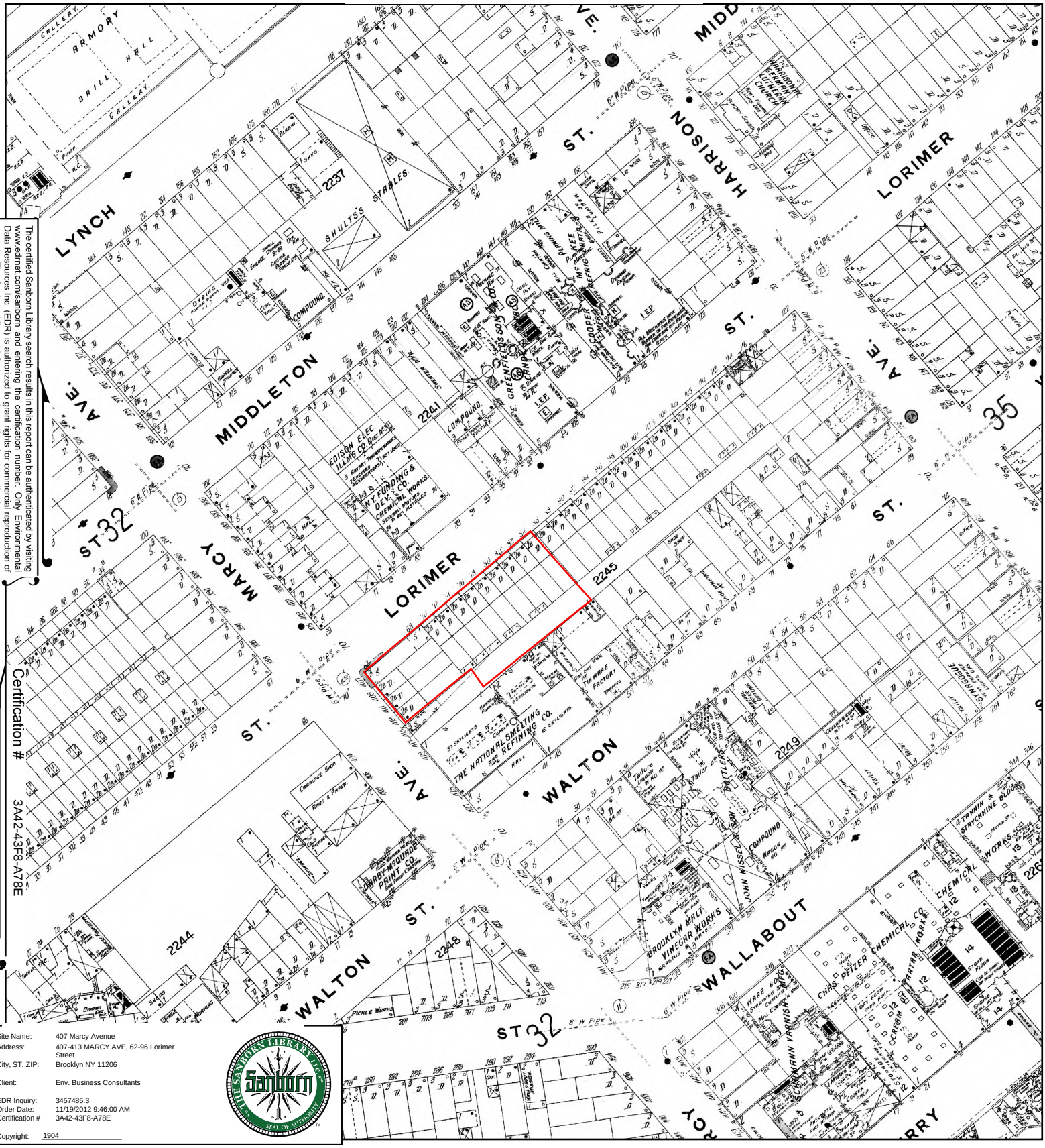

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Address:	407-413 MARCY AVE, 62-96 Lorimer Street
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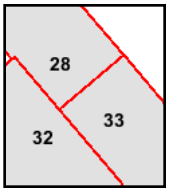

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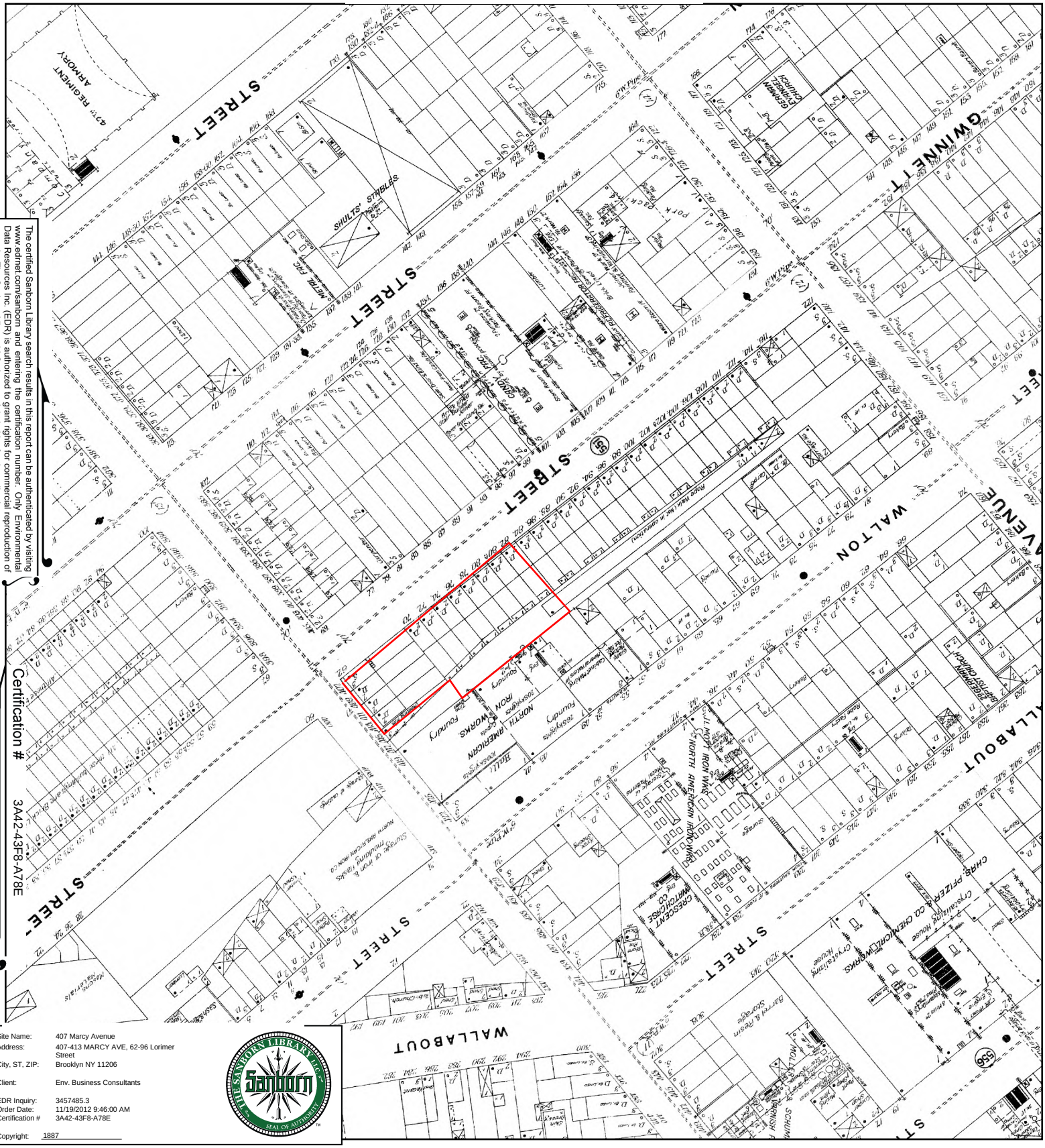
1887 Certified Sanborn Map



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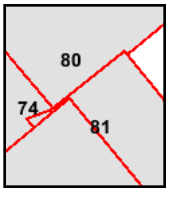

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Volume 3, Sheet 80

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ATTACHMENT C
Health and Safety Plan

FORMER CHARLES PFIZER & CO. SITE

407 MARCY AVENUE
BROOKLYN, NEW YORK
Block 2245 Lot 8
Site No. C-224175

CONSTRUCTION HEALTH AND SAFETY PLAN

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B-12th Floor
625 Broadway
Albany, New York 12233

JULY 2013

Program Volunteer:
Marcy Housing LLC
505 Flushing Avenue 1B
Brooklyn, NY 11205

Prepared By:

Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961

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Former Charles Pfizer & Co. Site
407 Marcy Avenue, Brooklyn, New York

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CONSTRUCTION HEALTH AND SAFETY PLAN
Former Charles Pfizer & Co. Site
871 Grand Street, Brooklyn, New York

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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 407 Marcy Avenue, 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 407 Marcy Avenue, 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 the client and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

1.1 Training Requirements

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

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

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

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

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

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

1.2 Medical Monitoring Requirements

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

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

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

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

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Health and Safety Plan are:

Name	Title	Address	Contact Numbers
Mr. Kevin Brussee	EBC – Project Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000 (631) 338-1749
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 address for the subject property is 407 Marcy Avenue, Brooklyn, New York 11211. The subject property is designated as Block 2245, Lot 8 by the New York City Department of Assessment. The subject property is located in the City of New York and Borough of Brooklyn (Kings County). The lot has 72 feet of frontage on Marcy Avenue and 224 feet of frontage of Lorimer Street and Walton Street for a total area of 18,662 square feet (0.428 acres).

The subject site was previously developed with a one-story brick building which occupied approximately two-thirds of the lot. The remainder of the lot consists of a loading dock area and a parking area. The building has since been demolished, however the concrete building slab remains in place.

The elevation of the property is approximately 13 feet above the National Geodetic Vertical Datum (NGVD) feet. based upon regional groundwater contour maps, and measurements made at adjacent properties, the depth to groundwater beneath the site is approximately 10 feet below existing grade and flows west-northwest toward Wallabout Channel.

2.1 Previous Investigations

2.1.1 Phase I Desktop Environmental Review (EBC)

A Phase I Desktop Environmental Review was conducted by Environmental Business Consultants (EBC) in January 2013.

The review researched the environmental history of the property and evaluated current conditions utilizing the following resources:

- Performed an inspection of the Site on December 12, 2012.
- Query Federal, State and Local Environmental Databases for the Site and surrounding area.
- Review Sanborn Fire Insurance Maps from 1887, 1904, 1918, 1935, 1935, 1947, 1950, 1965, 1977, 1979-1982, 1984, 1986, 1987, 1989, 1991-1996, 2001-2007.
- Review City Directory search of Site and adjacent properties.

The Site was not listed in any of the databases searched. According to historical records the property was developed prior to 1887 with 12 two-story residential homes. By 1935 the home on the corner of Marcy and Lorimer was replaced with a storefront labeled as "club" and the eastern 5 of 8 lots fronting on Lorimer Street are now replaced with a vacant commercial building. The 1950 maps shows the commercial building extending through the remaining three lots on Lorimer and the building is now labeled "truck sales and service". The southern most lot on Marcy is now vacant. By 1965 the property is in its current configuration and identified as " Charles Pfizer and Company". The property remains labeled as Pfizer through 1987. From 1989 to 2007 the property is shown as a warehouse.

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Based upon reconnaissance of the subject and surrounding properties, interviews and review of historical records and regulatory agency databases, the historic use of the property for truck sales and service and as a Pfizer Co. facility were identified as recognized environmental conditions.

The review also noted that the subject site has been assigned an E-designation (E-282) for Window Wall Attenuation/Alternate Ventilation (Noise-E), Air Quality/Exhaust Stack Limitations (Air-E) and Hazardous Materials Phase I/Phase II Testing Protocol (Hazmat-E) as part of the 59 Walton Street rezoning action completed by the City of New York in September of 2012 (CEQR No. 10DCP001K). The E-designation prevents the NYC Department of Buildings from issuing building permits unless a release in the form of a Notice to Proceed is issued by OER.

