

FORMER BRONX FREIGHT TERMINAL SITE
101 LINCOLN AVENUE
BRONX, NEW YORK 10454
Block 2316, Lot 1

REMEDIAL ACTION WORK PLAN

June 2016

Prepared for:
101 Lincoln Associates Property LLC
512 Seventh Avenue 15th Floor
New York, NY 10018



AMC Engineering
99 Jericho Turnpike, Suite 300J
Jericho, NY 11753
Phone: (516) 417-8588

CERTIFICATIONS

I _____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).

NYS Professional Engineer #

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.

TABLE OF CONTENTS
REMEDIAL ACTION WORK PLAN
Former Bronx Freight Terminal Site

EXECUTIVE SUMMARY	.....	i
1.0 INTRODUCTION	.....	1
1.1 SITE LOCATION AND DESCRIPTION	.....	1
1.2 CONTEMPLATED REDEVELOPMENT PLAN	.....	2
1.3 DESCRIPTION OF SURROUNDING PROPERTY	.....	2
2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS	.....	3
2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED	.....	3
2.1.1 Soil Borings	.....	3
2.1.2 Monitoring Wells	.....	3
2.1.3 Samples Collected	.....	4
2.1.3.1 Soil Samples	.....	4
2.1.3.2 Groundwater Samples	.....	4
2.1.3.3 Soil Gas Samples	.....	4
2.1.4 Chemical Analytical Work Performed	.....	5
2.1.5 Documentation	.....	5
2.2 SIGNIFICANT THREAT	.....	6
2.3 SITE HISTORY	.....	8
2.3.1 Past Uses and Ownership	.....	8
2.3.2 Summary of Previous Reports	.....	9
2.4 GEOLOGICAL CONDITIONS	.....	11
2.5 CONTAMINATION CONDITIONS	.....	12
2.5.1 Conceptual Model of Site Contamination	.....	12
2.5.2 Description of Areas of Concern	.....	13
2.5.3 Soil/Fill Contamination	.....	13
2.5.3.1 Summary of Soil/Fill Contamination	.....	13
2.5.3.2 Comparison of Soil/Fill to SCGs	.....	13
2.5.4 On-Site and Off-Site Groundwater Contamination	.....	13
2.5.4.1 Summary of Groundwater Contamination	.....	14
2.5.4.2 Comparison of Groundwater with SCGs	.....	14
2.5.5 On-Site and Off-Site Soil Vapor Contamination	.....	14
2.5.5.1 Summary of Soil Vapor Contamination	.....	15
2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS	.....	15
2.6.1 Qualitative Human Health Exposure Assessment	.....	15
2.6.2 Fish & Wildlife Remedial Impact Analysis	.....	17
2.7 REMEDIAL ACTION OBJECTIVES	.....	18
2.7.1 Groundwater	.....	18
2.7.2 Soil	.....	18
2.7.3 Soil Vapor	.....	18

TABLE OF CONTENTS
REMEDIAL ACTION WORK PLAN
Former Bronx Freight Terminal Site

3.0	DESCRIPTION OF REMEDIAL ACTION PLAN	19
3.1	EVALUATION OF REMEDIAL ALTERNATIVES.....	19
3.2	STANDARDS, CRITERIA AND GUIDANCE (SCG)	19
3.3	ALTERNATIVE ANALYSIS.....	21
3.4	REMEDIAL ALTERNATIVE 1	22
3.4.1	Overall Protection of Human Health and the Environment.....	23
3.4.2	Compliance with Remedial Goals, SCGs and RAOs	23
3.4.3	Long-Term Effectiveness and Permanence	23
3.4.4	Reduction in Toxicity, Mobility or Volume Through Treatment.....	24
3.4.5	Short-Term Effectiveness	24
3.4.6	Implementability	24
3.4.7	Cost.....	25
3.4.8	Compatibility with Land Use.....	25
3.4.9	Community Acceptance.....	26
3.5	REMEDIAL ALTERNATIVE 2	26
3.5.1	Overall Protection of Human Health and the Environment.....	26
3.5.2	Compliance with Remedial Goals, SCGs and RAOs	27
3.5.3	Long-term Effectiveness and Permanence	27
3.5.4	Reduction in Toxicity, Mobility or Volume through Treatment	27
3.5.5	Short-term Effectiveness.....	27
3.5.6	Implementability	28
3.5.7	Cost.....	28
3.5.8	Compatibility with Land Use.....	29
3.5.9	Community Acceptance.....	29
3.6	SELECTION OF THE PREFERRED REMEDY	29
3.6.1	Preferred Land Use Factor Evaluation.....	30
3.7	SUMMARY OF SELECTED REMEDIAL ACTIONS.....	33
4.0	REMEDIAL ACTION PROGRAM	36
4.1	GOVERNING DOCUMENTS.....	36
4.1.1	Health and Safety Plan (HASP).....	36
4.1.2	Quality Assurance Project Plan (QAPP)	37
4.1.3	Construction Quality Assurance Plan (CQAP).....	38
4.1.4	Soil/Materials Management Plan (SoMP)	39
4.1.5	Erosion and Sediment Control Plan (ESCP).....	39
4.1.6	Community and Environment Response Plan (CERP).....	39
4.1.7	Contractors Site Operations Plan (SOP).....	39
4.1.8	Community Participation Plan (CPP)	40

TABLE OF CONTENTS
REMEDIAL ACTION WORK PLAN
Former Bronx Freight Terminal Site

4.2	GENERAL REMEDIAL ACTION INFORMATION	41
4.2.1	Project Organization	41
4.2.2	Remedial Engineer.....	41
4.2.3	Remedial Action Schedule.....	41
4.2.4	Work Hours.....	42
4.2.5	Site Security.....	42
4.2.6	Traffic Control	42
4.2.7	Worker Training and Monitoring	43
4.2.8	Agency Approvals	44
4.2.9	NYSDEC BCP Signage.....	45
4.2.10	Pre-Construction Meeting with NYSDEC.....	45
4.2.11	Emergency Contact Information.....	45
4.2.12	Remedial Action Costs	45
4.3	SITE PREPARATION.....	45
4.3.1	Mobilization.....	45
4.3.2	Erosion and Sedimentation Controls	46
4.3.3	Stabilized Construction Entrance(s)	46
4.3.4	Utility Marker and Easements Layout	46
4.3.5	Sheeting and Shoring.....	47
4.3.6	Equipment and Material Staging	47
4.3.7	Decontamination Area	47
4.3.8	Site Fencing	47
4.3.9	Demobilization.....	48
4.4	REPORTING.....	48
4.4.1	Daily Reports	48
4.4.2	Monthly Reports	49
4.4.3	Other Reporting	49
4.4.4	Complaint Management Plan.....	50
4.4.5	Deviations from the Remedial Action Work Plan	50
5.0	REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE	51
5.1	UST REMOVAL METHODS.....	51
5.2	SOIL CLEANUP OBJECTIVES.....	53
5.3	REMEDIAL PERFORMANCE EVALUATION (END-POINT SAMPLING).....	53
5.3.1	End-Point Sampling Frequency	54
5.3.2	Methodology	54
5.3.3	Reporting of Results	54
5.3.4	QA/QC.....	54
5.3.5	DUSR.....	55
5.3.6	Reporting of End-Point Data in FER.....	55
5.4	ESTIMATED MATERIAL REMOVAL QUANTITIES.....	56

TABLE OF CONTENTS
REMEDIAL ACTION WORK PLAN
Former Bronx Freight Terminal Site

5.5	SOIL/MATERIALS MANAGEMENT PLAN	56
5.5.1	Excavation of Petroleum CVOC Contaminated Soil.....	58
5.5.2	Excavation of Historic Fill Materials.....	58
5.5.3	Excavation of Native Soils	58
5.5.4	Soil Screening Methods	59
5.5.5	Soil Stockpile Methods.....	60
5.5.6	Materials Excavation and Load Out	60
5.5.7	Materials Transport Off-Site.....	61
5.5.8	Materials Disposal Off-Site	62
5.5.9	Materials Reuse On-Site	67
5.5.10	Fluids Management.....	67
5.5.11	Backfill from Off-Site Sources	68
5.5.12	Stormwater Pollution Prevention.....	69
5.5.13	Contingency Plan.....	70
5.5.14	Community Air Monitoring Plan.....	70
5.5.15	Odor, Dust and Nuisance Control Plan.....	70
	5.5.15.1 <i>Odor Control Plan</i>	71
	5.5.15.2 <i>Dust Control Plan</i>	71
	5.5.15.3 <i>Nuisance Control Plan</i>	72
6.0	RESIDUAL CONTAMINATION TO REMAIN ONSITE	73
7.0	ENGINEERING CONTROLS	74
8.0	INSTITUTIONAL CONTROLS.....	75
8.1	ENVIRONMENTAL EASEMENT	75
8.2	SITE MANAGEMENT PLAN.....	76
9.0	FINAL ENGINEERING REPORT	79
9.1	CERTIFICATIONS	80
10.0	SCHEDULE	82

TABLE OF CONTENTS
REMEDIAL ACTION WORK PLAN
Former Bronx Freight Terminal Site

LIST OF TABLES

Table 1	Soil Cleanup Objectives
Table 2	Summary of RI Sampling - Soil, Groundwater and Soil Gas Samples
Table 3	Laboratory Results – Soil Samples, Volatile Organic Compounds
Table 4	Laboratory Results – Soil Samples, Semi-Volatile Organic Compounds
Table 5	Laboratory Results – Soil Samples, Pesticides/PCBs
Table 6	Laboratory Results – Soil Samples, TAL Metals
Table 7	Parameters Detected Above Track 1 Soil Cleanup Objectives
Table 8	Laboratory Results – Groundwater Samples, Volatile Organic Compounds
Table 9	Laboratory Results – Groundwater Samples, Semi-Volatile Organic Compounds
Table 10	Laboratory Results – Groundwater Samples, Pesticides/PCBs
Table 11	Laboratory Results – Groundwater Samples, Total Metals
Table 12	Laboratory Results – Groundwater Samples, Dissolved Metals
Table 13	Parameters Detected Above Ambient Groundwater Standards
Table 14	Laboratory Results – Soil Gas Samples, Volatile Organic Compounds
Table 15	Permits
Table 16	Emergency Contact Numbers

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3	Surrounding Property
Figure 4	Soil Boring Locations
Figure 5	Monitoring Well Locations
Figure 6	Soil Vapor Sampling Locations
Figure 7	Cross Section
Figure 8	Groundwater Elevation Map
Figure 9	Posted Soil Results above Unrestricted / Restricted SCOs
Figure 10	Posted Groundwater Results above AWQS
Figure 11	Posted Soil Vapor Results
Figure 12	Truck Routes
Figure 13	Excavation Plan
Figure 14	Endpoint Sampling Plan
Figure 15	Capping Plan
Figure 16	Alpha-Numeric Grid Map

TABLE OF CONTENTS
REMEDIAL ACTION WORK PLAN
Former Bronx Freight Terminal Site

ATTACHMENTS

Attachment A	Metes and Bounds Description of Property
Attachment B	Construction Health & Safety Plan (CHASP)
Attachment C	Quality Assurance Project Plan (QAPP)
Attachment D	Community Air Monitoring Plan (CAMP)
Attachment E	Citizen Participation Plan (CPP)
Attachment F	Resumes
Attachment G	BCP Signage Specifications
Attachment H	Estimated Remedial Costs

LIST OF ACRONYMS

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

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

This Remedial Action Work Plan (RAWP) was prepared on behalf 101 Lincoln Associates Property LLC (Requestor) for the property known as the Former Bronx Freight Terminal, located at 101 Lincoln Avenue, Bronx, New York (hereafter referred to as the Site). In May 2015, Requester filed an application with the New York State Department of Environmental Conservation (NYSDEC), to admit the Project Site into the New York State Brownfield Cleanup Program (BCP). This application was denied because of the absence of evidence showing contamination requiring remediation. Following denial of the BCP application, Requestor implemented a phase 2 workplan under the supervision of NYCOER to comply with the hazardous materials “e” designation for the Site. This investigation revealed previously unknown contamination. As a result, the Requestor has submitted another BCP application to the NYSDEC in June 2016. This RAWP is being submitted with the BCP application,

A Restricted Residential use is proposed for the property. When completed the project will include three new 24-story and one 20-story residential tower buildings. The towers will be interconnected with a common base which will include three 7-story, one 6-story, and one 3-story buildings.

The street address for the Site is 101 Lincoln Avenue, Bronx, NY (Figure 1). The Site is located in the South Bronx section of Bronx County and is comprised of a single tax lot (Figure 2) totaling 133,700 sf (3.07 acres). The property has approximately 300 feet of street frontage on Bruckner Avenue, approximately 350 feet of street frontage on Lincoln Avenue and approximately 500 feet of frontage along the north side of the Harlem River.