The Noise E requires that any new building constructed on the property include a window wall system which will achieve a minimum of 28 dBA of window/wall attenuation for all new dwelling units. An alternate means of ventilation such as through the wall or central air conditioning will also be required to maintain a closed window condition. Satisfaction of the Noise E requires the submission of a Noise Remedial Action Plan and an Installation Report certified by a Professional Engineer or Registered Architect.

The Air E requires that any new residential or commercial building constructed on the property use natural gas as the fuel source for hot water and HVAC systems and that the boiler stacks be located on the highest bulkhead at least 103 feet high and at least 23.5 feet from the Lorimer Street lot line.

The Hazmat E requires a detailed environmental review and release by the NYC Office of Environmental Remediation. Such reviews require a full subsurface investigation, remedial and health and safety planning, implementation of a remedial program and documentation that the remedial program was completed during redevelopment of the property.

2.1.2 Limited Phase II Subsurface Investigation, (November, 2013)

On November 21, 2012, a limited Phase II investigation began at the subject Site as part of the due diligence to complete the purchase of the property. During installation of the first boring (B1) suspect asbestos containing material was observed on piping and the work was halted. Work resumed on December 9, 2012 with the installation of the nine soil borings (B2-B10). For each boring, soil samples were collected continuously from grade to a final depth of 12 feet below existing grade using Geoprobe direct-push equipment. A total of 10 soil samples from 5 borings were retained for analysis. Groundwater samples were also collected from 6 of the boring locations (GW1-5, GW7) through temporary monitoring wells installed at a depth of approximately 5 feet below the water table interface.

All retained soil samples were analyzed for VOCs and SVOCs by EPA Method 8260 and 8270 (CP51 list). In addition four of the shallow samples were analyzed for PCBs by EPA Method 8082 and two soil samples were analyzed for RCRA metals. Groundwater samples were analyzed for VOCs only.

The laboratory results reported petroleum SVOCs in soil above restricted residential soil cleanup

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objectives (SCOs) in two shallow (2-4 ft) and one deep (8-10 ft) boring locations. Although elevated, the SVOC concentrations in the deep boring are consistent with that typically found in historic fill materials. However high concentrations indicative of a release of petroleum were reported in two borings with total SVOC concentrations ranging from 276,000 to 8,147,000 µg/kg. Based on these results a spill was reported to the NYSDEC and Spill No. 1214474 was assigned to the Site.

Elevated levels of metals were reported in the fill material layer including cadmium, lead and mercury above restricted residential criteria. PCBs were not reported above detection levels.

The laboratory results of the groundwater samples reported cis1,2-dichloroethane (DCE) above ambient water quality standards at 3 of 5 locations with concentrations ranging from 5.9 to 61 µg/kg. Trichlorothene, trans DCE and vinyl chloride were also reported below or slightly above standards.

In addition to the chlorinated solvents, napthalene was reported at two locations above standards ranging from 56 µg/L at B2 to 95 µg/L at B5. Since both B2 and B5 were the locations with elevated SVOCs in soil, there is an apparent correlation between contamination in soil and contamination in groundwater.

2.1.3 Remedial Investigation, (June, 2013)

The remedial investigation was performed between June 24 and June 28, 2013 in accordance with the Remedial Investigation 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.

The results of sampling performed during this RI identified elevated levels of SVOCs in soil and groundwater in the former loading dock/truck ramp area which is likely related to a surface spill of fuel oil or diesel fuel as well as CVOCs in soil, groundwater and soil gas throughout the site which is likely related to surface spills of brake cleaners/degreasers during truck service operations occupancy or surface spills of chlorinated solvents during the Pfizer Company occupancy.

High levels of SVOCs were reported at boring 13SB4 in the former loading dock/truck ramp area of the Site and including acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, ideno(1,2,3-cd)pyrene, napthalene, phenanthrene, and pyrene. The SVOC concentrations at this location were magnitudes higher than that related to historic fill detected across the Site.

One or more metals including arsenic, barium, cadmium, copper, lead, and mercury were reported above restricted use SCO in all seven soil samples. Chromium and selenium were reported above unrestricted SCOs in one soil sample and zinc was detected at concentrations above unrestricted use SCOs at all boring locations. Although elevated SVOCs and metals are

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commonly associated with historic fill, in this case some of the metals may be related historic site use as SVOC concentrations in one of the borings (>2,000,000 ug/kg) is considerably above that typically encountered in historic fill.

Cis-1,2-dichloroethene was detected in 5 of the 31 soil samples at depths ranging from 10 feet to 20 feet below grade and 1,1,1-trichloroethane was detected in 3 of the 31 samples at depths ranging from 7 feet to 10 feet below grade. Both compounds were detected at concentrations well below Unrestricted Use SCOs.

Groundwater was encountered at a depth of approximately 5-7 feet below grade. Groundwater samples indicate that there are low to moderate levels of cis-1,2-dichloroethene and 1,1,1,-trichloroethene present throughout the Site as well as elevated SVOC concentrations in the former loading dock/truck ramp area.

Several petroleum related VOCs were detected in soil gas at elevated concentrations in one or more of the soil vapor samples and ranged from 98.06 µg/m^3 in SG7 located adjacent to the southwest property line in the central portion of the property to 3,212 µg/m^3 in SG3 located in the central portion of the property. 1,1,1-Trichloroethane was detected in all nine soil gas sampling locations above mitigation levels established within the State DOH soil vapor guidance matrix. 1,1,1-Trichlorethane concentrations in soil gas ranged from 190 µg/m^3 to a high of 32,200 µg/m^3. Tetrachloroethene was detected in five of the nine soil gas samples at concentrations below NYSDOH Guidance Values. Neither trichloroethene nor carbon tetrachloride were detected in any of the nine samples.

2.2 Redevelopment Plans

Redevelopment plans have not been finalized. However, the property owner intends to construct a new multi-family residential building with a full basement. Although financing for the project has not yet been finalized, it is anticipated that financing will come through conventional lenders.

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. Removal of SVOC impacted soil "hotspots" from the property.
2. Excavation of soil/fill exceeding Track 2 restricted residential SCOs as listed in **Table 1** to a depth of approximately 10 feet below grade, with additional excavation to 12 feet for SVOC "hotspot" areas;
3. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
4. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of restricted residential SCOs;

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5. 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;
6. 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.
7. Installation of a waterproofing membrane/vapor barrier beneath occupied areas of the building to be constructed on the Site.
8. A composite cover system consisting of the concrete building slab and paved outdoor parking area will be constructed across the entire Site.
9. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
10. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.

3.0 HAZARD ASSESSMENT

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

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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.

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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 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

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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 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),

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pesticides, polychlorinated biphenyl's (PCBs), and heavy metals such as arsenic, chromium, lead and mercury.

Based on the findings of the Remedial Investigation and the inherent properties of urban fill, the following compounds are considered for the site as potential contaminants: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and heavy metals.

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

Acetone	Methylene Chloride	m&p-xylenes

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

Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene
Benzo(b)fluoranthene	Benzo(k)fluoranthene	Dibenzo(a,h)anthracene	Chrysene
Fluoranthene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene
Pyrene	m&p-cresol		

Pesticides/ PCBs reported to be present in soil include the following:

4,4,4-DDE

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

Arsenic	Barium	Cadmium	Chromium	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 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.

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

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 both soil and groundwater 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 SVOC 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 the SVOC 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
Jamaica Hospital 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 — Mr. Kevin Brussee (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

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

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

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

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

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

International Chemical Safety Cards

m-XYLENE

ICSC: 0085

meta-Xylene
1,3-Dimethylbenzene
m-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

ICSC # 0085
CAS # 108-38-3
RTECS # ZE2275000
UN # 1307
EC # 601-022-00-9
August 03, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. 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.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. 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. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0085

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

m-XYLENE

ICSC: 0085

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

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

PHYSICAL DANGERS:
As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
Reacts with strong acids strong oxidants

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001).
MAK: 100 ppm 440 mg/m³
Peak limitation category: II(2)
skin absorption (H);
Pregnancy risk group: D
(DFG 2005).
EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000).
OSHA PEL†: TWA 100 ppm (435 mg/m^3)
NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3)
NIOSH IDLH: 900 ppm See: 95476

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin 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 and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The liquid defats the skin. The substance may have effects on the central nervous system Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 139°C
Melting point: -48°C
Relative density (water = 1): 0.86
Solubility in water:
none
Vapour pressure, kPa at 20°C: 0.8

Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 27°C c.c.
Auto-ignition temperature: 527°C
Explosive limits, vol% in air: 1.1-7.0
Octanol/water partition coefficient as log Pow: 3.20

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms.

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0086 p-Xylene.

NFPA Code: H 2; F 3; R 0;
Transport Emergency Card: TEC (R)-30S1307-III

ADDITIONAL INFORMATION

ICSC: 0085 **m-XYLENE**

International Chemical Safety Cards

p-XYLENE

ICSC: 0086

para-Xylene
1,4-Dimethylbenzene
p-Xylol
$C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2

ICSC # 0086
CAS # 106-42-3
RTECS # ZE2625000
UN # 1307
EC # 601-022-00-9
August 03, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. 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.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. 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. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants, strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0086

International Chemical Safety Cards

p-XYLENE

ICSC: 0086

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** As a result of flow, agitation, etc., electrostatic charges can be generated. **CHEMICAL DANGERS:** Reacts with strong acids strong oxidants **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m³ Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL†: TWA 100 ppm (435 mg/m^3) NIOSH REL: TWA 100 ppm (435 mg/m^3) ST 150 ppm (655 mg/m^3) NIOSH IDLH: 900 ppm See: 95476 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin 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 and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The liquid defats the skin. The substance may have effects on the central nervous system. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Boiling point: 138°C Melting point: 13°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 528°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.15
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. 

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0085 m-Xylene.

Transport Emergency Card: TEC (R)-30S1307-III
NFPA Code: H 2; F 3; R 0;

ADDITIONAL INFORMATION

ICSC: 0086 **p-XYLENE**

International Chemical Safety Cards

DICHLOROMETHANE

ICSC: 0058

Methylene chloride
DCM
CH_2Cl_2
Molecular mass: 84.9

ICSC # 0058
CAS # 75-09-2
RTECS # PA8050000
UN # 1593
EC # 602-004-00-3
December 04, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. 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 (see Chemical Dangers).	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. Nausea. Weakness. Unconsciousness. Death.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness. Burning sensation.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain. Severe deep burns.	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	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. 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.	Separated from metals (see Chemical Dangers), food and feedstuffs . Cool. Ventilation along the floor.	Do not transport with food and feedstuffs. Xn symbol R: 40 S: (2-)23-24/25-36/37 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0058

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

DICHLOROMETHANE

ICSC: 0058

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. Reacts violently with metals such as aluminium powder and magnesium powder, strong bases and strong oxidants causing fire and explosion hazard. Attacks some forms of plastic rubber and coatings.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 50 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK:
Carcinogen category: 3A;
(DFG 2004).
OSHA PEL: 1910.1052 TWA 25 ppm ST 125 ppm
NIOSH REL: Ca See Appendix A
NIOSH IDLH: Ca 2300 ppm See: 75092

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 very quickly 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 . Exposure could cause lowering of consciousness. Exposure could cause the formation of methaemoglobin.

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 and liver . This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 40°C
Melting point: -95.1°C
Relative density (water = 1): 1.3
Solubility in water, g/100 ml at 20°C: 1.3
Vapour pressure, kPa at 20°C: 47.4
Relative vapour density (air = 1): 2.9
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.9
Auto-ignition temperature: 556°C
Explosive limits, vol% in air: 12-25
Octanol/water partition coefficient as log Pow: 1.25

ENVIRONMENTAL DATA

This substance may be hazardous in the environment; special attention should be given to ground water contamination.

N O T E S

Addition of small amounts of a flammable substance or an increase in the oxygen content of the air strongly enhances combustibility. 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. R30 is a trade name. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1593

NFPA Code: H2; F1; R0;

ADDITIONAL INFORMATION

ICSC: 0058 **DICHLOROMETHANE**

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

International Chemical Safety Cards

ACETONE

ICSC: 0087

2-Propanone
Dimethyl ketone
Methyl ketone
C_3H_6O / CH_3COCH_3
Molecular mass: 58.1

ICSC # 0087
CAS # 67-64-1
RTECS # AL3150000
UN # 1090
EC # 606-001-00-8
April 22, 1994 Validated
Fi, review at IHE: 10/09/89

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, alcohol-resistant foam, water in large amounts, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
•INHALATION	Sore throat. Cough. Confusion. Headache. Dizziness. Drowsiness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness. Pain. Blurred vision. Possible corneal damage.	Safety spectacles or face shield . Contact lenses should not be worn.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Nausea. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: self-contained breathing apparatus. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Then wash away with plenty of water.	Fireproof. Separated from strong oxidants. Store in an area without drain or sewer access.	F symbol Xi symbol R: 11-36-66-67 S: 2-9-16-26 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0087

International Chemical Safety Cards

ACETONE

ICSC: 0087

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

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

PHYSICAL DANGERS:
The vapour is heavier than air and may travel along the ground; distant ignition possible.

CHEMICAL DANGERS:
The substance can form explosive peroxides on contact with strong oxidants such as acetic acid, nitric acid, hydrogen peroxide. Reacts with chloroform and bromoform under basic conditions, causing fire and explosion hazard. Attacks plastic.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 500 ppm as TWA, 750 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued; (ACGIH 2004).
MAK: 500 ppm 1200 mg/m³
Peak limitation category: I(2); Pregnancy risk group: D; (DFG 2006).
OSHA PEL†: TWA 1000 ppm (2400 mg/m^3)
NIOSH REL: TWA 250 ppm (590 mg/m^3)
NIOSH IDLH: 2500 ppm 10%LEL See: 67641

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

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

EFFECTS OF SHORT-TERM EXPOSURE:
The vapour irritates the eyes and the respiratory tract. The substance may cause effects on the central nervous system , liver , kidneys and gastrointestinal tract .

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the blood and bone marrow .

PHYSICAL PROPERTIES

Boiling point: 56°C
Melting point: -95°C
Relative density (water = 1): 0.8
Solubility in water:
miscible
Vapour pressure, kPa at 20°C: 24

Relative vapour density (air = 1): 2.0
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2
Flash point: -18°C c.c.
Auto-ignition temperature: 465°C
Explosive limits, vol% in air: 2.2-13
Octanol/water partition coefficient as log Pow: -0.24

ENVIRONMENTAL DATA

N O T E S

Use of alcoholic beverages enhances the harmful effect.

Transport Emergency Card: TEC (R)-30S1090

NFPA Code: H 1; F 3; R 0;
Card has been partially updated in July 2007: see Occupational Exposure Limits.
Card has been partially updated in January 2008: see Storage.

ADDITIONAL INFORMATION

International Chemical Safety Cards

PYRENE

ICSC: 1474

Benzo (d,e,f) phenanthrene
beta-Pyrene
$C_{16}H_{10}$
Molecular mass: 202.26

ICSC # 1474
CAS # 129-00-0
RTECS # UR2450000
November 27, 2003 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, carbon dioxide, dry powder, alcohol-resistant foam, foam.
EXPLOSION			
EXPOSURE			
•INHALATION		Avoid inhalation of dust	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety spectacles.	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.	Do NOT induce vomiting. 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 Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles.)	Separated from strong oxidants. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1474

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

PYRENE

ICSC: 1474

I **M**	**PHYSICAL STATE; APPEARANCE:** YELLOW COLOURLESS SOLID IN VARIOUS FORMS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation through the skin and by ingestion

P O R T A N T D A T A	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on heating producing irritating fumes **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK not established. **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:** Exposure to sun may provoke an irritating effect of pyrene on skin and lead to chronic skin discoloration. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

PHYSICAL PROPERTIES	Boiling point: 404°C Melting point: 151°C Density: 1.27 g/cm3	Solubility in water: 0.135 mg/l at 25°C Vapour pressure, Pa at °C: 0.08 Octanol/water partition coefficient as log Pow: 4.88
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in crustacea,in fish,in milk,in algae andin molluscs. It is strongly advised that this substance does not enter the environment. 	

N O T E S

Pyrene is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, pyrene may be encountered as a laboratory chemical in its pure form. Health effects of exposure to the substance have not been investigated adequately. See ICSC 1415 Coal-tar pitch.

ADDITIONAL INFORMATION

ICSC: 1474 **PYRENE**

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.

Material Safety Data Sheet

Version 4.0
Revision Date 07/24/2010
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Phenanthrene
Product Number	:	695114
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Harmful by ingestion., Irritant

Other hazards which do not result in classification
Photosensitizer.

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.

Eyes	Causes eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{14}H_{10}$
Molecular Weight : 178.23 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Phenanthrene			
85-01-8	201-581-5	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis

			parameters		
Phenanthrene	85-01-8	TWA	0.2 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses with side-shields conforming to EN166

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

pH	no data available
Melting point	98 - 100 °C (208 - 212 °F)
Boiling point	340 °C (644 °F)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	1.063 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 4.57

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - mouse - 700.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Phenanthrene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 3.2 mg/l - 96.0 h
	LC100 - other fish - 1.5 mg/l - 1.0 h
Toxicity to daphnia	EC50 - Daphnia magna (Water flea) - 0.86 mg/l - 24 h

and other aquatic invertebrates.

EC50 - Daphnia magna (Water flea) - 0.38 mg/l - 48 h

Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae) - 1.20 mg/l - 3 h

Persistence and degradability

Biodegradability Result: 55 - 95 % - Partially biodegradable.

Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 28 d
Bioconcentration factor (BCF): 5,100

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms.

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Phenanthrene)
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Phenanthrene)
Marine pollutant: No

IATA

UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Phenanthrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards

Harmful by ingestion., Irritant

DSL Status

All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Phenanthrene	85-01-8	1990-01-01

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

o-Phenylenepyrene
2,3-Phenylenepyrene
$C_{22}H_{12}$
Molecular mass: 276.3

ICSC # 0730
CAS # 193-39-5
RTECS # NK9300000
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.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0730

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

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

I **M** **P**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS **PHYSICAL DANGERS:**	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin. **INHALATION RISK:**

O R T A N T D A T A	**CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK: Carcinogen category: 2; (DFG 2004).	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.
PHYSICAL PROPERTIES	Boiling point: 536°C Melting point: 164°C Solubility in water: none	Octanol/water partition coefficient as log Pow: 6.58
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in fish. 	

N O T E S

Indeno(1,2,3-cd)pyrene 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 Indeno(1,2,3-c,d)pyrene 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: 0730 **INDENO(1,2,3-cd)PYRENE**

Material Safety Data Sheet

Version 3.1
Revision Date 10/15/2010
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Fluorene

Product Number : 46880
Brand : Aldrich
Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
No known OSHA hazards

GHS Classification
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P273 Avoid release to the environment.
P501 Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification
Health hazard: 1
Flammability: 1
Physical hazards: 0

NFPA Rating
Health hazard: 1
Fire: 1
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{13}H_{10}$
Molecular Weight : 166.22 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Fluorene			
86-73-7	201-695-5	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	crystalline
Colour	white

Safety data

pH	no data available
Melting/freezing point	Melting point/range: 113 - 115 °C (235 - 239 °F)
	Melting point/range: 111 - 114 °C (232 - 237 °F) - lit.
Boiling point	298 °C (568 °F) - lit.
Flash point	151.0 °C (303.8 °F) - closed cup
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available

Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
LD50 Intraperitoneal - mouse - > 2.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Fluorene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: LL5670000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Fish - 0.82 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Remarks: no data available
Toxicity to algae	EC50 - Algae - 3.4 mg/l - 96 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 24 h Bioconcentration factor (BCF): 512

Mobility in soil
Adsorbs on soil.

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Fluorene)
Marine pollutant: Marine pollutant

IATA
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Fluorene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

1,25,6-Dibenzanthracene
$C_{22}H_{14}$
Molecular mass: 278.4

ICSC # 0431
CAS # 53-70-3
RTECS # HN2625000
EC # 601-041-00-2
October 23, 1995 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	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: P3 filter respirator for toxic particles.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0431

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

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

I

M

P

O

PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALLINE POWDER.

PHYSICAL DANGERS:

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

R T A N T D A T A	**CHEMICAL DANGERS:** **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established.	of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the skin , resulting in photosensitization. This substance is probably carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 524°C Melting point: 267°C Relative density (water = 1): 1.28	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.5
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood. 	

N O T E S

This 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. DBA is a commonly used name. This substance is one of many polycyclic aromatic hydrocarbons (PAH).

ADDITIONAL INFORMATION

ICSC: 0431 **DIBENZO(a,h)ANTHRACENE**

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

BENZO(k)FLUORANTHENE

ICSC: 0721

Dibenzo(b,jk)fluorene
8,9-Benzofluoranthene
11,12-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0721
CAS # 207-08-9
RTECS # DF6350000
EC # 601-036-00-5
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 if powder.	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: 0721

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(k)FLUORANTHENE

ICSC: 0721

I **M**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

P O R T A N T D A T A	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK: Carcinogen category: 2; (DFG 2004). **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.
PHYSICAL PROPERTIES	Boiling point: 480°C Melting point: 217°C Solubility in water: none Octanol/water partition coefficient as log Pow: 6.84
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish. 

N O T E S

Benzo(k)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(k)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: 0721 **BENZO(k)FLUORANTHENE**

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

BENZO(a)PYRENE

ICSC: 0104

Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0104
CAS # 50-32-8
RTECS # DJ3675000
EC # 601-032-00-3
October 17, 2005 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		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		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. 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.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

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(a)PYRENE

ICSC: 0104

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
PALE-YELLOW CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Reacts with strong oxidants causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK:
Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, 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 when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 496°C
Melting point: 178.1°C
Density: 1.4
g/cm³

Solubility in water: none (<0.1 g/100 ml)
Vapour pressure :
negligible
Octanol/water partition coefficient as log Pow: 6.04

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.

NOTES

Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

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

ANTHRACENE

ICSC: 0825

Anthracin
Paranaphthalene
$C_{14}H_{10}$ / $(C_6H_4CH)_2$
Molecular mass: 178.2

ICSC # 0825
CAS # 120-12-7
RTECS # CA9350000
March 24, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, 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.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Sore throat.	Ventilation (not if powder), 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 spectacles, 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.	Do not eat, drink, or smoke during work.	Rinse mouth. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from strong oxidants. Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0825

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

ANTHRACENE

ICSC: 0825

I **M**	**PHYSICAL STATE; APPEARANCE:** WHITE CRYSTALS OR FLAKES.	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by

P O R T A N T D A T A	**PHYSICAL DANGERS:** Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** The substance decomposes on heating, under influence of strong oxidants producing acrid, toxic fume , causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. inhalation. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance slightly irritates the skin and the respiratory tract. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis under the influence of UV light.
PHYSICAL PROPERTIES	Boiling point: 342°C Melting point: 218°C Density: 1.25-1.28 g/cm3 Solubility in water, g/100 ml at 20 °C: 0.00013 Vapour pressure, Pa at 25°C: 0.08 Relative vapour density (air = 1): 6.15 Flash point: 121°C Auto-ignition temperature: 538°C Explosive limits, vol% in air: 0.6-? Octanol/water partition coefficient as log Pow: 4.5 (calculated)
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. 

N O T E S

Green oil, Tetra-olive N2G are trade names.

NFPA Code: H0; F1; R;

ADDITIONAL INFORMATION

ICSC: 0825 **ANTHRACENE**

International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674

1,2-Dihydroacenaphthylene
1,8-Ethylenenaphthalene
$C_{12}H_{10}$
Molecular mass: 154.2

ICSC # 1674
CAS # 83-32-9
RTECS # AB1000000
UN # 3077
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 NOTES.	PREVENT DISPERSION OF DUST!	
•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 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: P2 filter respirator for harmful particles. Do NOT let this chemical enter the environment. Sweep spilled substance into covered 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.	UN Hazard Class: 9 UN Packing Group: III Signal: Warning Enviro Very toxic to aquatic life with long lasting effects

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1674

International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
WHITE TO BEIGE CRYSTALS

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

CHEMICAL DANGERS:
On combustion, forms toxic gases including carbon monoxide. Reacts with strong oxidants .