The Site is currently owned by the Requestor, 101 Lincoln Associates Property LLC. The property is currently vacant but was must recently used as a bus garage and bus / truck storage yard.

Summary of the Remedial Investigation

A Remedial Investigation was completed at the Site in December 2015 in connection with the hazardous materials “e” designation for the Site and documented in a Remedial Investigation Report dated June 2016. 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:

- Sampling for non-petroleum contaminants such as pesticides, PCBs and metals in soil and groundwater including the analysis of soil and groundwater samples;
- Soil sampling and analysis for petroleum compounds in soil samples from 12 soil boring locations;
- The installation of 6 groundwater monitoring wells;
- The collection and analysis of groundwater samples for petroleum compounds;
- The collection of analysis of soil gas samples for VOCs from 8 soil gas sampling locations and 5 subsurface vapor sampling locations.

The results of sampling performed during the RI, identified petroleum-related contaminants in soil at a depth of 12-14 feet in the northwestern portion of the Site and to a lesser degree in the southwestern portion of the Site.

Historic fill material has been identified across the Site to depths as great as 7 feet below grade. The historic fill material contains semi-volatile organic compounds and metals including arsenic, barium, chromium, copper, lead, mercury, nickel, silver and zinc above unrestricted, restricted residential or restricted commercial use SCOs.

Several petroleum VOCs were reported at elevated concentrations in a monitoring well in the vicinity of the northwestern impacted soil area indicating that some of the VOC-impacted soil has transferred to the dissolved phase in this area. The pesticide dieldrin was also reported above its part per trillion standard in this area.

SVOC detections above groundwater standards were reported across the Site but limited to those polynuclear aromatic hydrocarbons (PAHs) with a 2 parts per trillion standard. SVOCs reported in the parts per trillion range are a function of the laboratories ability to achieve extremely low detection limits and general background conditions.

Several dissolved metals were detected above standards including sodium, iron, magnesium and manganese were detected above standards throughout the Site.

Total petroleum-related VOCs were detected in soil vapor samples across the Site.

PCE was reported in all of the soil vapor samples ranging from 0.94 $\mu\text{g}/\text{m}^3$ in SG7 to 161 $\mu\text{g}/\text{m}^3$ in SG1.

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 of petroleum compounds, CVOCs, pesticides, PCBs and heavy metals 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 commercial buildings may be exposed to CVOCs through the vapor intrusion pathway, if remedial action is not taken to prevent off site vapor intrusion.

The exposure assessment indicated a limited potential exposure to residents and commercial workers in adjacent buildings which would be reduced further following the removal of the identified source areas.

Potential environmental impacts through the groundwater to surface water discharge were considered likely based on the distance to the Harlem River.

Summary of the Remedy

The remedy recommended for the Site is a Track 4 alternative (Alternative 2) which consists of the removal underground storage tanks and hydraulic lifts, excavation of petroleum impacted soil to a depth of 15 feet within the northwest source area, excavation and disposal of historic fill soil from the building foundation areas, excavation of the top 2 feet of soil from within the planned landscape areas and capping the entire Site with the building foundations, concrete walkways / driveways or 2 feet of soil meeting Restricted Residential SCOs.

The remedy will include the following items:

1. Removal of twelve 550-gallon diesel and two 550-gallon gasoline previously closed-in-place underground storage tanks;
2. Removal of one 1,000-gallon waste oil underground tank and one 1,000-gallon motor oil tank previously closed-in-place;
3. Removal an underground oil /water separator and hydraulic lifts;
4. Excavate petroleum impacted soil area to a depth of 15 feet in the northwest source area;
5. Excavation of soil/fill exceeding groundwater protection SCOs for those VOC parameters in groundwater above standards as listed in **Table 1** to depths as great as 15 feet below grade in the northwest source area;
6. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
7. Excavation and disposal of historic fill materials as needed for installation of the new buildings basement level foundations;
8. Excavation and disposal of historic fill materials from planned landscaped (exposed soil) areas;
9. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of groundwater protection SCOs for VOCs present in groundwater above standards;
10. 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;
11. Capping the entire Site with the building foundations, concrete walkways / driveways or 2 feet of soil meeting Restricted Residential SCOs.

12. 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.
13. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
14. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.

REMEDIAL ACTION WORK PLAN

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared on behalf of the Requestor for the property known as the Former Bronx Freight Terminal, located at 101 Lincoln Avenue, Bronx, New York (hereafter referred to as the Site). In May 2015, 101 Lincoln Associates Property LLC filed an application with the New York State Department of Environmental Conservation (NYSDEC), to admit the Project Site into the New York State Brownfield Cleanup Program (BCP). This application was denied because of the absence of evidence showing contamination requiring remediation. Following the denial of the BCP application, Requestor implemented a phase 2 workplan under the supervision of NYCOER to comply with the hazardous materials “e” designation for the Site. This investigation revealed previously unknown contamination. As a result, the Requestor has submitted another BCP application to the NYSDEC in June 2016. This RAWP is being submitted with the BCP application.

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between December 4, 2015 and December 8, 2015, in connection with hazardous materials “e” designation for the Site. 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 street address for the Site is 101 Lincoln Avenue, Bronx, NY (Figure 1). The Site is located in the South Bronx section of Bronx County and is comprised of a single tax lot (Figure 2) totaling 133,700 sf (3.07 acres). The property has approximately 300 feet of street frontage on Bruckner Avenue, approximately 350 feet of street frontage on Lincoln Avenue and approximately 500 feet of frontage along the north side of the Harlem River.

The lot is developed with a one-story L-shaped warehouse building with a connected two-story office building totaling 83,064 square feet. The Site was first developed sometime before 1908. From 1908 to 1951 the Site was occupied by the New Jersey Central Rail Bronx Freight Terminal. From 1968 to 2007, the Site is identified as Gerosa Haulage Corporation (with uses including crane repair, paint shop, blacksmith shop, and garage repair shop). According to the NYC Department of Buildings, the existing building was constructed in 1966.

The elevation of the Site is approximately feet above the National Geodetic Vertical Datum (NGVD). The area topography gradually slopes to the southwest. The depth to groundwater beneath the Site is 6-7 feet below grade. Based on regional groundwater elevation maps, and measurements made at the Site, groundwater flows to the southwest toward the Harlem River.

A boundary map will be attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The 0.43-acre property is fully described in **Attachment A – Metes and Bounds**.

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The proposed new building will consist of three new 24-story and one 20-story residential tower buildings. The towers will be interconnected with a common base which will include three 7-story, one 6-story, and one 3-story buildings. The project will include 74,000 sf of underground parking, 31,199 sf of retail space, 2,872 sf of community space and 833,829 sf of residential space.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The area surrounding the property (**Figure 3**) is highly urbanized and predominantly consists of heavy commercial / industrial / warehouse properties to the north along a corridor adjacent to the Harlem River. Multi-use residential / commercial (retail) properties are present to the east along Bruckner Boulevard and a large housing project is located to the northeast.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The field work portion of the Remedial Investigation was conducted by EBC in December 2015 in connection with the hazardous materials “e” designation for the Site. The investigation is summarized in the sections below. Further details are provided in the Remedial Investigation Report (EBC June 2016).

2.1 SUMMARY OF REMEDIAL INVESTIGATIONS PERFORMED

2.1.1 Soil Borings

A total of twelve borings (15B1-15B12) were advanced on December 4 and 7, 2015 to identify source areas and to obtain general soil quality information present at the Site (**Figure 4**).

At each soil boring location soil samples were collected continuously in 5-foot intervals from grade to a depth of 15 feet below grade using a Geoprobe™ 6720DT, 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 1.25-inch diameter, 5-foot long dual-tube sampler with disposable acetate liners. Soil recovered from each soil boring was field screened by an environmental professional for the presence of VOCs with a photo-ionization detector (PID) and visually inspected for evidence of contamination. Soil samples were retained for laboratory analysis from all borings in accordance with the RIWP.

Twenty- six (26) soil samples retained and submitted for laboratory analysis of one or more of the following analyses: volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, TAL Metals, pesticides and PCBs by EPA Method 8081/8082. Soil boring locations are identified in **Figure 4**.

2.1.2 Monitoring Wells

Six groundwater monitoring wells, MW1 through MW6, were installed at the Site from December 4, 2015 through December 7, 2015. All of the wells were installed with a track mounted probe drilling machine to a depth of approximately 15 feet below grade with 10 feet of 0.010 PVC well screen and 5 feet of PVC riser.

A No. 00 morie filter-pack sand filled the annulus surrounding the screen within two feet above the top of the screen. A one-foot hydrated bentonite seal was then placed on top of the filter sand and the remainder of the borehole was backfilled to grade. Following installation, each of the wells were surveyed to determine relative casing elevation to the nearest 0.01 feet and horizontal position to the nearest 0.1 feet. Monitoring well locations are identified in **Figure 5**. Well completion reports detailing monitoring well construction are provided in **Appendix B**.

Prior to sampling, a synoptic round of depth-to-groundwater (DTW) measurements was obtained from the wells on December 10, 2015 to determine the water table elevation and to calculate the volume of standing water in the well.

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

A total of twenty-six soil samples were collected from 12 soil borings for laboratory analysis of one or more of the following parameters: VOCs (EPA Method 8260), SVOCs (EPA Method 8270), TAL metals and pesticides/PCBs (EPA Method 8081/8082).

2.1.3.2 Groundwater Samples

A total of six groundwater samples were collected from the groundwater monitoring wells for laboratory analysis of VOCs (EPA Method 8260), SVOCs (EPA Method 8270), TAL metals and pesticides/PCBs (EPA Method 8081/8082).

2.1.3.3 Soil Vapor Samples

To assess the presence of VOCs in soil vapor beneath the site, eight soil vapor implants were installed at the Site on December 7, 2015 and sampled on December 8, 2015. Sample SV5 was not analyzed due to a malfunctioning regulator on the canister. The vapor implants (Geoprobe™ Model AT86 series), were constructed of a 6-inch length of double woven stainless steel wire

and installed to a depth of 2 to 4 feet below grade using Geoprobe™ equipment. All soil vapor samples were collected over a 2- hour sampling period.

Soil vapor samples were collected in accordance with the procedures as described in section 2.4 of the approved RIR and 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. Laboratory services for soil and groundwater sample analysis were provided by Phoenix Environmental Laboratories of Manchester, CT, a New York State ELAP certified environmental laboratory (ELAP Certification No. 11301).

Retained soil samples were submitted for laboratory analysis of one or more of the following analyses: volatile organic compounds (VOCs) by EPA Method 8260, semi-volatile organic compounds (SVOCs) by EPA Method 8270, TAL Metals, pesticides and PCBs by EPA Method 8081/8082.

All groundwater samples from the monitoring wells were analyzed for VOCs / SVOCs by EPA method 8260 / 8270, target analyte list (TAL) metals by EPA method 6010 and Pesticides/PCBs by method 8081/8082. Soil gas samples were analyzed for VOCs by USEPA Method TO-15.

2.1.5 Documentation

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

The results of sampling performed during the RI, identified petroleum-related contaminants in soil at a depth of 12-14 feet in the northwestern portion of the Site and to a lesser degree in the southwestern portion of the Site.

Historic fill material has been identified across the Site to depths as great as 7 feet below grade. The historic fill material contains semi-volatile organic compounds and metals including arsenic, barium, chromium, copper, lead, mercury, nickel, silver and zinc above unrestricted, restricted residential or restricted commercial use SCOs.

Several petroleum VOCs were reported at elevated concentrations in a monitoring well in the vicinity of the northwestern impacted soil area indicating that some of the VOC impacted soil has transferred to the dissolved phase in this area. The pesticide deildrin was also reported above its part per trillion standard in this area.

SVOC detections above groundwater standards were reported across the Site but limited to those polynuclear aromatic hydrocarbons (PAHs) with a 2 parts per trillion standard. SVOCs reported in the parts per trillion range are a function of the laboratories ability to achieve extremely low detection limits and general background conditions.

Several dissolved metals were detected above standards including sodium, iron, magnesium and manganese were detected above standards throughout the Site.

Total petroleum-related VOCs were encountered in soil vapor samples across the Site.

PCE was reported in all of the soil vapor samples ranging from 0.94 µg/m³ in SG7 to 161 µg/m³ in SG1.

2.2 SIGNIFICANT THREAT

The NYSDEC and NYSDOH will review the RI Report and will determine if the Site poses a significant threat to human health and the environment. Notice of that determination will be provided during the public comment period, through fact sheet No. 2 and the Proposed Decision Document.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

The Site is currently owned by the Requestor. The property is currently vacant but was most recently used as a bus garage and bus / truck storage yard.