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.
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:
See Notes.

PHYSICAL PROPERTIES

Boiling point: 279°C
Melting point: 95°C
Density: 1.2
g/cm³
Solubility in water, g/100 ml at 25°C: 0.0004

Vapour pressure, Pa at 25°C: 0.3
Relative vapour density (air = 1): 5.3
Flash point: 135°C o.c.
Auto-ignition temperature: >450 °C
Octanol/water partition coefficient as log Pow: 3.9 - 4.5

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised that this substance does not enter the environment.

NOTES

Acenaphthene occurs as a pure substance and also as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

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

ADDITIONAL INFORMATION

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

4-NITROANILINE

ICSC: 0308

p-Nitroaniline
1-Amino-4-nitrobenzene
C.I. 37035
$C_6H_6N_2O_2$
Molecular mass: 138.1

ICSC # 0308
CAS # 100-01-6
RTECS # BY7000000
UN # 1661
EC # 612-012-00-9
December 03, 2001 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Many reactions may cause fire or explosion.	NO open flames. NO contact with combustible substances.	Powder, water spray, 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.	In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.
EXPOSURE		PREVENT DISPERSION OF DUST!	
•**INHALATION**	Blue lips or finger nails. Blue skin. Headache. Dizziness. Nausea. Confusion. Convulsions. Laboured breathing. Unconsciousness.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•**SKIN**	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
•**EYES**	Redness. Pain.	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**	(Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING

Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Wash away remainder with plenty of water. (Extra personal protection: P3 filter respirator for toxic particles.) Do NOT let this chemical enter the environment.	Separated from strong acids, strong oxidants, combustible and reducing substances, food and feedstuffs . Dry.	Do not transport with food and feedstuffs. Note: C T symbol R: 23/24/25-33-52/53 S: 1/2-28-36/37-45-61 UN Hazard Class: 6.1 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0308

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

4-NITROANILINE

ICSC: 0308

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
YELLOW CRYSTALS OR POWDER.

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

CHEMICAL DANGERS:
May explode on heating. On combustion, forms toxic fumes of nitrogen oxides. Reacts with strong acids , strong oxidants and strong reducing agents . Reacts with organic materials in presence of moisture causing fire hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 3 mg/m³
(as TWA)
(skin) A4 (not classifiable as a human carcinogen); BEI issued (ACGIH 2005).
MAK: skin absorption (H);
Carcinogen category: 3A
(DFG 2005).
OSHA PEL†: TWA 6 mg/m^3 (1 ppm) skin
NIOSH REL: TWA 3 mg/m^3 skin
NIOSH IDLH: 300 mg/m^3 See: 100016

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

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is mildly irritating to the eyes . The substance may cause effects on the blood , resulting in formation of methaemoglobin. The effects may be delayed. Medical observation is indicated. See Notes.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood , resulting in the formation of methaemoglobin. See Notes.

PHYSICAL PROPERTIES

Boiling point: 332°C
Melting point: 148°C
Density: 1.4
g/cm³
Solubility in water, g/100 ml at 18.5°C: 0.08

Vapour pressure, Pa at 20°C: 0.2
Relative vapour density (air = 1): 4.8
Flash point: 199°C
Octanol/water partition coefficient as log Pow: 2.66

ENVIRONMENTAL DATA

The substance is harmful to aquatic organisms. Do not let this chemical enter the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. Specific treatment is necessary in case

of poisoning with this substance; the appropriate means with instructions must be available. Also consult ICSC 0306 2-Nitroaniline, and ICSC 0307 3-Nitroaniline.

Transport Emergency Card: TEC (R)-61G12b

NFPA Code: H 3; F 1; R 2;

ADDITIONAL INFORMATION

ICSC: 0308 **4-NITROANILINE**

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.

MSDS : 2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99%
CAS : 72-55-9
SYNONYMS : p,p'-DDE ; ethylene,1,1-dichloro-2,2-bis-(p-chlorophenyl)- ; DDT dehydrochloride ; DDE; 1-1'-(Dichloroethenylidene)bis(4-chlorobenzene)

Catalog of Chemical Suppliers, Buyers, Custom Synthesis Companies And Equipment Manufacturers
[2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99% 72-55-9]

Suppliers:

Not Available

Buyers:

Not Available

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
72-55-9	2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene	99	200-784-6

Hazard Symbols: XN
Risk Phrases: 22 33

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW
Harmful if swallowed. Danger of cumulative effects.Cancer suspect agent.Possible risks of irreversible effects.

Potential Health Effects
Eye:
May cause eye irritation.
Skin:
May cause skin irritation.
Ingestion:
May cause irritation of the digestive tract. May be harmful if swallowed. Ingestion of large amounts may cause liver and/or kidney damage.
Inhalation:
May cause respiratory tract irritation.
Chronic:
May cause cancer according to animal studies. Adverse reproductive effects have been reported in animals. Laboratory experiments have resulted in mutagenic effects.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin:
Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion:
If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation:
Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:
Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire.
Extinguishing Media:
For large fires, use water spray, fog or regular foam. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:
Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not ingest or inhale. Use with adequate ventilation.
Storage:
Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:
Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits
CAS# 72-55-9:

Personal Protective Equipment

Eyes:
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin:
Wear appropriate protective gloves to prevent skin exposure.
Clothing:
Wear appropriate protective clothing to prevent skin exposure.
Respirators:
A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State: Crystals
Color: white
Odor: None reported.
pH: Not available.
Vapor Pressure: 6.5106 mm Hg @ 20 C
Viscosity: Not available.
Boiling Point: 336 deg C
Freezing/Melting Point: 88.00 - 90.00 deg C
Autoignition Temperature: Not available.
Flash Point: Not available.
Explosion Limits, lower: Not available.
Explosion Limits, upper: Not available.
Decomposition Temperature:
Solubility in water: 0.010 ppm
Specific Gravity/Density:
Molecular Formula: C14H8Cl4
Molecular Weight: 318.02

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, dust generation, strong oxidants.
Incompatibilities with Other Materials:
Strong oxidizing agents - strong bases.
Hazardous Decomposition Products:
Hydrogen chloride, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 72-55-9: KV9450000
LD50/LC50:
CAS# 72-55-9: Oral, mouse: LD50 = 700 mg/kg; Oral, rat: LD50 = 880 mg/kg.
Carcinogenicity:
2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene -
California: carcinogen, initial date 1/1/89

Other:
See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:
Estimated BCF value = 8,300 based on water solubility. Estimated Koc value = 8,300. There was no movement of DDE reported in soil column mobility experiments.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.

**** SECTION 14 - TRANSPORT INFORMATION ****

IATA
Not regulated as a hazardous material.
IMO
Not regulated as a hazardous material.
RID/ADR
Not regulated as a hazardous material.
USA RQ: CAS# 72-55-9: 1 lb final RQ; 0.454 kg final RQ

**** SECTION 15 - REGULATORY INFORMATION ****

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XN
Risk Phrases:
R 22 Harmful if swallowed.
R 33 Danger of cumulative effects.
Safety Phrases:
S 24/25 Avoid contact with skin and eyes.
WGK (Water Danger/Protection)
CAS# 72-55-9: 3
Canada
None of the chemicals in this product are listed on the DSL/NDSL list.
CAS# 72-55-9 is listed on Canada's Ingredient Disclosure List.
US FEDERAL
TSCA
CAS# 72-55-9 is not listed on the TSCA inventory.
It is for research and development use only.

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 9/28/1998 Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

4-Cyano-4-Phenylpiperidine Hydrochloride, 99% (TLC)	51304-58-6
Methanesulfonamide	3144-09-0
gamma-Octanoic lactone, 98%	104-50-7
Cis,cis,cis,cis-1,2,3,4-cyclopentane- tetracarboxylic dianhydride,	4802-47-5
Tetrachloroethylene Carbonate, 98+%	22432-68-4
Oxamic Acid, 98%	471-47-6
1O,11-Dihydro-5H-Dibenzo(A,D)-Cycloheptene, 98%	833-48-7
Thallium (I) Sulfate, 99.9+%	7446-18-6
N-(2,6-Dimethylphenylcarbamoyl-Methyl)-Iminodiacetic Acid, 99%	59160-29-1
P-(Dimethylamino)cinnamic Acid, 99%	1552-96-1
Biebrich Scarlet, 99% (UV-VIS)	4196-99-0
4-Chlorobenzenediazonium hexafluoro- phosphate	1582-27-0
Ammonium hexachloroiridate(IV), 99.99%	16940-92-4
Methylamine-d2 deuteriochloride, 98+ atom % D	593-51-1
2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99%	72-55-9
Nitro red	56431-61-9
Methyl 2,3-dichlorobenzoate, 98+%	2905-54-6
Isopropyl Bromoacetate, 98% (GC)	29921-57-1
1-Iodo-4-Nitrobenzene, 99%	636-98-6
4-Ethylcyclohexanol, 99% cis/trans mixture	4534-74-1
Fluorescamine	38183-12-9
Tris(2,2,6,6-Tetramethyl-3,5-Heptanedionato)Dysprosium(III), 99+%	15522-69-7
3-Amino-2,2,5,5-Tetramethyl-1-Pyrrolidinyloxy, 99% (Titr.)	34272-83-8
3,4-Dihydroxyphenylacetic Acid,98%	102-32-9

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

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

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

N O T E S

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

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

ADDITIONAL INFORMATION

ICSC: 1205 **ZINC POWDER**

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

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

IMPORTANT DATA

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

PHYSICAL DANGERS:

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

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

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

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

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

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

PHYSICAL PROPERTIES

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

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

ENVIRONMENTAL DATA

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

N O T E S

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

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

ADDITIONAL INFORMATION

ICSC: 0056 **MERCURY**

International Chemical Safety Cards

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

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

CHROMIUM

ICSC: 0029

Chrome
Cr
Atomic mass: 52.0
(powder)

ICSC # 0029
CAS # 7440-47-3
RTECS # GB4200000
October 27, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions.	No open flames if in powder form.	In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION		Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST!	
•**INHALATION**	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•**SKIN**		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•**EYES**	Redness.	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
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P2 filter respirator for harmful particles.		R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0029

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

I

M

P

PHYSICAL STATE; APPEARANCE:
GREY POWDER

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

ROUTES OF EXPOSURE:

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

O R T A N T D A T A	**CHEMICAL DANGERS:** Chromium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances , causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m³ as TWA A4 (ACGIH 2004). MAK not established. OSHA PEL*: TWA 1 mg/m^3 See Appendix C *Note: The PEL also applies to insoluble chromium salts. NIOSH REL: TWA 0.5 mg/m^3 See Appendix C NIOSH IDLH: 250 mg/m^3 (as Cr) See: 7440473 **EFFECTS OF SHORT-TERM EXPOSURE:** May cause mechanical irritation tothe eyesandthe respiratory tract. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: 2642°C Melting point: 1900°C Density: 7.15 g/cm³ Solubility in water: none
ENVIRONMENTAL DATA	

N O T E S

The surface of the chromium particles is oxidized to chromium(III)oxide in air. See ICSC 1531 Chromium(III) oxide.

ADDITIONAL INFORMATION

ICSC: 0029 **CHROMIUM**

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

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

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

Barium sulphate
Blanc fixe
Artificial barite
$BaSO_4$
Molecular mass: 233.43

ICSC # 0827
CAS # 7727-43-7
RTECS # CR0600000
October 20, 1999 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			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES		Safety spectacles.	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
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P1 filter respirator for inert particles.		R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0827

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International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Reacts violently with aluminium powder. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 10 mg/m³ as TWA; (ACGIH 2004). MAK: (Inhalable fraction) 4 mg/m³; (Respirable fraction) 1.5 mg/m³; (DFG 2004). OSHA PEL†: TWA 15 mg/m^3 (total) TWA 5 mg/m^3 (resp) NIOSH REL: TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp) NIOSH IDLH: N.D. See: IDLH INDEX **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol. **INHALATION RISK:** Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Lungs may be affected by repeated or prolonged exposure to dust particles , resulting in baritosis (a form of benign pneumoconiosis).
PHYSICAL PROPERTIES	Melting point (decomposes): 1600°C Density: 4.5 g/cm³ Solubility in water: none
ENVIRONMENTAL DATA	

NOTES

Occurs in nature as the mineral barite; also as barytes, heavy spar. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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.