The Requestor is the current owner of the property and has owned the property since November 2014. The Requestor purchased the property from Gerosa Incorporated which owned the property since at least 1974. The property was originally operated as a freight terminal by New Jersey Rail from at least 1908 through the 50's and possibly the 1960's. Gerosa Inc. owned the site and operated a crane business from at least 1968 through at least 2007. At some time after 2007 the property was leased to Oz Moving and Storage and Third Avenue Transit which operated a bus garage. Both occupants remain on the Site but are currently in the process of vacating the Site. The property has been underutilized for years and was proposed for inclusion in a newly designated BOA as a strategic property by the South Bronx Overall Economic Development Corp.

Previous Owners

Dates	Name	Comments	Contact Info
Prior to 1974 to 11/13/2014	Gerosa Incorporated	Deed Owner Knowledge	101 Lincoln Avenue, Bronx, NY 10454 and C/O Donovan LLP 152 Madison venue 14th Floor, New York, NY 10016
From 11/13/2014 to present	101 Lincoln Associates Property LLC	Deed	512 7 th Avenue 15 th Floor, New York, NY 10018

Previous Operators

Dates	Name	Comments	Contact Info
From sometime prior to 1908 to sometime between 1951 and 1968	NJ Central Rail - Bronx Freight Terminal	Sanborn Maps	Unknown 101 Lincoln Avenue, Bronx, NY 10454
From sometime between 1951 and 1968 to sometime between 2007 and 2014	Gerosa Haulage Corporation	Sanborn Maps	101 Lincoln Avenue, Bronx, NY 10454 and C/O McKivney & Kluger P.C. 80 Broad Street 23rd floor New York, NY 10454
From sometime between 2007 and April 2014 to the present.	Oz Moving & Storage Third Avenue Transit	Owner Knowledge Phase I Report	101 Lincoln Avenue, Bronx, NY 10454

2.3.2 Summary of Previous Reports

Environmental investigations performed at the Site include the following:

- Phase I Environmental Site Assessment - Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. April, 2014
- Phase II Data Summary - Environmental Business Consultants, April 2015

April 2014 - Phase I Environmental Site Assessment Report (Langan)

A Phase I Environmental Site Assessment Report was prepared by Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. (Langan) on April, 2014.

Based upon reconnaissance of the subject and surrounding properties, interviews and review of historical records and regulatory agency databases, Langan identified the following recognized environmental conditions:

REC 1 – Current and Historical Site Use

The following current and historical property uses are considered a REC:

- Coal Storage from approximately 1891 to 1908;
- New Jersey Rail Road Bronx Freight terminal from approximately 1908 through the 1950s; and,
- Crane repair, paint shop, blacksmith shop, bus depot, and vehicle repair shop from approximately 1968 to present.

The Site is divided into two sections with Third Avenue Transit Inc. occupying the eastern portion of the Site and Oz Moving & Storage occupying the western portion. Third Avenue Transit Inc. utilizes the Site for storage of equipment & materials, school bus repairs, and as office space. There is an oil-water separator with an apparent leak detection system in the middle of the Third Avenue Transit warehouse building. The condition of the oil-water separator system is unknown. Oz Moving & Storage utilizes the Site for the storage of equipment, materials and vehicles, and vehicle repair. Vehicle repair equipment and discolored and stained floors are apparent throughout the building. Inadvertent and/or incidental releases of solvents, petroleum

products, PCBs and/or other chemicals used during operations at these facilities may have adversely impacted soil, soil vapor and groundwater.

REC 2 – On-Site Closed-In-Place Underground Storage Tanks

Twelve 550-gallon diesel USTs, two 550-gallon gasoline USTs, one 1,000-gallon motor oil UST, and one 1,000-gallon waste oil UST were closed-in-place between 1991 and 1992. Inadvertent releases from these tanks while they were active may have impacted soil, soil vapor, and groundwater. Based on the historic usage and the presumed age of the tanks (approximately 44 years), the closed-in-place USTs are a REC.

REC 3 – Potential Historic Petroleum Storage

An apparent fill port was identified in the sidewalk along the northwestern edge of the Site. There are no records of a petroleum bulk storage tank near the apparent fill port. Based on the potential presence of tanks and lack of any closure documentation, the fill port and potential petroleum tank(s) are a REC.

REC 4 – Soil Staining

Petroleum-like staining and odors were identified along the southwestern corner of the building during the site reconnaissance. A petroleum release may have impacted soil, soil vapor and groundwater and is considered a REC. According to the NYC Department of Finance Tax Map, an approximate 50-foot wide sliver of land (Block 2316, Lot 35) exists between the Site and the Harlem River; therefore, the observed soil staining may be located outside the Site property line.

REC 5 – Historical Use of Surrounding Properties

Historical use of properties surrounding the Site include commercial buildings with office space, lofts, auto repairs (1908 – present), parking garages (1951 – 1968), manufacturing facilities (1891 – 1946), freight depots (1891 – 1947), a piano factory (1891), printing (1935 – 1947), and woodworking (1891). Additionally, an active NYSDEC BCP Site was identified approximately 745 feet northeast (up-gradient) of the Site. Based on investigations conducted to date, the primary contaminants of concern in soil and groundwater are petroleum related compounds. No information was provided with respect to the off-site migration of contaminants; however, the

EDR report indicates that the potential exists for off-site migration of site-related contaminants in soil vapor. Potential petroleum and solvent releases associated with the historical surrounding property uses may have adversely impacted soil, groundwater, and/or soil vapor at the Site and is, therefore, considered a REC.

April 2015 – Phase II Data Summary (EBC)

The field work portion of the Phase II was performed on April 20, 2015 and included the installation of 8 soil borings (B1-B8) and the collection and analysis of 7 soil samples and 5 groundwater samples (GW1, GW2, GW3, GW4, GW6). Each of the borings were advanced to a depth of 15 feet below grade.

Soil samples were retained from 0-2 feet and / or the water table interface (7-8 feet below grade) and analyzed for one or more of the following parameters: VOCs by EPA 8260, SVOCs by EPA 8270 (CP51 list only), TAL metals by EPA 6010 and pesticides / PCBs by EPA 8081/8082.

Five temporary 1-inch diameter monitoring wells were installed to a depth of 15 feet below surface, approximately 8 feet below the water table. Samples from the monitoring wells were submitted for analysis of VOCs by USEPA 8260 only.

Soil at the site is described as historic fill materials to a depth ranging from 5 to 7 feet below the surface followed by native silty-sand and peat layers.

Results indicated some petroleum VOC detections in soil at the water table. SVOCs, metals, pesticides and PCBs were reported in fill material samples above unrestricted and / or restricted residential SCOs. Petroleum VOCs were detected in groundwater at several locations.

2.4 GEOLOGICAL CONDITIONS

The bedrock geology at the property and in the immediate vicinity consists of Inwood Marble of Lower Ordovician to Lower Cambrian age with steep westerly dip of its upper surface. The depth to bedrock is anticipated at approximately 20 to 30 feet below land surface (ft-bls). Bedrock is overlain by an unconsolidated overburden of an unsorted heterogeneous mix of

Pleistocene and Recent glacial material (i.e., glacial till) including clay, silt, sands, gravel, cobbles, and boulders. This overburden is overlain by historic urban fill.

Subsurface soils at the Site consist of historic fill materials to a depth of approximately 5 feet below grade, and extending to 15 feet on some borings. Brown sand, grey sand, dark brown sand clay, grey black clay with rock is present immediately below this layer (**Figure 7**). According to the USGS topographic map for the area (Central Park Quadrangle), the elevation of the property is approximately 5 feet above mean sea level. The topography within the immediate area slopes gradually to west.

Groundwater occurs beneath the Site at a depth of 6 to 7 feet below grade under water table conditions. Based upon on-site measurements, groundwater flow is to the west and west to southwest (**Figure 8**).

Considering the poor quality of groundwater in the area, including high levels of sodium and magnesium associated with saltwater intrusion, there is no anticipated future groundwater use.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

VOC contamination at the Site consists of petroleum related contaminants in soil at a depth of 12-14 feet in the northwestern portion of the Site and to a lesser degree in the southwestern portion of the Site.

Several petroleum VOCs were reported at elevated concentrations in a monitoring well in the vicinity of the northwestern impacted soil area indicating that some of the VOC impacted soil has transferred to the dissolved phase in this area.

PCE in soil vapor was reported in all locations with the highest concentration noted in the northeast corner of the property. The PCE present in the vapor phase appears to be migrating on

site from an off-site source since PCE was not reported in any of the soil or ground water samples.

Lighter end VOC components such as heptane and hexane have transferred to the vapor phase from impacted soil and / or groundwater.

2.5.2 Description of Areas of Concern

The source area identified during the RI is the petroleum contamination in the soil on the northwest side of the Site.

2.5.3 Soil/Fill Contamination

VOC contamination at the Site consists of petroleum related contaminants in soil to a depth of 14 feet in the northwest and southwest areas of the Site.

Historic fill material has been identified across the Site to depths as great as 5 feet below grade. The historic fill material contains SVOCs, metals including arsenic, chromium, copper, lead, mercury, nickel and zinc above unrestricted and / or restricted use SCOs.

2.5.3.1 Summary of Soil/Fill Data

Soil sample results from the RI are summarized in **Tables 3-6**. Further information on soil sample collection, handling and analysis can be found in the RI Report (EBC 5/16).

2.5.3.2 Comparison of Soil/Fill with SCGs

Table 7 shows sample results above Track 1 Unrestricted SCOs for all overburden soil at the Site. **Figure 9** is spider map which shows soil sampling locations and summarizes shallow and deep sample results above Track 1 Unrestricted SCOs for all overburden soil.

2.5.4 On-Site and Off-Site Groundwater Contamination

Several petroleum related compounds; benzene (9.2 ug/L), ethylbenzene (280 ug/L), isopropylbenzene (95 ug/L), naphthalene (1,300 ug/L), n-propylbenzene (20 ug/L) and toluene

(12 ug/L) above standards at one monitoring well location (MW6) located on the west side of the Site.

SVOC detections above groundwater standards were detected for naphthalene (at 720 ug/L), benz(a)anthracene (maximum of 1.2 ug/L), benzo(b)fluoranthene (maximum of 0.46 ug/L), benzo(k)fluoranthene (maximum of 0.91 ug/L), chrysene (maximum of 1.2 ug/L) and indeno(1,2,3-cd)pyrene (maximum of 0.57 ug/L) in MW1, MW2, MW3, MW5, MW6 and MW7.

One pesticide was detected at concentrations above NYSDEC AWQS standards; Dieldrin in MW6.

Several dissolved metals were detected above standards including sodium, iron, manganese and manganese were detected above standards throughout the Site.

2.5.4.1 Summary of Groundwater Data

The results of groundwater samples collected during the RI are summarized in **Tables 8-12**. Further information on groundwater sample collection, handling and analysis can be found in the RI Report (EBC 5/16).

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 13**. Spider maps which show groundwater sampling locations and summarize results above GA groundwater standards prior to the remedy are shown in **Figure 10**.

2.5.5 On-Site and Off-Site Soil Vapor Contamination

Total petroleum-related VOCs (benzene, toluene, ethylbenzene, and xylene “BTEX”) ranged from 18.76 µg/m³ in SV8 to 194.75 µg/m³ in SV2 which was collected on the north side of the Site. Total BTEX compounds ranged from 5.17 µg/m³ (SS-4) to 69.38 µg/m³ (SG-7) at all other soil vapor locations.

Chlorinated VOCs (CVOCs) were reported in all of the soil vapor samples with Tetrachloroethene (PCE) reported in all seven soil vapor samples. Carbon Tetrachloride, trichloroethene and 1,1,1-trichloroethane were detected in several of the soil vapor samples and had relatively low detections. Detectable concentrations of PCE ranged in concentration from 0.94 µg/m³ in SV7 located at the northeast side of the Site within the building to 161 µg/m³ in SV1 located on the north side of the Site within the building. Detectable concentrations of carbon tetrachloride were noted at 0.29 µg/m³ in SV4 located at the southwest side of the Site. 1,1,1-Trichloroethane concentrations ranged from 1.32 µg/m³ in SV1 located on the north side of the Site to 6.71 µg/m³ from SV4 located in the southwest side of the Site. Concentrations of trichloroethene ranged from 0.53 µg/m³ from SV1 located on the north side of the Site to 1.39 µg/m³ from SV1 located on the southwest side of the Site.

2.5.5.1 Summary of Soil Vapor Data

A table of soil vapor data collected prior to the remedy is shown in **Table 14**. Further information on soil gas sample collection, handling and analysis can be found in the RI Report (EBC 2/16). Soil vapor results are posted on **Figure 11**.

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

Source areas of the Site include petroleum VOCs located on the northwest side of the Site, which is likely associated with a historic release.

Elevated levels of metals, PAHs, PCBs and pesticides are also present in fill materials throughout the Site to depths as great as 15 feet below grade in some areas of the Site.

Contaminant Release and Transport Mechanism

Petroleum contamination is present in soil on the northwest side of the Site. The contamination extends vertically below the groundwater interface to a depth of 14 feet. There appears to be transfer of petroleum related VOC contaminants in soil to the groundwater.

There does not appear to be any transfer of petroleum VOCs to the vapor phase in close proximity to the source area (15B6 12-14 feet). Elevated PCE was noted in SG1 and appears to be migrating on site from an off-site source. PCE was not noted in any one site soil and groundwater samples.

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 petroleum VOCs / SVOCs, CVOCs, pesticides and heavy metals through several routes. Workers excavating impacted soil may be exposed to VOCs, SVOCs, pesticides and heavy metals through inhalation, ingestion and dermal contact. A site specific Health and Safety Plan has been developed to identify and minimize the potential hazards to on-site workers.

Site trespassers could also be exposed to impacted soil during excavation, however, security measures including an 8 feet high construction fence and 24- hour security will minimize potential exposure through this route. Potential vapor intrusion of PCE is a potential concern for residents of the planned construction in the northwest corner of the Site although the

concentration was lower than the typical action levels. CVOCs in soil vapor appear to be migrating on site from an off-site source.

Future occupants of the new building including commercial retail workers, residents and visitors could be exposed to SVOCs and heavy metals in soil through ingestion and dermal contact if these contaminants were to remain in exposed soils at the Site. Vapor intrusion of PCE is a potential concern for residents and commercial retail workers of the planned construction in the northwest corner of the Site although the concentration was lower than typical action levels. CVOCs in soil vapor appear to be migrating on site from an off-site source.

Potential Off-Site Exposures: Off-Site residents could also be exposed to dust or vapors during the excavation of impacted soil. A site specific Community Air Monitoring Plan has been developed to identify and minimize the potential for off-site exposure to residents through continuous air monitoring during excavation activity.

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.

2.6.2 Fish & Wildlife Remedial Impact Analysis

Based on the nature and location of the contamination at the site, with limited impact to subsurface soils and groundwater, there are no expected adverse impacts to River. However, removal / remediation of petroleum impacted areas would be appropriate.

The presence of elevated levels of SVOCs, metals and pesticides in surficial soil at the Site would be a concern if these contaminants were to be discharged to the river in sediments from surface runoff. Therefore, capping or otherwise stabilizing surficial soil should be included in the Remedial Plan developed for 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.
- Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer, to the extent practicable, to pre-disposal/pre-release conditions.
- Prevent the discharge of contaminants to surface water.

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.

2.7.3 Soil Vapor

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

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 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 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 first two criteria are threshold criteria and must be satisfied in order for an alternative to be considered for selection. The remaining seven criteria are balancing criteria which are used to compare the positive and negative aspects of each of the remedial alternatives, provided the alternative satisfies the threshold criteria.

3.2 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)
- 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 3.3 of this work plan have been prepared in conformance with this requirement.

3.3 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. Excavation to a minimum depth of 5 feet across the Site with the excavation of the petroleum impacted areas and deep fill areas to a depth of approximately 15 feet. 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 new building.
- Alternative 2 - Track 4, removal / replacement of the top 2 feet of soil in all planned exposed soil areas, and excavation / removal of all petroleum impacted soils with VOCs above groundwater protection SCOs which are also present above groundwater standards. This alternative would require a lesser degree of excavation than Alternative 1 consisting of the excavation of petroleum impacted soil in the northwest source area to an approximate depth of 14 feet. An engineered cap consisting of the concrete building slab, paved driveways and walkways and removal /replacement of soil within landscaped areas with 2 feet of clean fill / soil meeting Restricted Residential use SCOs. Long-term institutional /engineering controls are not necessary but would be allowed to address or prevent exposures from soil vapor, if required.

3.4 REMEDIAL ALTERNATIVE 1

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

3.4.1 Overall Protection of Human Health and the Environment

Alternative 1 will be protective of human health and the environment by eliminating constituents in soil related to petroleum and historic fill. The potential for human and environmental exposure to these constituents on-site will be eliminated by excavation of all petroleum contaminated and

historic fill soils with parameters in excess of unrestricted criteria, disposing of excavated materials off-site and backfilling as needed with certified clean fill, virgin mined materials or recycled concrete materials from a NYSDEC permitted recycling facility.

Potential post-remediation exposures to on-site residents from soil vapors are not expected to require the operation of SSD systems, though groundwater will be restricted at the Site.

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).

3.4.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 1 will achieve compliance with the remedial goals, SCGs and RAOs for soil through source removal to Track 1 unrestricted cleanup levels. SCGs for groundwater may not be achieved as the groundwater is of poor quality. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.4.3 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 and by remediating groundwater. Under this Alternative, risk from soil impacts and groundwater will be eliminated. Alternative 1 will continue to meet RAOs for soil, groundwater and soil vapor in the future, providing a permanent long-term solution for the Site.

3.4.4 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.

3.4.5 Short-Term Effectiveness

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

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

Other potential impacts to the community such as construction-related noise, vibrations and traffic, 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.

3.4.6 Implementability

The techniques, materials and equipment to implement Alternative 1 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites.

However, excavation to a depth of 15 ft or more over a 3 acre site located adjacent to a river represents considerable technical challenges which in this case limit its feasibility. Sloping and shoring requirements and dewatering would present significant construction challenges and would impede and interfere with the construction of the new buildings.

3.4.7 Cost

Costs associated with Alternative 1 are estimated at approximately \$ 8,676,272. This cost estimate includes the following elements and assumptions:

- Removal of twelve 550-gallon diesel and two 550-gallon gasoline previously closed-in-place underground storage tanks;
- Removal of one 1,000-gallon waste oil underground tank and one 1,000-gallon motor oil tank previously closed-in-place;
- Removal an underground oil /water separator and hydraulic lifts;
- Excavate petroleum impacted soil area to a depth of 15 feet in the northwest source area;
- Excavate a minimum of 5 feet across entire Site. With additional excavation over half the Site to 15 feet to meet unrestricted SCOs. Additional over excavation as needed to meet SCOs;
- Shoring to allow excavation to 15 feet depth at property lines;
- Dewatering half the Site to allow excavation to 15 feet depth;
- Disposal of approximately 150 tons of petroleum impacted non-hazardous soil from the former fueling area;
- Disposal of approximately 71,275 tons of historic fill soil as non-hazardous;
- Backfilling excavations with certified clean fill meeting unrestricted SCOs (approximately 37,138 cy);
- HASP and CAMP monitoring for the duration of the remedial activities.

3.4.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current M1-3 / R8 zoning. Following remediation, the Site will meet unrestricted use objectives which will exceed the objectives for its planned commercial-retail and residential use. A groundwater use restriction may be required to prevent future exposure to affected groundwater.

3.4.9 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 had 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.

3.5 REMEDIAL ALTERNATIVE 2

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

3.5.1 Overall Protection of Human Health and the Environment

Alternative 2 will be protective of human health and the environment by eliminating constituents related to petroleum in soil. The potential for human and environmental exposure to these constituents on-site will be eliminated by excavation of the petroleum impacted areas and then capping exposed soil areas with a combination of the concrete building slab, concrete walkways / driveways and 2 feet of soil / fill which meets restricted residential SCOs.

Potential post-remediation exposures to on-site residents from soil vapors are not expected to require the operation of SSD systems, though groundwater use will be restricted at the Site.

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.

3.5.2 Compliance with Remedial Goals, SCGs and RAOs

Alternative 2 will achieve compliance with the remedial goals, SCGs and RAOs for soil through petroleum source and then capping the remainder of the Site with concrete building slab, concrete walkways / driveways and 2 feet of soil / fill which meets restricted residential SCOs. SCGs for groundwater may not be achieved. Compliance with SCGs for soil vapor is expected following completion of the remedial action.

3.5.3 Long-term Effectiveness and Permanence

Alternative 2 achieves long term effectiveness and permanence by permanently removing and/or remediating soils affected by Site contaminants above site specific objectives. 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.

3.5.4 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 removing petroleum impacted soil and by meeting groundwater protection SCOs for VOCs present above standards in groundwater and restricted residential objectives in the upper 2 feet of exposed soil.

3.5.5 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.

3.5.6 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.

3.5.7 Cost

Costs associated with Alternative 2 are estimated at approximately \$ 2,868,916. This cost estimate includes the following elements and assumptions:

- Removal of twelve 550-gallon diesel and two 550-gallon gasoline previously closed-in-place underground storage tanks;
- Removal of one 1,000-gallon waste oil underground tank and one 1,000-gallon motor oil tank previously closed-in-place;
- Removal an underground oil /water separator and hydraulic lifts;
- Excavate petroleum impacted soil area to a depth of 15 feet in the northwest source area;
- Excavate exposed soil areas (11,500 sf) to a depth of 2 feet below grade;
- Disposal of approximately 150 tons of petroleum impacted non-hazardous soil from the former fueling area;
- Disposal of approximately 34,137 tons of non-hazardous soil from the building excavation and exposed soil areas;
- Backfilling excavations and exposed soil areas certified clean fill meeting Restricted Residential Use and Groundwater (approximately 1,000 cy);
- HASP and CAMP monitoring for the duration of the remedial activities;
- Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls;
- Filing an Environmental Easement to ensure implementation of the SMP.

3.5.8 Compatibility with Land Use

The proposed redevelopment of the Site is compatible with its current M1-3 / R8 zoning. Following remediation, the Site will meet restricted-residential use objectives in the top 2 feet of soil which will meet objectives for its planned mixed commercial-retail and residential use. A groundwater use restriction may be required to prevent future exposure to brackish groundwater.

3.5.9 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.

3.6 SELECTION OF THE PREFERRED REMEDY

The remedy recommended for the site is a Track 4 alternative (Alternative 2) which consists of the excavation of petroleum impacted soil to a depth of 15 feet within the impacted soil area, excavation and disposal of historic fill soil from the building foundation areas, excavation of the top 2 feet of soil from within the planned landscape areas and capping the entire Site with the building foundations, concrete walkways / driveways or 2 feet of soil meeting Restricted Residential SCOs.

Any backfill materials used at the site will either consist of clean native soil excavated from other areas of the site, virgin mined materials, recycled materials or certified fill which meets Restricted Residential SCOs.

3.6.1 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 two new 25-story residential tower buildings, is in compliance with the M1-3 / R8 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 Port Morris / Bruckner Boulevard rezoning action (CEQR No. 05DCP005X), and the Port Morris Harlem Riverfront Brownfield Opportunity Area (BOA).

The rezoning action, covering an eleven block area of Port Morris, Bronx Community District 1, was completed by the New York City Department of City Planning and adopted by the City Council in March 2005. The BOA, which was designated in April 2015, identified the Site as a strategic Site in the nomination document, referring to it as a sizeable and underutilized waterfront site strategically located on the Harlem River waterfront.

The preferred remedy will be in full compliance with these applicable land use plans.

Surrounding Property Uses

The area surrounding the property is highly urbanized and predominantly consists of heavy commercial / industrial / warehouse properties to the north along a corridor adjacent to the Harlem River. Multi-use residential / commercial (retail) properties are present to the east along Bruckner Boulevard and a large housing project is located to the northeast.

The Lot is currently zoned M1-3/R8 residential / commercial. The M1-3/R8 is a Special Mixed Use District established to encourage investment in, and enhance the vitality of, existing neighborhoods with mixed residential and industrial uses in close proximity and create expanded opportunities for new mixed use communities. New residential and non-residential uses (commercial, community facility and light industrial) can be developed as-of-right and be located side-by-side or within the same building. Pairing an M1 district with an R3 through R10 district ensures a balanced variety of uses.

The proposed project is compatible with the surrounding land use and will be in compliance with the current zoning. The proposed remedy will not interfere with surrounding property uses and considers the short term affects to neighboring properties.

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, Mott Haven Branch of the New York Public Library).

Environmental Justice Concerns

The Site is not 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 the highest 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 Major Deegan Expressway (I-87) will assist soil transportation and contractor access to the Site. The Site is also accessible to mass transit and is within walking distance to the 6 line of the NYC Subway system with a stop located on 138th Street at Third Avenue (2 blocks to the north). 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 potential off-site groundwater impacts by removing petroleum impacted soil from the Site and capping exposed fill. The proposed remedy will not affect natural resources other than to potentially improve the quality of groundwater on a local basis and eliminate potentially impacted surface runoff and sediment into the Harlem River.