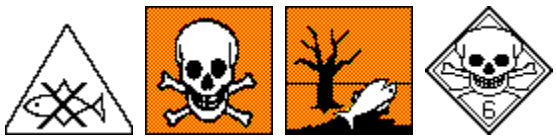
International Chemical Safety Cards

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

ICSC: 0013

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International Chemical Safety Cards

ARSENIC

ICSC: 0013

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

PHYSICAL STATE; APPEARANCE:
ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.01 mg/m³ as TWA A1 (confirmed human carcinogen); BEI issued (ACGIH 2004).
MAK:
Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).
OSHA PEL: 1910.1018 TWA 0.010 mg/m^3
NIOSH REL: Ca C 0.002 mg/m^3 15-minute See Appendix A
NIOSH IDLH: Ca 5 mg/m^3 (as As) See: 7440382

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol 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:
The substance is irritating to the eyes the skin and the respiratory tract. The substance may cause effects on the gastrointestinal tract cardiovascular system central nervous system kidneys , resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders shock convulsions and kidney impairment Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the mucous membranes, skin, peripheral nervous system liver bone marrow , resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment anaemia This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Sublimation point: 613°C
Density: 5.7 g/cm³

Solubility in water:
none

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.

N O T E S

The substance is combustible but no flash point is available in literature. Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC 0377), Arsenic trichloride (ICSC 0221), Arsenic trioxide (ICSC 0378), Arsine (ICSC 0222).

Transport Emergency Card: TEC (R)-61GT5-II

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:

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.)? _____

_____

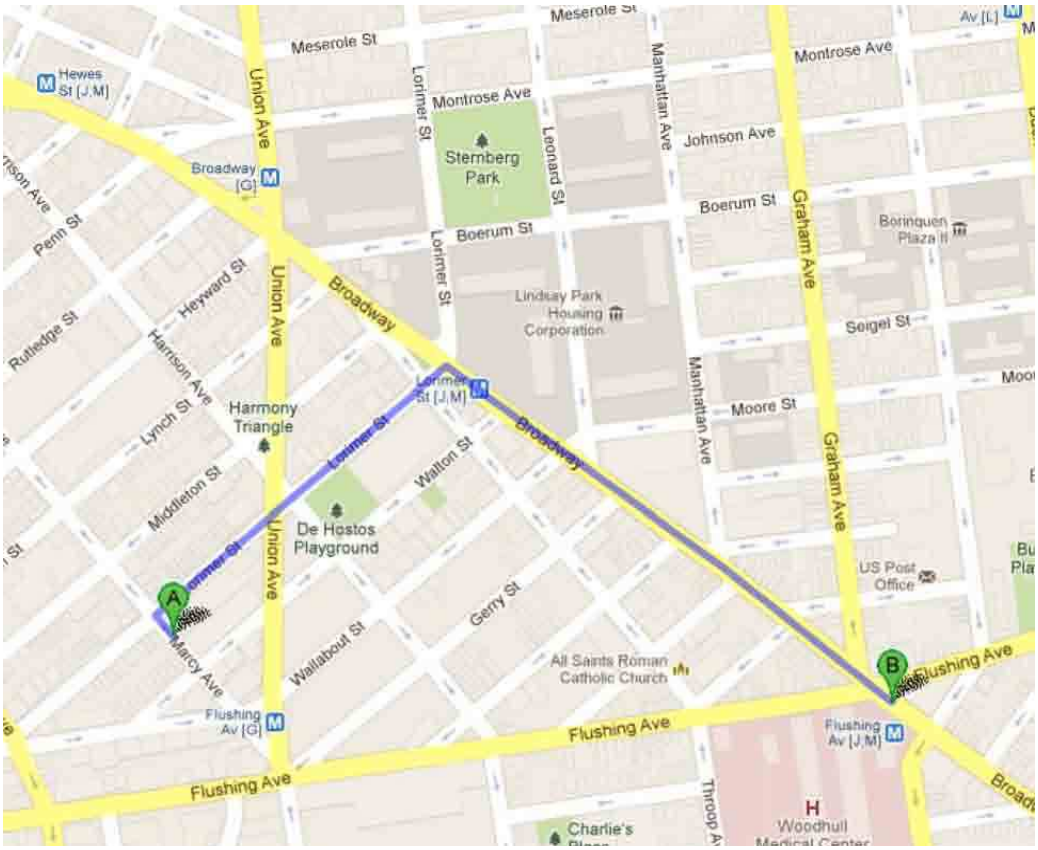
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

WOODHUL MEDICAL CENTER
760 Broadway, Brooklyn, New York 11206
718-963-8000
0.7 Miles – About 4 Minutes



A 407 Marcy Ave, Brooklyn, NY 11206

1. Head **northwest** on **Marcy Ave** toward **Lorimer St**	go 102 ft total 102 ft
2. Take the 1st right onto **Lorimer St** About 2 mins	go 0.3 mi total 0.3 mi
3. Turn right onto **Broadway** Destination will be on the right About 2 mins	go 0.4 mi total 0.7 mi

B 760 Broadway, Brooklyn, NY 11206

ATTACHMENT D
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
Former Charles Pfizer & Co. Site
407 Marcy Avenue, Brooklyn, NY

Prepared on behalf of:

Marcy Housing LLC
505 Flushing Avenue, Suite 1B
Brooklyn, NY 11205

Prepared by:

EBC
Environmental Business Consultants
Ridge, NY 11961

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QUALITY ASSURANCE PROJECT PLAN

Former Charles Pfizer & Co. Site
407 Marcy Avenue, 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.

Kevin Brussee 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.	Kevin Brussee, 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

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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.

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2.2.3 Method Blanks

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

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SR = sample results
SA = spike added from spiking mix

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.

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7. QC check sample and standard recovery results
8. Blank results (field, trip, and method).
9. Internal standard area and RT summary.

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	21	1 per 900 square feet	Endpoint verification	VOCs / SVOCs by 8260 / 8270 and TAL Metals	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
Soil	SVOC Contaminated Soil Hotspot Excavation Bottom	3	1 per 900 square feet	Endpoint Verification of SVOC Contaminated Soil Hot Spot	SVOCs by 8270	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
Soil	SVOC Contaminated Soil Hotspot Excavation Sidewalls	12	1 per 30 linear feet	Endpoint Verification of SVOC Contaminated Soil Hot Spot	SVOCs by 8270	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
Soil	Excavated SVOC Contaminated Soil	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
Soil	Excavated Historic Fill Material	11	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

FORMER CHARLES PFIZER &CO. SITE
407 MARCY AVENUE
BROOKLYN, NY

JULY - 2013

FORMER CHARLES PFIZER & CO. SITE

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 the Former Charles Pfizer & Co. Site. 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) and petroleum VOCs and SVOCs 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.

1808 MIDDLE COUNTRY ROAD
RIDGE, NY 11961
PHONE 631.504.6000
FAX 631.924.2870

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.

APPENDIX A
ACTION LIMIT REPORT

CAMP
ACTION LIMIT REPORT

Project Location: _____

Date: _____ Time: _____

Name: _____

Contaminant: _____ PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

Temperature: _____ Barometric Pressure: _____

DOWNWIND DATA

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

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

UPWIND DATA

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

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

BACKGROUND CORRECTED LEVELS

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

ACTIONS TAKEN

_____
_____
_____
_____
_____
_____
_____
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_____
_____
_____
_____

ATTACHMENT F
Citizen Participation Plan

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan

for

FORMER CHARLES PFIZER & CO. SITE

407 Marcy Street
Brooklyn, NY 11211

June 2013

Contents

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Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **Marcy Housing LLC**
Site Name: **Former Charles Pfizer & Co. ("Site")**
Site Address: **407 Marcy Street, Brooklyn**
Site County: **Kings**
Site Number: **C224175**

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants that conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: http://www.dec.ny.gov/chemical/8450.html.

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interest in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment;

- Improving public access to, and understanding of, issues and information related to a particular site and that Site's investigation and cleanup process;

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process;

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community; and

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the Site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the Site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the Site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC website. If this occurs, NYSDEC will inform the public in fact sheets distributed about the Site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the Site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- Chief executive officer and planning board chairperson of each county, city, town and village in which the Site is located;
- Residents, owners, and occupants of the Site and properties adjacent to the Site;
- The public water supplier which services the area in which the Site is located;
- Any person who has requested to be placed on the site contact list;

- The administrator of any school or day care facility located on or near the Site for purposes of posting and/or dissemination of information at the facility; and
- Location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the Site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

- **Document repositories** allow the public to access and review project documents including investigation and cleanup work plans and final reports.

The public is encouraged to contact project staff at any time during the Site's investigation and cleanup process with questions, comments, or requests for information. This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the Site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the Site, as described in Section 5.

If the Site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret

and understand existing environmental information about the nature and extent of contamination related to the Site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the Site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the Site.

For more information about TAGs, go online at http://www.dec.ny.gov/regulations/2590.html.

Note: The table identifying the citizen participation activities related to the Site's investigation and cleanup program follows on the next page:

Citizen Participation Requirements (Activities)	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repositories	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement:	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about proposed RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that summarizes the Final Engineering Report • Distribute fact sheet to site contact list announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets are combined if possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the Site. Additional major issues of public concern may be identified during the course of the Site's investigation and cleanup process.

The major issues of concern to the public will be potential impacts of nuisance odors and dust during the removal of affected soil at the Site. Another example of a major issue of public concern would be the impact of increased truck traffic on the surrounding neighborhood. Construction safety issues will also be addressed. In addition, this Site may be located in a potential environmental justice area. Furthermore, it may be determined that translation services may be necessary for fact sheets and public meetings. This work will be performed in accordance with procedures which will be specified under a detailed Remedial Program which considers and takes preventive measures for exposures to future residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a Health and Safety Plan (HASP) and a Community Air Monitoring Plan (CAMP) are required components of the remedial program. Implementation of these plans will be under the direct oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

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

- On-site air monitoring for worker protection;
- Perimeter air monitoring for community protection;
- The use of odor, vapor, and dust controls, such as water or foam sprays, as needed;
- Monitoring and control of soil, sediments, and water generated during remediation; and
- Truck routes which avoid residential streets.

The HASP and the CAMP will be prepared as part of the Remedial Action Work Plan (RAWP) and will be available for public review at the document repository as identified in Appendix A (page 11).

Furthermore, the Applicant has prepared a Scoping Sheet for Major Issues of Public Concern which will assist them in identifying any concerns. Experience from similar projects, 311 complaints and other construction projects in the area will help in identifying such issues.

4. Site Information

Appendix C contains a map identifying the location of the Site.

Site Description

The Site to be remediated and redeveloped is located in the Williamsburg section of Brooklyn (Kings County) and is comprised of a single tax parcel totaling 18,662 square feet (0.428 acres). The subject property is located in the City of New York and Borough of Brooklyn (Kings County). The lot has 72 feet of frontage on Marcy Avenue and 224 feet of frontage on Lorimer Street.

The lot is currently developed with a one-story brick building which occupies approximately 70 percent of the lot. The remainder of the lot consists of a loading dock and truck staging area. According to the NYC Department of Buildings, the current building was constructed in 1959.

The elevation of the Site is approximately 14 feet above the National Geodetic Vertical Datum (NGVD). The area topography gradually slopes to the east. The depth to groundwater beneath the Site, as determined from field measurements, is approximately 10 feet below grade. Based on regional groundwater contour maps, groundwater flow is expected to be west-northwest toward Wallabout Channel approximately 0.85 miles from the Site.