Proximity to floodplains

The entire Site is located within a designated high risk flood zone area. Capping of the Site will reduce the potential impacts from flooding.

Geography and geology of the Site

The selected remedy will excavate petroleum impacted soils from the source area to a depth of 15 feet below grade, and historic fill materials to a depth of 7 feet within the proposed building footprint areas and to a depth of 2 feet in the proposed landscaped areas. 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.

3.7 SUMMARY OF SELECTED REMEDIAL ACTIONS

The remedy recommended for the Site is a Track 4 alternative (Alternative 2) which consists of the removal underground storage tanks and hydraulic lifts, excavation of petroleum impacted soil to a depth of 15 feet within the northwest source area, excavation and disposal of historic fill soil from the building foundation areas, excavation of the top 2 feet of soil from within the planned landscape areas and capping the entire Site with the building foundations, concrete walkways / driveways or 2 feet of soil meeting Restricted Residential SCOs.

The remedy will include the following items:

1. Removal of twelve 550-gallon diesel and two 550-gallon gasoline previously closed-in-place underground storage tanks;
2. Removal of one 1,000- gallon waste oil underground tank and one 1,000-gallon motor oil tank previously closed-in-place;
3. Removal an underground oil /water separator and hydraulic lifts;
4. Excavate petroleum impacted soil area to a depth of 15 feet in the northwest source area;
5. Excavation of soil/fill exceeding groundwater protection SCOs for those VOC parameters in groundwater above standards as listed in **Table 1** to depths as great as 15 feet below grade in the northwest source area;
6. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;

7. Excavation and disposal of historic fill materials as needed for installation of the new buildings basement level foundations;
8. Excavation and disposal of historic fill materials from planned landscaped (exposed soil) areas;
9. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of groundwater protection SCOs for VOCs present in groundwater above standards;
10. 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;
11. Capping the entire Site with the building foundations, concrete walkways / driveways or 2 feet of soil meeting Restricted Residential SCOs.
12. 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.
13. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
14. 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. Any anticipated deviations to the RAWP shall be submitted to the NYSDEC for review.

4.0 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 consistent with the requirements of the Brownfield Cleanup Program.

4.1 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), a Quality Assurance Project Plan (QAPP), fluid management procedures, and contractors' site operations and quality control procedures. Highlights of these documents and procedures are provided in the following sections.

4.1.1 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 Remedial Engineer will insure that it meets the minimum requirements as detailed in the site-specific HASP prepared for the Site.

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 Remedial Engineer (RE), Site Safety Manager (SSM) and/or Project Manager (PM).

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

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an

appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

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

The Site Safety Coordinator will be Mr. Kevin Waters. His resume is provided in **Attachment F**. 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 B**.

4.1.2 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°C.

Dedicated disposable sampling materials will be used for both soil and groundwater samples (if collected), 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 withalconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Prepare field blanks 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. 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 C**.

4.1.3 Construction Quality Assurance Plan (CQAP)

All construction work related to the remedy (i.e. soil excavation) will be monitored by EBC / AMC 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 an environmental professional (EP) 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 EP 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. Daily updates will also be submitted to the NYSDEC. See section 4.4.1 Daily Reports.

4.1.4 Soil/Materials Management Plan (SoMP)

A SoMP has been prepared for excavation, handling, storage, transport and disposal of all soils/materials that are disturbed / excavated at the Site. The SoMP includes all of the controls that will be applied to these efforts to assure effective, nuisance-free performance in compliance with all applicable Federal, State and local laws and regulations. The SoMP is presented in Section 5.4.

4.1.5 Erosion and Sediment Control Plan (ESCP)

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.

4.1.6 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.

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

4.1.7 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.

4.1.8 Citizen Participation Plan (CPP)

The Citizen Participation Plan prepared for this project is provided in **Attachment E**. The public will be informed of key project documents and events through the distribution of fact sheets through the Department's List Serv. The public was initially informed of the Site and the opportunity to join the List Serv through an ad placed in the local newspaper and mailed fact sheets.

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.

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

New York Public Library - Mott Haven Branch

321 East 140th Street
Bronx, NY 10454
(718) 665-4878

Hours:

Mon 10:00 AM - 6:00 PM
Tue 10:00 AM - 7:00 PM
Wed 10:00 AM - 7:00 PM
Thu 10:00 AM - 6:00 PM
Fri 10:00 AM - 5:00 PM
Sat 10:00 AM - 5:00 PM
Sun closed

4.2 GENERAL REMEDIAL ACTION INFORMATION

4.2.1 Project Organization

The Project Manager for the Remedial Action will be Ms. Chawinie Reilly. 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 F**.

4.2.2 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 and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of back fill material, and management of waste transport and disposal, 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.

4.2.3 Remedial Action Schedule

The remedial action will begin with mobilization of equipment and material to the Site, which will begin approximately 1 week following RAWP approval and 10 days after the distribution of the remedial construction Fact Sheet. A pre-construction meeting will be held among NYSDEC, the Remedial Engineer, and the selected remedial contractor prior to site mobilization. Mobilization will be followed by soil removal and disposal and confirmation sampling. The

work is expected to take 6 months as part of the construction excavation and foundation installation.

4.2.4 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.

4.2.5 Site Security

A construction fence will be erected around the entire 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.

4.2.6 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 Lincoln Avenue. All traffic will enter and leave the Site via existing gates on Third Avenue. The excavation contractor 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 the Third Avenue exit / entrance. Traffic related to the remedial activity will require the staging of trucks along Lincoln Avenue. The local transport route will be as follows:

- **ENTERING SITE** - from the Major Deegan Expressway (I87) heading south; take the Willis Ave / Third Ave Exit (Exit 2) and turn right heading north on Bruckner Blvd. to Lincoln Avenue. Turn left, heading south on Lincoln Avenue 1 block to Site entrance on the left.
- **EXITING SITE** – Turn left onto Lincoln Avenue heading northeast to 138th Street. Turn right onto 138th Street heading southeast to Willis Avenue. Turn right onto Willis

Avenue heading south to E. 135th Street. Turn right on E.135th Street and continue to the on-ramp (bearing left) for the Major Deegan Expressway (I-87).

This route was designed to minimize or eliminate the time trucks will be on local streets. Equipment and trucks needed to install the grade beam will remain within the Site boundaries and not on residential Streets. Site personnel will be required to park on Site or in legal all-day on-street parking spaces, near the Site or in an off-street parking lot/garage.

A map showing the truck routes is included as **Figure 12**.

4.2.7 Worker Training and Monitoring

An excavation contractor with appropriate experience, personnel and training (40 hr OSHA) is required to perform the removal of the USTs and VOC impacted soil. After this material is removed the contractor will remove historic fill as needed for the foundation installation and landscaped areas. The excavation contractor's on-site personnel engaged in historic fill and / or native soil removal (if present) 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 a 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.

4.2.8 Agency Approvals

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

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

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

4.2.9 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 G**.

4.2.10 Pre-Construction Meeting with NYSDEC

A pre-construction meeting or conference call 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.

4.2.11 Emergency Contact Information

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

4.2.12 Remedial Action Costs

The total estimated cost of the Remedial Action is \$ 2,425,810. An itemized and detailed summary of estimated costs for all remedial activity is attached as **Attachment H**. This will be revised based on actual costs and submitted as an Appendix to the Final Remediation Report.

4.3 SITE PREPARATION

4.3.1 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.

4.3.2 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. The DEC will be consulted to determine if a Notice of Intent (NOI) will be required for this project.

4.3.3 Stabilized Construction Entrance(s)

Stabilized construction entrances will be installed at all points of vehicle ingress and egress to the Site. The construction entrance will be stabilized with crushed stone, gravel, plywood sheeting, existing asphalt or existing concrete as necessary to provide a safe egress and ingress to 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.

4.3.4 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.

4.3.5 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.

4.3.6 Equipment and Material Staging

Equipment used for excavation work will be staged on Site within the fenced perimeter. All equipment and work materials will be staged on-Site in areas as designated by the General Contractor, and / or Construction Site Superintendent.

4.3.7 Decontamination Area

All materials and equipment (except disposable items) will be decontaminated on specially constructed “pads”, an existing asphalt surface or an existing concrete surface located at the exit point from the Site. At a minimum, the constructed pad (if used) will consist of a layer of crushed stone underlain by an impervious plastic liner that has been graded to drain to the interior of the Site. If an existing surface is used it will be surrounded by hay bales or other silt controlling materials. The pad will be sized to accommodate the largest piece of equipment used on the project. 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. Disposable items will be containerized within the site and transported for appropriate off- site disposal.

4.3.8 Site Fencing

The lot currently has an 8 ft high chain link fence and gate along Lincoln Avenue (east side). The south property line is bordered by the Harlem River and the west and north property lines are bordered by the existing building. An 8 ft high construction fence will be erected around the

north, east and west property lines prior to building demolition. The site access and gate will remain on Lincoln Avenue. The fences and gates will be maintained during the remedial activity and properly secured at the end of the day.

4.3.9 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.

4.4 REPORTING

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

4.4.1 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.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week 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.

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG, PDF) 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 included in the daily reports as needed, and a comprehensive collection of photos will be included in the Final Engineering Report.

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.

4.4.4 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 via email on the same day as the complaint is received.

4.4.5 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.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Excavation work includes the following; the removal and off-Site disposal of petroleum impacted soil to a depth of 15 feet in the northwest source area (150 cy) and historic fill soil to a depth of 7 feet within the building footprint area (21,907 cy) and to a depth of 2 feet in planned landscaped (exposed soil) areas (851 cy). Soil excavation and loading 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 petroleum impacted soil and historic fill soil will be performed by a qualified contractor and trained personnel (Minimum 24HR OSHA HAZWOPER). Removal of underground storage tanks (USTs) and hydraulic lift systems will be completed by a qualified contractor and trained personnel (Minimum 40HR OSHA HAZWOPER) in accordance with DER-10, NYSDEC PBS regulations and NYC Fire Department regulations. It is anticipated that the excavation of petroleum impacted and historic fill materials will be performed by the excavation contractor for the construction project.

An excavation plan showing the excavation depths to achieve the Track 4 remedy is provided in **Figure 13**. Some dewatering may be needed for the excavation of contaminated areas but is not anticipated for foundation construction.

5.1 UST REMOVAL METHODS

USTs, which are present 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 transporter. 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.

Since most of the tanks were previously closed-in-place, it may not be necessary to perform all of the tasks above. 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).

5.2 SOIL CLEANUP OBJECTIVES

The Soil Cleanup Objectives for this Site are listed in **Table 1**. **Table 7** summarizes all soil samples that exceed unrestricted SCOs at the Site. Spider maps showing all soil samples that exceed the unrestricted SCO are shown in **Figure 9**.

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

Post excavation (endpoint) soil samples will be collected from across the Site to verify that remedial goals have been achieved. Documentation and confirmatory soil samples will be collected from the Site as follows:

- (1) Confirmation soil samples will be collected following the removal of the USTs and soil from the petroleum areas to verify that remedial goals have been achieved (**Figure 14**). The confirmatory soil samples from the UST excavation and petroleum area hotspot will be analyzed for VOCs and SVOCs. Sidewall confirmation soil samples will also be collected from each UST and petroleum impacted excavation area unless they are to be further excavated as part of the new buildings cellar level.
- (2) Confirmation soil samples will be collected following the removal of the hydraulic lift system to verify that remedial goals have been achieved (**Figure 14**). The confirmatory soil samples from the hydraulic lift area will be analyzed for VOCs, SVOCs and PCBs. Sidewall confirmation soil samples will also be collected from this area unless it is to be further excavated as part of the new buildings cellar level.
- (3) Documentation soil samples will be collected following the excavation of the cellar level of the new building to evaluate the quality of soil remaining at the Site (**Figure 14**). The documentation soil samples from the cellar excavation will be analyzed for VOCs, SVOCs, pesticides, PCBs and metals. Sidewall documentation soil samples will not be collected.

5.3.1 Sampling Frequency

Confirmation soil 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 linear feet. Documentation soil sampling frequency will be performed as shown in **Figure 14**.

5.3.2 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 /AMC 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 post excavation confirmation soil samples for the UST and petroleum areas will be analyzed for VOCs by EPA Method 8260B and SVOCs by EPA method 8270 PAHs. Post excavation confirmation soil samples for the hydraulic lift area will be analyzed for VOCs by EPA Method 8260B, SVOCs by EPA method 8270 PAHs and PCBs by EPA method 8082. All post excavation cellar area documentation samples will be analyzed for VOCs by EPA Method 8260B, SVOCs by EPA method 8270, Pesticides / PCBs by EPA method 8081/8082 and TAL metals by EPA method 6010.

5.3.3 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.

5.3.4 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°C.

Dedicated disposable sampling materials will be used for 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.

5.3.5 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.

5.3.6 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 unrestricted SCOs to verify attainment of Track 1. Laboratory reports and the DUSR will be included as an appendix in the FER.

5.4 ESTIMATED MATERIAL REMOVAL QUANTITIES

It is expected that 150 cubic yards (225 tons) of petroleum impacted soil will be generated by excavating the northwest source area to a depth of 15 feet. Historic fill material was also documented throughout the Site to depths as great as 15 feet below grade. Therefore, an estimated 21,907 cubic yards (32,860 tons) of historic fill material will be generated by excavating the basement foundations of the new building. An additional 851 cubic yards (1,277 tons) of historic fill soil will be excavated from the proposed landscaped areas.

5.5 SOIL/MATERIALS MANAGEMENT PLAN

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. Excavated soils including petroleum contaminated soil and historic fill soil are expected to be classified as non-hazardous.

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 additional previously unknown 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 6.2** of this document.

5.5.1 Excavation of Petroleum Contaminated Soil

Petroleum impacted soil is known to be present in the northwest area of the Site. The vertical extent is approximately 14 feet below grade. However, soil screening will be performed to determine the limits of the excavation with verification sampling performed to confirm removal of all petroleum impacted soil. The excavation of the petroleum soil will be performed by a qualified contractor and trained (24 hr HAZWOPER) personnel.

5.5.2 Excavation of Historic Fill Soil

Historic fill material is present beneath the site to depths which vary from 5 to 15 feet below grade. The historic fill material contains SVOCs, metals and pesticides above unrestricted and restricted-residential use SCOs. Historic fill material will be segregated from non-contaminated native soils and disposed of off-Site at a permitted disposal facility.

Excavated historic fill materials will either be pre-characterized and live-loaded into trucks for transport to the disposal facility or temporarily stored on-Site until arrangements can be made for off-Site disposal. It is anticipated that the historic fill material will be classified as non-hazardous material. If this material is classified as non-hazardous, then the excavation of historic fill material will be performed by the excavation contractor for the construction project using trained personnel (24 hr HAZWOPER). If this material is classified as hazardous, then 40 hr HAZWOPER trained personnel will be needed to perform the excavation of this material.

5.5.3 Excavation of Native Soils

Native soils are present directly below the fill materials and may be encountered during excavation for basement areas and foundation components during construction of the new buildings. Since excavation of the basement areas will begin following removal of petroleum contaminated soil and historic fill, it is expected that native soils (if encountered) will not be contaminated. However, if evidence of contamination is discovered during the excavation of basement areas, 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 or petroleum. Any excess native soil will be disposed of off-site as a beneficial re-use material upon. If the soil is to be disposed of as beneficial reuse material within NY State, approval by DEC will be required.

Clean native soils utilized on-site will be subject to a testing program to verify that they meet restricted residential SCOs prior to use.

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

5.5.4 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by an 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.

5.5.5 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. Soils which exhibit strong odors will be completely sealed with heavy tarps or vapor suppressant foam.

5.5.6 Materials Excavation and Load Out

The Remedial Engineer or an EP 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 EP 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 EP 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.

Development-related grading cuts and fills will not interfere with, or otherwise impair or compromise, the performance of remediation required by this plan.

Mechanical processing of historical fill material 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.

5.5.7 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.

All traffic will enter and leave the Site via existing gates on Third Avenue. The excavation contractor 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 the Lincoln Avenue exit / entrance. The local transport route will be as follows:

- **ENTERING SITE** - from the Major Deegan Expressway (I87) heading south; take the Willis Ave / Third Ave Exit (Exit 2) and turn right heading north on Bruckner Blvd. to Lincoln Avenue. Turn left, heading south on Lincoln Avenue 1 block to Site entrance on the left.
- **EXITING SITE** – Turn left onto Lincoln Avenue heading northeast to 138th Street. Turn right onto 138th Street heading southeast to Willis Avenue. Turn right onto Willis Avenue heading south to E. 135th Street. Turn right on E.135th Street and continue to the on-ramp (bearing left) for the Major Deegan Expressway (I-87).

This route was designed to minimize or eliminate the time trucks will be on local streets. Equipment and trucks needed to install the grade beam will remain within the Site boundaries

and not on residential Streets. Site personnel will be required to park on Site or in legal all-day on-street parking spaces, near the Site or in an off-street parking lot/garage.

These routes are shown in **Figure 12**.

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. Wet loads are not anticipated since the disposal facilities maintain strict moisture limits on acceptable loads. However, if wet soils are excavated they will be stockpiled within the excavation to dry or blended with dry soils. No loads of material capable of generating free liquid will be allowed to leave the Site. All trucks will be inspected, dry-brushed and / or washed, as needed, before leaving the site.

5.5.8 Materials Disposal Off-Site

Multiple disposal facility designations may be employed for the materials removed from the Site. Once final arrangements have been made, the disposal location(s) will be reported to the NYSDEC Project Manager. It is anticipated that the soil will be disposed of at up to 3 different facilities, based on the following classification:

- Non Hazardous - Contaminated (petroleum) Low Lead < 1,000 mg/kg.
- Non Hazardous - Contaminated (historic fill) Low Lead < 1,000 mg/kg.
- Uncontaminated Native Soil - meets NJDSC Criteria for beneficial Reuse.

The total quantity of material expected to be disposed off-Site is 22,908 cubic yards, including 150 cubic yards of petroleum impacted soil, 21,907 cubic yards of historic fill material from the basement excavations and 851 cubic yards of historic fill material from the planned landscaped areas.

Hazardous Soil Disposal and Transport

Although not anticipated to be present, soil classified as hazardous will be shipped under a hazardous waste manifest system. All hazardous waste transported and disposed of must have a

USEPA ID Number and waste code and must be distributed in accordance with the regulatory requirements.

The multi-part manifest will be filled out for each load of soil shipped off of the Site. At a minimum, the following information will be recorded on each manifest:

- 1) Generator's Name, Address, and Phone Number
- 2) Destination Facility Name, Address and Phone Number
- 3) EPA ID Number
- 4) Waste classification code
- 5) Transporter Name, Address, Phone Number, License Plate Number, Driver Name, and SW Haulers Permit #
- 6) Signatures – Generator or an authorized agent for the generator shall print, sign, and date each non-hazardous material manifest after each truck is loaded. The transporter shall then sign and date noting time material was picked up at the site. Both the transporter and a representative of the disposal facility will sign the non-hazardous material manifest when the material has been delivered to disposal facility.

Non-Hazardous Soil Disposal and Transport

Non-hazardous historic fill material and petroleum contaminated soil classified as non-hazardous, will be handled, at a minimum, as a Municipal Solid Waste per 6 NYCRR Part 360-1.2. Historical fill material 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.

Soil classified as non-hazardous fill will be transported under a non-hazardous waste manifest obtained from the selected disposal facility. The multi-part manifest will be filled out for each load of soil shipped off of the Site. At a minimum, the following information will be recorded on each manifest:

- 1) Generator's Name, Address, and Phone Number
- 2) Destination Facility Name, Address and Phone Number
- 3) Transporter Name, Address, Phone Number, License Plate Number, Driver Name, and SW Haulers Permit #
- 4) Signatures – Generator or an authorized agent for the generator shall print, sign, and date each non-hazardous material manifest after each truck is loaded. The transporter shall then sign and date noting time material was picked up at the site. Both the transporter and a representative of the disposal facility will sign the non-hazardous material manifest when the material has been delivered to disposal facility.

A copy of the manifest will be retained by on-Site personnel for each shipment. Final signed manifests will be forwarded by the disposal facility to the generator. Copies of the final manifests will be presented in the FER.

Clean Soil Disposal

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 Use SCOs or Residential / Groundwater Protection SCOs prior to unregulated disposal or meets Restricted Residential Use SCOs prior to reuse on-Site. Confirmation testing of clean soils will be in accordance with DER-10 Section 5.4(e)(10) as follows:

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

Uncontaminated native soil confirmed by the above testing program and removed from the site, will be disposed of as C&D material (if approved) 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.

C&D and Scrap Metal Disposal

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. 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 than 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.

Scale Tickets

All trucks to be utilized for transport of hazardous or non-hazardous contaminated soil shall be weighed before and after unloading at the disposal facility. Disposal facilities must provide truck scales capable of generating load tickets measured in tons. The tonnage transported and disposed will be determined by the disposal facility and reported on a certified scale ticket which will be attached to each returned manifest. Weights will be reported on the certified scale ticket as Tare and Gross weights.

C&D Transport Tickets / Bills of Lading

Bill of Lading system or equivalent will be used for the disposal of C&D and related materials. 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. This information will be reported in the Final Engineering Report.

Disposal Facility Documentation

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.

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.

5.5.9 Materials Reuse On-Site

Re-use of on-Site soil will only be allowed if the material is found to meet Restricted Residential Use SCOs through the verification testing program detailed 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.

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 material 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.

5.5.10 Fluids Management

As the depth to groundwater at the site is approximately 7 feet below grade in the planned basement excavation area, some dewatering operations may 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 the 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.

5.5.11 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 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.

5.5.12 Stormwater Pollution Prevention

The NYSDEC will be consulted to determine if a Notice of Intent (NOI) is required for this project. If required, the NOI will be prepared and filed with the DEC prior to beginning the work. 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.

5.5.13 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 for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs) if the use/contents of the tank cannot be verified as petroleum. These analyses will not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC.

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.

5.5.14 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 D** or this Work Plan.

5.5.15 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."

5.5.15.1 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.

5.5.15.2 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.

5.5.15.3 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 will be developed and utilized by the contractor for all remedial work and conforms, to NYCDEP noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Since soil with parameters above restricted residential SCOs will remain at depth 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:

1. Site Cover will be required to allow for residential use of the Site. The cover will consist of the new building foundation, concrete capped rear parking area, and a demarcation barrier and 2 feet of certified clean soil/top soil in landscaped areas.

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

7.0 ENGINEERING CONTROLS

A site cover (**Figure 15**) will be required to allow for restricted residential use of the site. The cover will consist of the structures such as buildings, pavement, sidewalks comprising the site development and / or a soil cover in areas where the upper one foot (for commercial use) or two feet (for restricted residential use) of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where the soil cover is required it will be a minimum of one foot (for commercial use) or two feet (for restricted residential use) of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.7(d). The soil cover will be placed over a demarcation layer, with the upper six inches of the soil of sufficient quality to maintain a vegetation layer. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d).

A SoMP will be included in the Site Management Plan and will outline the procedures to be followed in the event that the soil cover system and underlying residual contamination are disturbed after the Remedial Action is complete. Maintenance of the soil cover system will be described in the Site Management Plan in the FER.

8.0 INSTITUTIONAL CONTROLS

Institutional Controls (ICs) 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 a Site Management Plan (SMP).

All as-build drawings, diagram, calculation and manufacturer documentation for treatment will be presented in the FER. A Site-Specific Environmental Easement will be recorded with the City of New York 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 the 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.

8.1 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:

- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- Compliance with the Environmental Easement by the Grantee and the Grantee's successor's is required;
- 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 Controls;
- 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;

8.2 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 for the Remedial Action. The

Site Management Plan is submitted as a separate and independent document from the FER. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

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

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

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

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

9.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) and Certificate of Completion 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.

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 6 NYCRR 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).

9.1 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 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, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Remedial Work Plan (or Remedial Design or Plans and Specifications) was implemented and that all construction activities were completed in substantial conformance with the DER-approved Remedial Work Plan (or Remedial Design or Plans and Specifications).

If the Remedial Action Work Plan (or Remedial Design or Plans and Specifications) identifies time frames to be achieved by the remedial program, the certification must include:

The data submitted to DER demonstrates that the remediation requirements set forth in the Remedial Work Plan (or Remedial Design or Plans and Specifications) and all applicable

statutes and regulations have been or will be achieved in accordance with the time frames, if any, established in the work plan (or Remedial Design or Plans and Specifications).

If the remedial program requires ICs or ECs, the certification will include:

All use restrictions, institutional controls, engineering controls and/or any operation and maintenance requirements applicable to the site are contained in an environmental easement created and recorded pursuant to ECL 71-3605 and that any affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

If the remedial program requires applicable SMP, the certification will include:

A Site Management Plan has been submitted for the continual and proper operation, maintenance, and monitoring of any engineering controls employed at the site including the proper maintenance of any remaining monitoring wells, and that such plan has been approved by DER.