The surrounding land use includes multi-family residential to the north, east and west with vacant or underutilized commercial properties to the south. The adjacent properties to the south on Walton Street are currently used for commercial purposes but are being marketed for residential development following the change in zoning. There are several schools in the immediate area of the Site including an elementary school (PS 380) approximately 550 feet west-northwest (downgradient) of the Site and an intermediate school (IS 318) approximately 650 feet to the east.

History of Site Use, Investigation, and Cleanup

The Site developed prior to 1887 with 12 two-story residential homes. By 1935 the home on the corner of Marcy and Lorimer was replaced with a storefront labeled as "club" and the eastern 5 of 8 lots fronting on Lorimer Street are now replaced with a vacant commercial building. The 1950 map shows the commercial building extending through the remaining three lots on Lorimer and the building is now labeled "truck sales and service. The southern-most lot on Marcy is now vacant. By 1965 the property is in its current configuration and identified as "Charles Pfizer and Company". The property remains labeled as Pfizer through 1987. From 1989 to 2007 the property is shown as an identified warehouse.

Preliminary investigations performed at the Site have identified chlorinated volatile organic compounds in groundwater and semi-volatile organic compounds in soil. As a result of these preliminary findings, a spill was reported to the NYSDEC and Spill No. 1214474 was assigned to the Site.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program (BCP) as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the Site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, and must conduct a qualitative exposure assessment, (a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the Site and to contamination that has migrated from the Site).

The Applicant in proposes that the Site will be used for unrestricted purposes.
To achieve this goal, the Applicant will conduct investigation and cleanup activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement (BCA) executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the Site.

Investigation

The Applicant has completed a preliminary site investigation before it entered into the BCP. The Applicant will now conduct an investigation of the Site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant previously developed a remedial investigation workplan, which was subject to public comment.

The site investigation has several goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; and
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the Site poses a significant threat to public health or the environment. If the Site is a significant threat, it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the Site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Remedy Selection

When the investigation of the Site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the Site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a Certificate of Completion (COC) (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant

may then develop a cleanup plan, officially called a Remedial Work Plan. The Remedial Work Plan describes the Applicant's proposed remedy for addressing contamination related to the Site.

When the Applicant submits a proposed Remedial Work Plan for approval, NYSDEC would announce the availability of the proposed plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a Final Engineering Report (FER) that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the Site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the Site, it will approve the FER. NYSDEC then will issue a COC to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the Site after it receives a COC.

Site Management

Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management may be conducted by the Applicant under NYSDEC oversight, if contamination will remain in place. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the Site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan (SMP).

An institutional control is a non-physical restriction on use of the Site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the Site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that is pumping and treating groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Ioana Munteanu-Ramnic
New York State Department of Environmental Conservation
Division of Environmental Remediation
One Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
ixmuntea@gw.dec.state.ny.us

Thomas Panzone
Regional Citizen Participation Specialist
NYSDEC Region 2
Division of Environmental Remediation
One Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
Tel: (718) 482-4953

New York State Department of Health (NYSDOH):
Krista Anders
New York State Department of Health
Bureau of Environmental Exposure Investigation
Empire State Plaza – Corning Tower Room 1787
Albany, New York 12237
Tel: (518) 402-7860
Email: beei@health.state.ny.us

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Brooklyn Public Library– Bushwick Branch
340 Bushwick Avenue at Seigel Street.
Brooklyn, NY 11206
718-602-1348

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

Appendix B - Site Contact List

Local Government Contacts:

City of New York
Michael Bloomberg
Mayor of New York City
City Hall
New York, NY 10007

Marty Markowitz
Brooklyn Borough President
209 Joralemon Street
Brooklyn, NY 11201

Christopher Olechowski
Chair, Brooklyn Community Board 1
435 Graham Avenue
Brooklyn, NY, 11211

Gerald Esposito
District Manager, Brooklyn Community Board 1
435 Graham Avenue
Brooklyn, NY, 11211

Stephen Levin
NYC Council Member
33rd District
410 Atlantic Avenue
Brooklyn, NY 11217

Amanda M. Burden
Chair of City Planning (Zoning)
22 Reade St.
Third Floor
New York, NY 10007

New York City Department of Transportation
Brooklyn Borough Commissioner
Attn: Joseph Palmieri
16 Court Street
Brooklyn, NY 11241

Kings County Clerk's Office
Nancy T. Sunshine, County Clerk
360 Adams Street, Room 189
Brooklyn, NY 11201

Hon. Bill de Blasio
Public Advocate
1 Centre Street, 15th Floor
New York, NY 10007

Hon. John Liu
Office of the Comptroller
1 Centre Street
New York, NY 10007

Hon. Daniel Squadron
NYS Senator
250 Broadway Suite 2011
New York, NY 10007

Vacant
NYS Assembly Member
434 South 5th Street
Brooklyn, NY 11211

Hon. Charles Schumer
U.S. Senator
780 Third Avenue, Suite 2301
New York, NY 10017

Hon. Kirsten Gillibrand
U.S. Senator
780 Third Avenue, Suite 2601
New York, NY 10017

Hon. Nydia M. Velazquez
U.S. House of Representatives
266 Broadway, Suite 201
Brooklyn, NY 11211

John Wuthenow
Office of Environmental Planning & Assessment
NYC Dept. of Environmental Protection
96-05 Horace Harding Expressway
Flushing, NY 11373

Dr. Robert Kulikowski
Director
NYC Office of Environmental Coordination
100 Gold Street – 2nd Floor
New York, NY 10038

Daniel Walsh
NYC Office of Environmental Remediation
100 Gold Street, 2nd Floor
New York, NY 10038

Local News Media:

The Brooklyn Paper
One Metrotech Center, Suite 1001
Brooklyn, NY 11201
(718) 260-4504

Courier-Life Publications
1 Metro-Tech Center North - 10th Floor
Brooklyn, NY 11201

Brooklyn Daily Eagle
30 Henry Street
Brooklyn, NY 11201

New York 1 News
75 Ninth Avenue
New York, NY 10011

New York Times
620 Eighth Ave.
New York, NY 10018

News 12 Brooklyn
East 18th & Avenue Z
Brooklyn, NY 11235

New York Daily News
4 New York Plaza
New York, NY 10004

New York Post
1211 Avenue of the Americas
New York, NY 10036-8790

Public Water Supplier:
New York City Department of Environmental Protection
Attn: Hon. Carter Strickland, Commissioner
59-17 Junction Boulevard
Flushing, NY 11373

Schools and Daycare Facilities:

1 Public School 380 John Wayne Elementary
370 Marcy Avenue New York, NY 11206
718-388-0607

2. Juan Morel Campos Secondary School
215 Heyward Street New York, NY 11206
718-302-7900

3. I.S. 318 Eugenio Maria De Hostos
101 Walton Street Brooklyn, NY 11206
718-782-0589

4. Congregation Ahavas Shulem
545 Broadway Brooklyn, NY 11206

5. Bedford Harrison Day Care Center
60 Harrison Avenue Brooklyn, NY 11211

6. Rabbinical College Of Ohr Shimon Yisroel
215 Hewes Street Brooklyn, NY 11211

7. United Talmudic Academy
212 Williamsburg Street East Brooklyn, NY 11211
718-963-9388

8. El Puente Leaders For Peace & Justice
250 Hooper Street Brooklyn, NY 11211
718-387-0404

9. Beth Rachel School For Girls
227 Marcy Avenue Brooklyn, NY 11211
718-963-9292

10. Bnos Chayil
Brooklyn New York, NY
718-388-6201

11. Nuestros Ninos Child Development School
384 South 4th Street New York, NY 11211
718-218-8275

12. P.S. 250 George H Lindsey
108 Montrose Avenue Brooklyn, NY 11206
718-384-0889

13. Goshin Ryu Shotokan
    100 Manhattan Avenue Brooklyn, NY 11206
    718-218-7117

14. Central Brooklyn Seventh Day Adventist School
    130 Boerum Street
    Brooklyn, NY 11206

15. Opportunities for a Better Tomorrow
    25 Thornton Street Brooklyn, NY 11206
    718-387-1600

16. Beginning With Children Charter School
    11 Bartlett Street Brooklyn, NY 11206
    718-388-8847

17. Public School 373
    185 Ellery Street Brooklyn, NY 11206
    718-782-6800

18. Tompkins Children's Center
    730 Park Avenue Brooklyn, NY 11206
    718-782-9140

19. P.S. 297 Abraham Stockton
    700 Park Avenue, Brooklyn, NY11206
    718-388-4581

20. Our Children Leaders Tomorrow
    756 Myrtle Avenue Brooklyn, NY 11206
    718-643-8201

21. Bnei Shimon Yisroel of Sopron
    18 Warsoff Place New York, NY 11205
    718-855-4092

22. Yeshiva Mesivta Arugath Habosem
    40 Lynch Street Brooklyn, NY 11206
    718-237-4500

23. Beth Chana School For Girls
    118 Wallabout Street Brooklyn, NY 11249
    718-625-4555

24. Yeshiva Mesivta Arugath Habosem
    40 Lynch Street Brooklyn, NY 11206
    718-237-4500

25. Hychel Hatorah of Williamsburg
    70 Franklin Avenue Brooklyn, NY 11205
    718-250-9982

26. Yeshiva Kehilath Yakov Inc
    638 Bedford Avenue Brooklyn, NY 11249

27. Yeled V'Yalda Torah Daycare Center
    2 LEE AVENUE
    Brooklyn, NY11211

28. Marcy Children's Ctr
    494 MARCY AVENUE
    Brooklyn, NY11206

Community, Civic, Religious and other Educational Institutions

Open Space Alliance of North Brooklyn
79 North 11th Street
Brooklyn, NY 11211

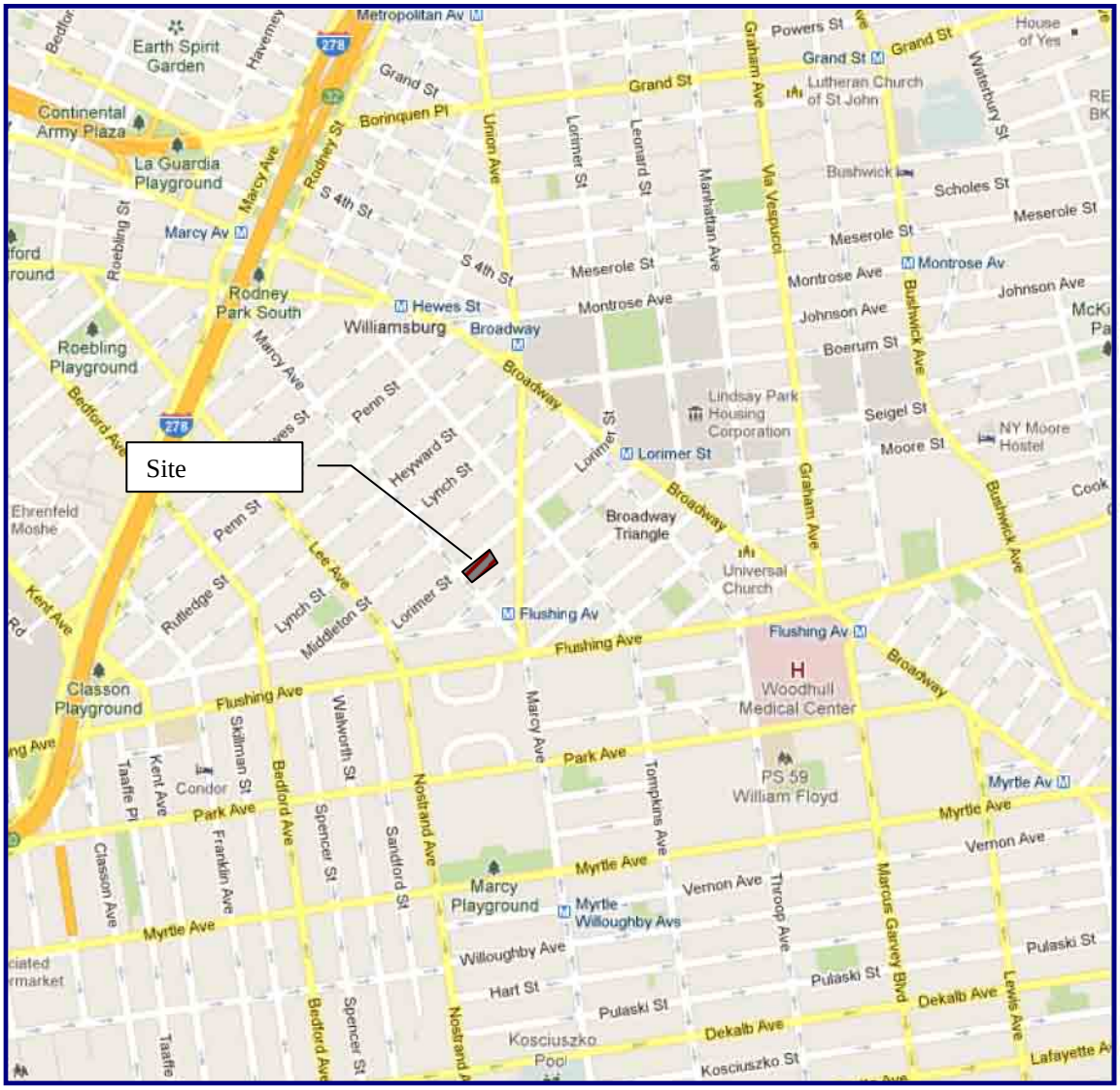
Brooklyn Chamber of Commerce
25 Elm Place, Suite 200 2nd Floor
Brooklyn, NY 11201