If the remedial program requires financial assurance, the certification will include:

Any financial assurance mechanisms required by DEC pursuant to Environmental Conservation Law have been executed.

10.0 SCHEDULE

The remedial action will begin with mobilization of equipment and material to the Site which will begin approximately 4 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 USTs followed by excavation and disposal of petroleum impacted soil, historic fill materials and native soil (if encountered), followed by confirmation sampling. The work is expected to take approximately 6 months 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 2 weeks of RAWP approval
Mobilize equipment to the site and construct truck pad and other designated areas	Within 2 weeks following the pre-construction meeting and issuance of Pre-Construction Fact Sheet
Begin excavation of USTs	Immediately following mobilization
Mobilize Excavation Contractor and equipment to the Site	Immediately following excavation of UST
Complete excavation and disposal of historic fill material and clean native soil.	Within 6 months of mobilization
Perform endpoint verification of UST areas	Performed in sequence as final depth of each excavated area is complete.
Submit SMP	By August 15 th of the year in which the COC is sought or as required by DEC.
Submit FER	By September 15 th of the year in which the COC is sought or as required by DEC.

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
Acenaphthylene	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
SUMMARY OF
SAMPLING PROGRAM RATIONALE AND ANALYSIS**

Matrix	Location	Approximate Number of Samples	Rationale for Sampling	Laboratory Analysis
Subsurface soil	15B1, 15B2, 15B3, 15B4, 15B5, 15B6, 15B7, 15B8, 15B9, 15B10, 15B11 and 15B12 ; 2 samples from each boring (fill layer and native soil) Fill samples for the borings collected from the 0-2' interval. Clean samples for the borings collected at the 12-14 foot intervals.	24	To evaluate soil quality of across the Site.	Fill and native soil: VOCs (Method 8260C), SVOCs (Method 8270D), TAL Metals (Method 6010C), pesticides / PCBs (Method 8081B/8082A).
Total (Soils)		24		
Groundwater (water table)	From six monitoring wells installed across the Site.	6	Define nature and extent of impacted groundwater	VOCs (Method 8260C), SVOCs (Method 8270D), TAL Metals total & dissolved (Method 6010C), pesticides / PCBs (Method 8081B/8082A). (9014 or 9012B)
Total (Groundwater)		6		
Soil Gas (2-4 ft below existing grade)	From eight soil vapor implants installed on the Site.	8	Evaluate soil gas at interior and perimeter of Site.	VOCs EPA Method TO15
Total (Soil Gas)		8		
Duplicates	Matrix spike and Matrix spike duplicates at the rate 5%	2	To meet requirements of QA / QC program	1 soil duplicate and 1 GW duplicate. Soil and Groundwater: VOCs EPA Method 8260C, for SVOCs EPA Method 8270D, pesticide / PCBs EPA Method 8081/8082. Soil: TAL metals (Method 6010C). Groundwater: Dissolved/TAL Metals (Method 6010C).
Trip Blanks	One laboratory prepared trip blank to accompany samples each time they are delivered to the laboratory.	4	To meet requirements of QA / QC program	VOCs EPA Method 8260B
Total (QA / QC Samples)		6		

Former Bronx Freight Terminal
101 Lincoln Avenue,
Bronx, New York

TABLE 6
Soil Analytical Results
Metals

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives*	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	15B1				15B2				15B3				15B4				15B5				15B6			
			(0-2) 12/7/2015 mg/Kg		(12-14) 12/7/2015 m/Kg		(0-2) 12/7/2015 mg/Kg		(12-14) 12/7/2015 mg/Kg		(0-2) 12/4/2015 mg/Kg		(12-14) 12/4/2015 mg/Kg		(0-2) 12/4/2015 mg/Kg		(12-14) 12/4/2015 mg/Kg		(0-2) 12/4/2015 mg/Kg		(12-14) 12/4/2015 mg/Kg		(0-2) 12/4/2015 mg/Kg		(12-14) 12/7/2015 mg/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
Aluminum			8,800	34	7,940	39	13,300	35	10,200	35	14,900	35	10,800	41	5,780	34	9,560	41	5,940	35	13,800	49	9,040	35	4,940	47
Antimony			< 1.7	1.7	< 2.0	2.0	< 1.8	1.8	< 1.8	1.8	< 1.7	1.7	< 2.1	2.1	1.8	1.7	< 2.1	2.1	4.7	1.8	< 2.5	2.5	< 1.8	1.8	< 2.3	2.3
Arsenic	13	16	4.3	0.7	3.1	0.8	4.3	0.7	2.3	0.7	4	0.7	4.5	0.8	20.8	0.7	3	0.8	17.2	0.7	21.1	1.0	14.3	0.7	26.8	0.9
Barium	350	350	72.4	0.7	55.2	0.8	134	0.7	28.4	0.7	72.6	0.7	59.6	0.8	466	0.7	99.8	0.8	176	0.7	147	1.0	152	0.7	221	0.9
Beryllium	7.2	14	0.88	0.27	0.42	0.31	0.4	0.28	0.3	0.38	0.81	0.28	0.41	0.33	0.27	0.27	0.25	0.33	0.47	0.28	0.65	0.39	0.45	0.28	0.2	0.38
Cadmium	2.5	2.5	0.14	0.34	< 0.39	0.39	< 0.35	0.35	< 0.35	0.35	< 0.35	0.35	0.2	0.41	0.8	0.34	< 0.41	0.41	1.19	0.35	0.77	0.49	0.6	0.35	1.99	0.47
Calcium			47,200	34	23,300	39	39,200	35	1,530	3.5	27,400	35	56,900	41	28,200	34	91,100	41	9,860	3.5	6,820	4.9	5,660	3.5	22,000	47
Chromium	30	180	17.3	0.34	15	0.39	25.8	0.35	23.1	0.35	24.8	0.35	16	0.41	15.1	0.34	18.3	0.41	32.1	0.35	38.4	0.49	19.5	0.35	21.1	0.47
Cobalt			10.9	0.34	7.25	0.39	13	0.35	10.1	0.35	11.8	0.35	6.75	0.41	9.95	0.34	8.82	0.41	8.2	0.35	11.3	0.49	11.8	0.35	15	0.47
Copper	50	270	27.7	0.34	18.2	0.39	43.5	0.35	10.4	0.35	26.1	0.35	27.1	0.41	81.2	0.34	22	0.41	138	0.35	121	0.49	52.4	0.35	340	4.7
Iron			16,400	34	13,000	39	23,000	35	15,500	35	25,000	35	22,400	41	23,500	34	17,100	41	25,300	35	27,600	49	26,900	35	103,000	47
Lead	63	400	74.3	0.7	98.2	0.8	90.2	0.7	4.4	0.7	57.5	0.7	96.9	0.8	4,750	68	44.2	0.8	388	7.0	584	9.8	208	7.0	609	9.4
Magnesium			30,600	34	11,200	39	5,990	35	4,470	3.5	16,900	35	8,330	41	3,120	3.4	56,600	41	2,780	3.5	7,000	4.9	4,250	3.5	3,870	4.7
Manganese	1,600	2,000	379	3.4	215	3.9	205	3.5	219	3.5	629	3.5	311	4.1	151	3.4	136	0.41	241	3.5	372	4.9	318	3.5	329	4.7
Mercury	0.18	0.81	0.15	0.03	0.06	0.03	2.74	0.27	< 0.03	0.03	0.59	0.03	0.07	0.03	0.97	0.03	0.43	0.03	0.48	0.03	5.64	0.35	0.45	0.03	1.5	0.04
Nickel	30	140	18.8	0.34	13.4	0.39	19.7	0.35	14.8	0.35	18.8	0.35	13.5	0.41	21.8	0.34	16.2	0.41	26	0.35	28.4	0.49	23.4	0.35	40.5	0.47
Potassium			3,110	7	1,780	8	6,140	71	2,170	7	3,200	7	2,920	8	2,210	7	5,030	82	1,250	7	4,000	10	3,210	70	1,040	9
Selenium	3.9	36	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 2.0	2.0	< 1.4	1.4	< 1.9	1.9
Silver	2	36	< 0.34	0.34	0.4	0.39	< 0.35	0.35	< 0.35	0.35	< 0.35	0.35	< 0.41	0.41	< 0.34	0.34	< 0.41	0.41	< 0.35	0.35	1	0.49	< 0.35	0.35	< 0.47	0.47
Sodium			321	7	709	8	865	7	416	7	313	7	2,540	8	694	7	2,710	8	394	7	2,560	10	400	7	903	9
Thallium			< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 1.4	1.4	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4	< 2.0	2.0	< 1.4	1.4	< 1.9	1.9
Vanadium			23.8	0.3	20.5	0.4	33.3	0.4	33.3	0.4	33	0.3	25.8	0.4	21.3	0.3	22.1	0.4	38.1	0.4	34.9	0.5	31.7	0.4	47.5	0.5
Zinc	109	2,200	516	6.8	46.1	0.8	133	7.1	32.7	0.7	77.3	0.7	66.5	0.8	384	6.8	51.6	0.8	282	7.0	295	9.8	180	7.0	413	9.4

Notes:

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

RL- Reporting Limit

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

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

TABLE 6
Soil Analytical Results
Metals

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives*	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	15B7				15B8				15B9				15B10				15B11				15B12				Duplicate	
			(0-2') 12/7/2015 µg/Kg		(12-14') 12/7/2015 µg/Kg		(0-2') 12/4/2015 mg/Kg		(12-14') 12/4/2015 mg/Kg		(0-2') 12/4/2015 mg/Kg		(12-14') 12/7/2015 mg/Kg		(0-2') 12/4/2015 mg/Kg		(12-14') 12/4/2015 mg/Kg		(0-2') 12/4/2015 mg/Kg		(12-14') 12/4/2015 mg/Kg		(0-2') 12/4/2015 mg/Kg		(12-14') 12/4/2015 mg/Kg		12/4/2015 mg/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
Aluminum			14,000	36	8,150	38	7,280	38	9,230	39	12,200	39	6,790	37	11,200	38	5,370	41	4,220	39	19,300	52	10,700	35	23,200	410	11,200	36
Antimony			< 1.8	1.8	< 1.9	1.9	3.5	1.9	< 1.9	1.9	< 1.9	1.9	< 1.9	1.9	< 1.9	1.9	< 2.1	2.1	7.6	2.0	< 26	26	< 1.7	1.7	< 2.0	2.0	< 1.8	1.8
Arsenic	13	16	6	0.7	1.3	0.8	16	0.8	1.4	0.8	5.8	0.8	3.9	0.7	4.7	0.8	3.3	0.8	22.3	0.8	20.5	1.0	3.5	0.7	3.2	0.8	5.6	0.7
Barium	350	350	63.4	7.3	13.2	0.8	189	0.8	97.5	0.8	117	0.8	137	0.7	118	0.8	60.9	0.8	120	0.8	201	1.0	88.9	0.7	82.1	0.8	95.3	0.7
Beryllium	7.2	14	0.49	0.29	0.31	0.30	0.47	0.31	0.45	0.31	0.52	0.31	0.34	0.30	0.56	0.31	0.28	0.33	0.51	0.31	0.9	0.42	0.41	0.28	0.87	0.32	0.58	0.29
Cadmium	2.5	2.5	< 0.36	0.36	< 0.38	0.38	1.14	0.38	< 0.39	0.39	0.33	0.39	0.17	0.37	0.33	0.38	0.36	0.41	1.23	0.39	10.3	0.52	< 0.35	0.35	< 0.41	0.41	0.29	0.36
Calcium			2,710	36	842	3.8	20,900	38	58,700	39	3,400	3.9	36,200	37	33,300	38	4,900	4.1	10,600	3.9	11,300	5.2	22,300	35	1,130	4.1	6,510	3.6
Chromium	30	180	16.9	3.6	22.3	0.38	21.7	0.38	16.1	0.39	18.4	0.39	16.8	0.37	19.9	0.38	12.1	0.41	16	0.39	46.9	0.52	19.1	0.35	47.3	0.41	20.7	0.36
Cobalt			8.6	3.6	7.24	0.38	8.27	0.38	8.38	0.39	8.46	0.39	7.99	0.37	10.5	0.38	6.12	0.41	9.4	0.39	14.4	0.52	9.86	0.35	13	0.41	9.66	0.36
Copper	50	270	26.8	0.36	13.1	0.38	86.9	0.38	26.3	0.39	41.2	0.39	36.8	0.37	31.9	0.38	43.2	0.41	114	0.39	181	0.52	36.4	0.35	31.8	0.41	62.3	0.36
Iron			23,100	36	11,400	38	23,100	38	15,800	39	21,200	39	17,000	37	21,100	38	17,700	41	28,800	39	39,400	52	19,100	35	36,400	41	22,100	36
Lead	63	400	92.2	7.3	3.7	0.8	478	7.6	124	0.8	383	7.8	476	7.4	120	0.8	243	8.2	437	7.8	519	10	73.9	0.7	7.3	0.8	297	7.2
Magnesium			3,470	36	4,100	3.8	6,230	3.8	33,800	3.9	3,700	3.9	4,610	3.7	17,600	3.8	4,100	4.1	1,780	3.9	9,100	5.2	6,770	3.5	12,500	4.1	3,630	3.6
Manganese	1,600	2,000	620	3.6	111	0.38	258	3.8	420	3.9	355	3.9	182	3.7	372	3.8	188	4.1	239	3.9	464	5.2	315	3.5	181	4.1	426	3.6
Mercury	0.18	0.81	6.38	0.30	< 0.03	0.03	0.48	0.03	0.69	0.03	6.18	0.28	0.4	0.03	0.6	0.03	0.47	0.03	0.29	0.03	4.43	0.37	0.32	0.03	< 0.03	0.03	8.06	0.27
Nickel	30	140	17.8	3.6	13.6	0.38	21.4	0.38	13.2	0.39	18.4	0.39	18.5	0.37	20.1	0.38	13.3	0.41	22.5	0.39	33.5	0.52	18.2	0.35	24.9	0.41	17.6	0.36
Potassium			1,090	7	1,660	8	1,590	8	2,890	8	1,580	8	3,370	7	3,700	8	1,380	8	810	8	4,900	10	3,360	7	4,040	81	1,640	7
Selenium	3.9	36	< 1.5	1.5	< 1.5	1.5	< 1.5	1.5	< 1.5	1.5	< 1.6	1.6	< 1.5	1.5	< 1.5	1.5	< 1.6	1.6	< 1.6	1.6	< 2.1	2.1	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4
Silver	2	36	< 0.36	0.36	< 0.38	0.38	< 0.38	0.38	< 0.39	0.39	< 0.39	0.39	< 0.37	0.37	< 0.38	0.38	< 0.41	0.41	< 0.39	0.39	1.53	0.52	< 0.35	0.35	< 0.41	0.41	< 0.36	0.36
Sodium			633	7	607	8	646	8	1,160	8	343	8	1,910	7	1,340	8	428	8	263	8	1,390	10	531	7	2,020	8	486	7
Thallium			< 1.5	1.5	< 1.5	1.5	< 1.5	1.5	< 1.5	1.5	< 1.6	1.6	< 1.5	1.5	< 1.5	1.5	< 1.6	1.6	< 1.6	1.6	< 2.1	2.1	< 1.4	1.4	< 1.6	1.6	< 1.4	1.4
Vanadium			21.6	3.6	26.8	0.4	38.9	0.4	23	0.4	23.7	0.4	26.5	0.4	32.9	0.4	16.3	0.4	27.2	0.4	45.5	0.5	30.3	0.3	51.4	0.4	27.5	0.4
Zinc	109	2,200	147	7.3	30.1	0.8	335	7.6	85.5	0.8	135	0.8	148	7.4	194	7.7	72.5	0.8	244	7.8	4,160	100	58.9	0.7	58.9	0.8	128	0.7