New York City Housing Authority
250 Broadway
New York, NY 10007
Attn: Sheila Stainback, Media Relations

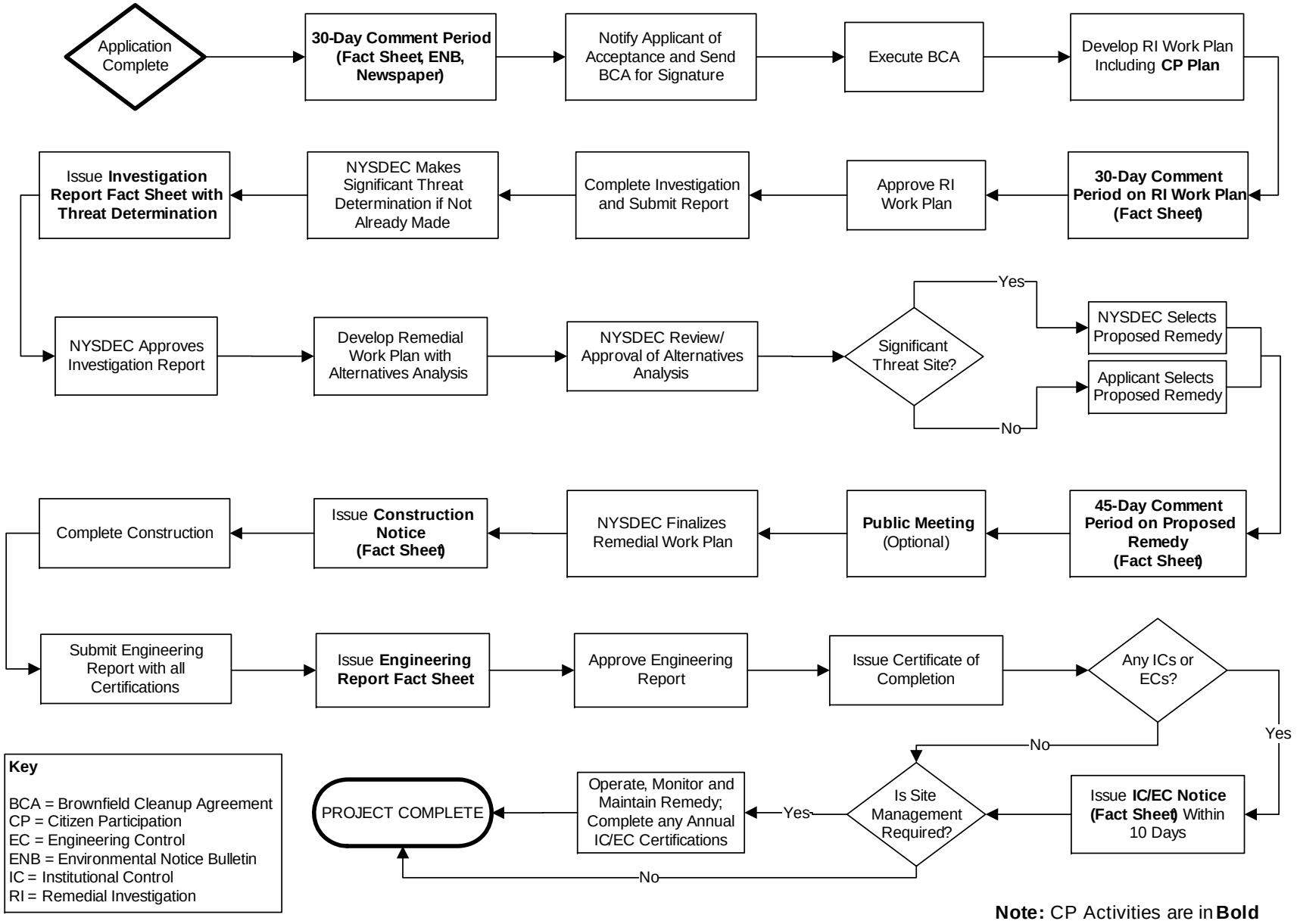
Marcy Houses (NYCHA)
Attn: Management Office
452 Marcy Avenue
Brooklyn, NY 11206

Marcy Houses (NYCHA)
Attn: President, Resident Association
452 Marcy Avenue
Brooklyn, NY 11206

Appendix C - Site Location Map



Appendix D– Brownfield Cleanup Program Process



Note: CP Activities are in **Bold**

ATTACHMENT G
Resumes

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

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

EBC

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

EBC

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.)

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Kristen DiScenza, Project Manager

Professional Experience
EBC: February 2013
Prior: 7.5 years

Education
Graduate Certificate, Waste Management, Stony Brook University, NY
Bachelor of Science, Environmental Science, SUNY Oneonta, Oneonta, NY

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

Professional Certification
- OSHA 40-hr HAZWOPER
- OSHA 10-hr Construction Health and Safety
- Lead Awareness

PROFILE

Ms. DiScenza has 7.5 years experience as an environmental consultant/contractor and has worked on and managed a wide range of environmental projects. Ms. DiScenza has conducted Phase I, Phase II, and Phase III Environmental Site Assessments for commercial, industrial and residential properties in New York.

Ms. DiScenza's field experience includes tank removal and installations, spill management and closure, soil and groundwater sampling, oversight of soil boring and well installation and abandonment activities, UIC structure remediation and abandonment, Enhanced Fluid Recovery oversight and installation and operation of soil vapor extraction/air sparge and oxygen injection remediation systems. Ms. DiScenza has prepared reports for both regulatory and client use.

PREVIOUS EXPERIENCE

Sovereign Consulting, Inc., Farmingdale, New York
Senior Project Manager, 2006-2013

Tyree Brothers Environmental Services, Farmingdale, New York
Field Technician, 2005-2006

EBC

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 H
BCP Signage Specifications

SIGNS FOR REMEDIAL PROGRAMS

Instructions

Signs are required at sites where remedial activities are being performed under one of the following remedial programs: State Superfund, Voluntary Cleanup Program (VCP), Brownfield Cleanup Program (BCP), Environmental Restoration Program (ERP), Brownfield Opportunity Area (BOA) Program (note: activities under this program would be for investigation). The cost of the sign will be borne by the parties performing the remedial activities based on the legal document the activities are being performed under (i.e. volunteers/participants would pay 100% of the cost under the BCP; municipalities would be reimbursed for 90% of the cost under the ERP).

Sign Requirements

Size: **Horizontal format - 96" wide by 48" high**

Construction Materials: **Aluminum or wood blank sign boards with vinyl sheeting.**

Inserts: **"Site Name", "Site Number", "Name of Party Performing Remedial Activities" and "Municipal Executive".**
Indicate position, size and topography for specific inserts.

Color Scheme: **Copy surrounding DEC logo - "NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION" - PMS 355**

DEC logo: **PMS 301 Blue**
PMS 355 Green

Text:

Program (choose one):	**PMS 301**
Brownfield Cleanup Program	
Voluntary Cleanup Program	
Brownfield Opportunity Areas Program	
Petroleum Remediation Program	
State Superfund Program	
1996 Clean Water/Clean Air Bond Act - Environmental Restoration Program	
Site Name, Site Number, Party Performing Remedial Activities	**PMS 355**
Names of Governor, Commissioner, Municipal Executive	**PMS 301**
Transform the Past.....Build for the Future	**PMS 355**

Type Specifications: **All type is Caslon 540, with the exception of the logotype.**
Format is: center each line of copy with small caps and initial caps.

Production Notes: **96" wide x 48" high aluminum blanks will be covered with vinyl sheeting to achieve background color. Copy and logo will be silk screened on this surface.**

See attached format

New York State Brownfields Cleanup Program

Former Charles Pfizer & Company Site
BCP Site No. C-224175
Marcy Housing LLC

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

Transform the Past. Build for the Future.

ATTACHMENT I
Estimated Remedial Costs

TABLE 1
FORMER CHARLES PFIZER CO. SITE
407 Marcy Avenue
Brooklyn, NY

Summary of Project Costs

TASK	NYS Brownfields Cleanup Program Costs by Task Alternative 2
BCP Entry Documents	COMPLETED
Supplemental Investigation and RI Report	COMPLETED
Remedial Work Plan, Remedy Scoping & Coordination	$ 21,750.00
Remedial Program Implementation	$ 762,598.00
Final Engineering Report, Site Management Plan & IC/ECs	$ 93,000.00
Subtotal	$ 877,348.00
15% Contingency	$ 131,602.20
Total	**$ 1,008,950.20**

TABLE 2
FORMER CHARLES PFIZER SITE
REMEDIAL PROGRAM COST ANALYSIS
REMEDIAL PHASE DOCUMENTS

Description	Category	Quant.	Unit	Unit Cost	Capital Cost
Remedy Scoping					$ 1,500.00
Includes scoping meeting, and discussions w/DEC, client, design team and construction team.	Scoping Meeting and Preparation	1	LS	$ 1,500.00	$ 1,500.00
Remedial Work Plan					$ 20,250.00
Includes development of an initial remedial plan which identifies and evaluates applicable remedial technologies, preparation and distribution of a remedial fact sheet, and the submission of detailed technical plans following remedy selection.	Remedial Work Plan	1	LS	$ 18,000.00	$ 18,000.00
	Fact Sheet and notification	1	ea	$ 750.00	$ 750.00
	Health and Safety plan	1	LS	$ 1,500.00	$ 1,500.00
	Community Air Monitoring Plan	1	LS	$ 950.00	$ 950.00
Total					**$ 21,750.00**

TABLE 3
FORMER CHARLES PFIZER SITE
REMEDIAL PROGRAM COST ANALYSIS
REMEDIAL ACTIONS

Description	Category	Quant.	Unit	Unit Cost	Capital Cost
Limited Excavation and Disposal of Impacted Soil					$ 651,813.00
Includes costs associated with excavation and disposal of excavated soil to a depth of 8 feet across the site and to 12 feet below building foundation. Assume top 8 feet to be disposaed of at Class B facility. Deeper soil assomed to meet restricted reside	Supervision, oversight & air monitoring	25	day	$ 850.00	$ 21,250.00
	Project Management & Coordination	60	hr	$ 100.00	$ 6,000.00
	Project Management & Coordination	24	hr	$ 100.00	$ 2,400.00
	Non-Hazardous disposal (5524 cy)	8286	tons	$ 45.00	$ 372,870.00
	Clean Soil Disposal (1899 cy)	2848.5	tons	$ 38.00	$ 108,243.00
	Poly-Sheeting	5	roll	$ 110.00	$ 550.00
	End point sample analysis (VOC/SVOC)	20	ea	$ 575.00	$ 11,500.00
	Cat B Deliverables and EDD	20	ea	$ 75.00	$ 1,500.00
	Additional Shoring	1	LS	$ 75,000.00	$ 75,000.00
	Additional Dewatering	1	LS	$ 50,000.00	$ 50,000.00
	Dusr	1	LS	$ 2,500.00	$ 2,500.00
Vapor Barrier System					$ 100,785.00
Includes costs associated with designing, inspecting and installing a vapor barrier system for the new building. Assumes that verification testing will consist of 4 subslab samples in the building and 1 outdoor control sample	Design	1	LS	$ 2,500.00	$ 2,500.00
	Supervision and Inspection	4	days	$ 500.00	$ 2,000.00
	Vapor Barrier materials & Installation	18662	sf	$ 5.00	$ 93,310.00
	Verification Sampling (NYSDOH protocol)	1	LS	$ 1,100.00	$ 1,100.00
	Sample Analysis (TO15)	5	ea	$ 375.00	$ 1,875.00
Reporting					$ 10,000.00
Includes costs associated status reports during remedial program.	Daily Status Reports	-			Included Above
	Monthly Status Reports	8	ea	$ 1,250.00	$ 10,000.00
Total					**$ 762,598.00**

TABLE 4
FORMER CHARLES PFIZER SITE
REMEDIAL PROGRAM COST ANALYSIS
CERTIICATE OF COMPLETION DOCUMENTS

Description	Category	Quant.	Unit	Unit Cost	Capital Cost
Final Engineering Report					$ 20,500.00
Includes preparation and submission of Final Engineering report to document the clean-up, supplemental investigation and remedial process.	Scoping Meeting	1	ea	$ 1,500.00	$ 1,500.00
	Final Engineering Report	1	LS	$ 17,500.00	$ 17,500.00
	Fact Sheet and notification	1	ea	$ 750.00	$ 750.00
	Preparation of Materials	1	ea	$ 750.00	$ 750.00
Site Management Plan					$ 8,250.00
Includes preparation of a site management plan to continue off-site monitoring and maintenance of a sub-slab venting system (if required).	Site Management Plan	1	LS	$ 10,000.00	$ 7,500.00
	Fact Sheet and notification	1	ea	$ 750.00	$ 750.00
Environmental Easement and Final Closure					$ 16,500.00
Includes recording the environmental easement, negotiations with DEC Albany on language of easement, and recording the Certificate of Completion. Requires title attorney and environmental counsel.	Title Search	1	LS	$ 1,500.00	$ 1,500.00
	Survey	1	LS	$ 2,500.00	$ 2,500.00
	Attorneys Fees	1	LS	$ 10,000.00	$ 10,000.00
	Recording Certificate of Completion	1	LS	$ 2,500.00	$ 2,500.00
DEC Costs					$ 30,000.00
Under the BCP the signatory must agree to pay all NYSDEC and NYSDOH costs for the review of project documents and for project oversight.	NYSDEC Costs	1	LS	$ 25,000.00	$ 25,000.00
	NYSDOH Costs	1	LS	$ 5,000.00	$ 5,000.00
Periodic Review Report					$ 17,750.00
Includes preparation of a yearly summary report and recertification of all engineering controls and institutional controls. Assumes 5 year period	Periodic Review Report	5	ea	$ 3,000.00	$ 15,000.00
	Engineering Inspections	5	ea	$ 550.00	$ 2,750.00
Total					**$ 93,000.00**

ATTACHMENT J
Waterproofing Membrane Specifications

GRACE

PREPRUFE® 300R & 160R

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

Description

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

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

The Preprufe R System includes:

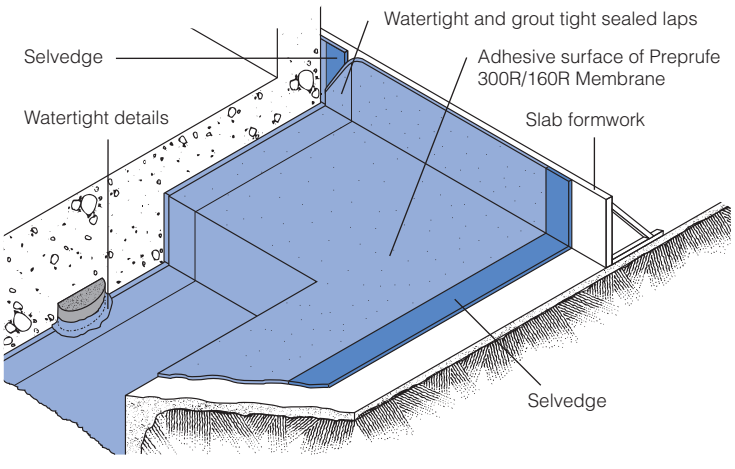
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe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

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

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

Advantages

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



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

BBA BRITISH BOARD OF AGREMENT CERTIFICATE No. 97/3325

Installation

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

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

Substrate Preparation

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

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

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

Membrane Installation

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

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

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

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

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

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal.

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

Details

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

Membrane Repair

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

Pouring of Concrete

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

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

Removal of Formwork

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

A minimum concrete compressive strength of 1500 psi (10 N/mm^2) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

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

Figure 1

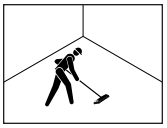


Figure 2

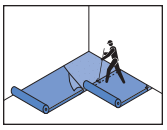
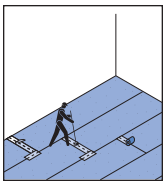
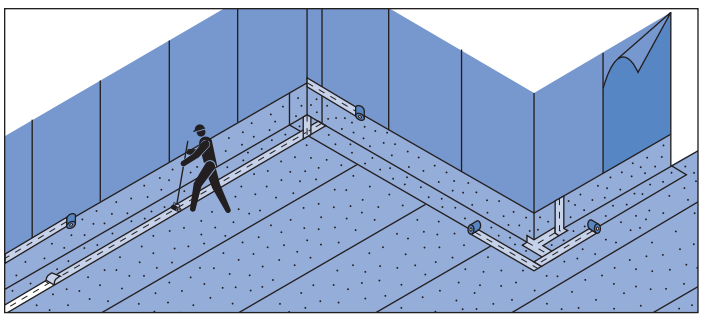


Figure 3

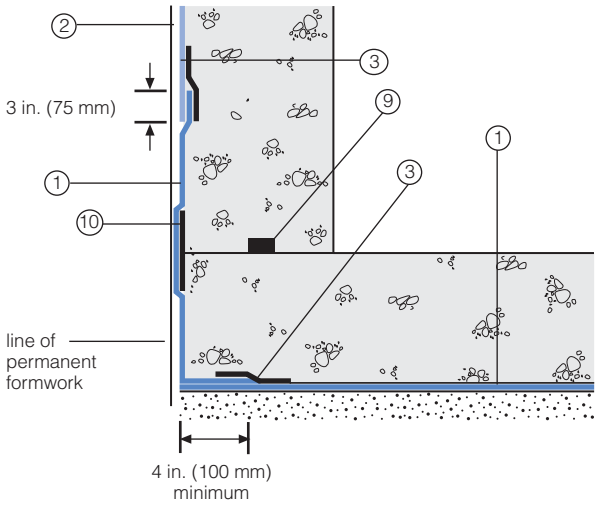




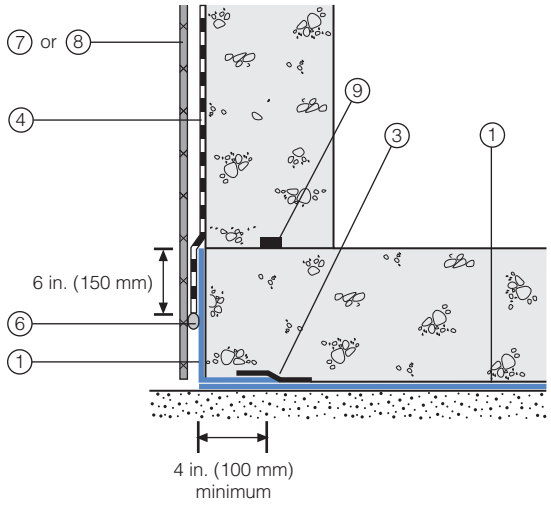
Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at graceconstruction.com. For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

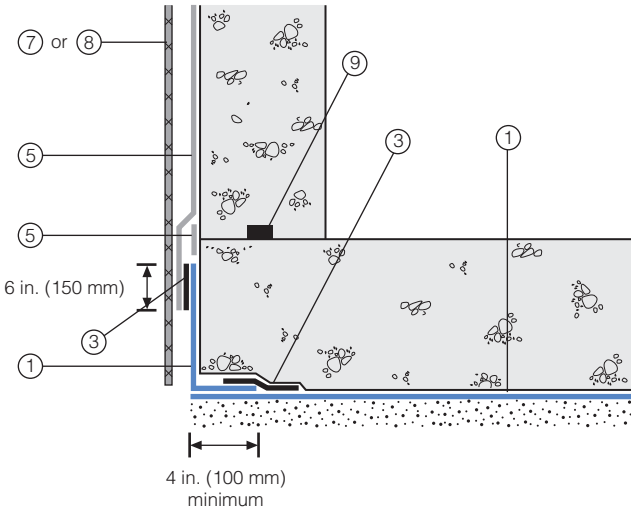
Wall base detail against permanent shutter



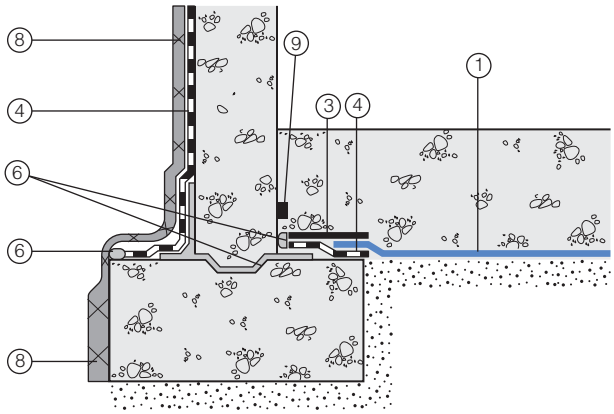
Bituthene wall base detail (Option 1)



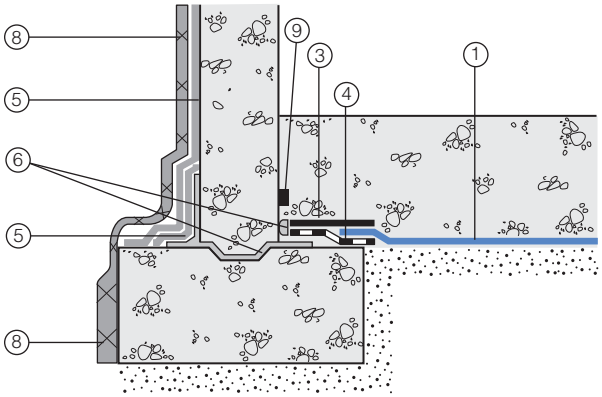
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



1 Preprufe 300R
2 Preprufe 160R
3 Preprufe Tape
4 Bituthene
5 Procor
6 Bituthene Liquid Membrane
7 Protection
8 Hydroduct®
9 Adcor ES
10 Preprufe CJ Tape

Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft^2 (36 m^2)	460 ft^2 (42 m^2)	
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)	4.3 lbs (2 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)
* LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C)) HC denotes Hot Climate (50°F (>+10°C))			
Ancillary Products			
Bituthene Liquid Membrane—1.5 US gal (5.7 liter) or 4 US gal (15.1 liter)			

Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385, modified[1]
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385, modified[2]
Elongation	500%	500%	ASTM D412, modified[3]
Tensile strength, film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836
Puncture resistance	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903, modified[4]
Lap peel adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876, modified[5]
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa x s x m^2))	0.01 perms (0.6 ng/(Pa x s x m^2))	ASTM E96, method B
Water absorption	0.5%	0.5%	ASTM D570

Footnotes:

1. Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
2. Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
3. Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
4. Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
5. The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute.

Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor with Preprufe.

Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

www.graceconstruction.com

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

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