Notes:

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

RL: Reporting Limit

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

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

TABLE 7
Parameters Detected Above Track 1 Soil Cleanup Objectives
Soil Borings 15SB1-15SB12

COMPOUND	Range in Exceedances	Frequency of Detection	15B1		15B2	15B3		15B4		15B5		15B6		15B7	15B8		15B9		15B10		15B11		15B12		Duplicate	
			12/7/2015		12/7/2015	12/4/2015		12/4/2015		12/4/2015		12/7/2015		12/7/2015	12/4/2015		12/4/2015		12/4/2015		12/4/2015		12/4/2015			
			(0-2')	(12-14')	(0-2')	(0-2')	(12-14')	(0-2')	(12-14')	(0-2')	(12-14')	(0-2')	(12-14')	(0-2')	(0-2')	(12-14')	(0-2')	(12-14')	(0-2')	(12-14')	(0-2')	(12-14')	(0-2')	(12-14')		
<i>Sample Results in ug/kg</i>																										
Acetone	51-320	5			-	77	-				51	-	-		61			-		53			320	-	-	-
Ethylbenzene	2,700-31,000	2			-	-	-				-	-	31,000		-			2,700		-		-	-	-	-	
n-Propylbenzene	3,900	1			-	-	-				-	-	3,900		-			-		-		-	-	-	-	
<i>Sample Results in ug/kg</i>																										
Benzo(a)anthracene	1,100-9,600	9			2,400						1,100	2,900	2,400	9,600		7,000				7,400	1,100	1,800				
Benzo(a)pyrene	1,200-9,000	9			2,400						1,200	2,600	2,500	9,000		6,300				6,700	1,400	1,700				
Benzo(b)fluoranthene	1,100-7,000	9			2,100						1,100	1,600	2,300	7,000		7,000				5,800	1,400	1,100				
Benzo(k)fluoranthene	950-6,500	9			2,100						950	1,900	2,100	6,500		4,300				4,300	1,000	1,200				
Chrysene	1,300-10,000	9			2,600						1,300	3,000	2,600	10,000		7,400				8,200	1,400	2,000				
Dibenz(a,h)anthracene	370-910	4			-	-					-	-	370	910		840				820						
Indeno(1,2,3-cd)pyrene	740-4,600	9			1,400						740	1,300	1,600	4,600		3,800				3,600	950	1,000				
<i>Sample Results in ug/kg</i>																										
4,4'-DDD	8.8-53	3														53					8.8			10		
4,4'-DDE	5.1-27	4									6.5		5.1			27					6.9					
4,4'-DDT	4.1-48	7									14.0	4.1	7.4			40					10.0		10	48		
PCB-1260	170.0	1				170																				
<i>Sample Results in mg/kg</i>																										
Arsenic	14.3-26.8	8							20.8		17.2	21.1	14.3	26.8		16					22.30	20.50				
Barium	466	1							466																	
Cadmium	10.3	1																			10.30					
Chromium	32.1-47.30	4									32.1	38.4									46.90		47.30			
Copper	52.4-340	9							81.20		138	121	52.4	340		86.9					114	181			62.30	
Lead	73.9-4,750	20	74.3	98	90.2		96.90		4,750		388	584	208	609	92.2	478	124	383	749	120	243	437	519	73.90	297	
Mercury	0.32-6.38	19			2.74	0.59			0.97	0.43	0.48	5.64	0.45	1.5	6.38	0.48	0.69	6.18	0.4	0.60	0.47	0.29	4.43	0.32	8.06	
Nickel	33.5-40.5	2											40.5									33.50				
Zinc	128-4,160	15	516		133				384		282	295	180	413	147	335		135	148	194	244	4,160			128	

Table 8
Ground Water Analytical Results
Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1		MW2		MW3		MW4		MW5		MW6		Duplicate	
		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015	
		Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL
1,1,1,2-Tetrachloroethane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,1,1-Trichloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	< 5.0	5.0
1,1,2,2-Tetrachloroethane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,1,2-Trichloroethane	1	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5	5	< 1.0	1.0
1,1-Dichloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	< 5.0	5.0
1,1-Dichloroethene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,1-Dichloropropene		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,2,3-Trichlorobenzene		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	< 2.0	2.0
1,2,3-Trichloropropane	0.04	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,2,4-Trichlorobenzene		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	< 2.0	2.0
1,2,4-Trimethylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,2-Dibromo-3-chloropropane	0.04	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,2-Dibromoethane		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,2-Dichlorobenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,2-Dichloroethane	0.6	< 0.60	0.60	< 0.60	0.60	< 0.60	0.60	< 0.60	0.60	< 0.60	0.60	< 5	5	< 0.60	0.60
1,2-Dichloropropane	0.94	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 0.50	0.50	< 1.0	1.0	< 5	5	< 1.0	1.0
1,3,5-Trimethylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,3-Dichlorobenzene		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,3-Dichloropropane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
1,4-Dichlorobenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
2,2-Dichloropropane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
2-Chlorotoluene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
2-Hexanone (Methyl Butyl Ketone)		< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0	< 2.5	2.5	< 50	50	< 5.0	5.0
2-Isopropyltoluene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
4-Chlorotoluene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
4-Methyl-2-Pentanone		< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0	< 2.5	2.5	< 50	50	< 5.0	5.0
Acetone		6.4	5.0	< 5.0	5.0	< 5.0	5.0	< 10	10	4.5	5.0	< 50	50	< 10	10
Acrolein		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 50	50	< 5.0	5.0
Acrylonitrile	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 50	50	< 5.0	5.0
Benzene	1	< 0.70	0.70	< 0.70	0.70	< 0.70	0.70	< 0.70	0.70	< 0.70	0.70	9.2	14	< 0.70	0.70
Bromobenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Bromochloromethane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Bromodichloromethane		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	< 2.0	2.0
Bromoform		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 10	10	< 5.0	5.0	< 50	50	< 10	10
Bromomethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	< 5.0	5.0
Carbon Disulfide	60	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	< 2.0	2.0
Carbon tetrachloride	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Chlorobenzene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	< 5.0	5.0
Chloroethane	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	< 5.0	5.0
Chloroform	7	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	< 7.0	7.0
Chloromethane	60	< 5.0	5.0	3.6	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	1.3	5.0
cis-1,2-Dichloroethene	5	< 1.0	1.0	0.27	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
cis-1,3-Dichloropropene		< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 5	5	< 0.40	0.40
Dibromochloromethane		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	< 2.0	2.0
Dibromomethane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Dichlorodifluoromethane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Ethylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	280	20	< 2.0	2.0
Hexachlorobutadiene	0.5	< 0.50	0.50	< 0.50	0.50	< 0.50	0.50	< 0.40	0.40	< 0.50	0.50	< 5	5	< 0.50	0.50
Isopropylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	95	20	< 2.0	2.0
m&p-Xylenes	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	< 2.0	2.0
Methyl Ethyl Ketone (2-Butanone)		3.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0	< 2.5	2.5	< 50	50	< 5.0	5.0
Methyl t-butyl ether (MTBE)	10	< 1.0	1.0	1.3	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	1.1	2.0
Methylene chloride	5	< 3.0	3.0	< 3.0	3.0	< 3.0	3.0	< 4.0	4.0	< 3.0	3.0	< 20	20	< 5.0	5.0
Naphthalene	10	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	1,300	100	< 2.0	2.0
n-Butylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
n-Propylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	20	20	< 2.0	2.0
o-Xylene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
p-Isopropyltoluene		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
sec-Butylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Styrene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
tert-Butylbenzene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Tetrachloroethene	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Tetrahydrofuran (THF)		< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 10	10	< 5.0	5.0	< 50	50	< 10	10
Toluene	5	1	1.0	< 1.0	1.0	1.1	1.0	1.4	2.0	0.55	1.0	12	20	< 2.0	2.0
trans-1,2-Dichloroethene	5	< 5.0	5.0	< 5.0	5.0	< 5.0	5.0	< 4.0	4.0	< 5.0	5.0	< 5	5	< 5.0	5.0
trans-1,3-Dichloropropene	0.4	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 0.40	0.40	< 5	5	< 0.40	0.40
trans-1,4-dichloro-2-butene	5	< 2.5	2.5	< 2.5	2.5	< 2.5	2.5	< 5.0	5.0	< 2.5	2.5	< 5	5	< 5.0	5.0
Trichloroethene	5	< 1.0	1.0	0.26	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Trichlorofluoromethane	5	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Trichlorotrifluoroethane		< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 5	5	< 2.0	2.0
Vinyl Chloride	2	< 1.0	1.0	< 1.0	1.0	< 1.0	1.0	< 2.0	2.0	< 1.0	1.0	< 20	20	< 2.0	2.0

Notes:

RL- Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 9
Groundwater Analytical Results
Semi-Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 12/8/2015		MW2 12/8/2015		MW3 12/8/2015		MW4 12/8/2015		MW5 12/8/2015		MW6 12/8/2015		Duplicate 12/8/2015	
		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L	
		Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL
1,2,4-Trichlorobenzene		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
1,2-Dichlorobenzene		<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
1,2-Diphenylhydrazine		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
1,3-Dichlorobenzene	3	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
1,4-Dichlorobenzene		<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2,4,5-Trichlorophenol	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2,4,6-Trichlorophenol	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2,4-Dichlorophenol		<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2,4-Dimethylphenol		<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2,4-Dinitrophenol	5	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2,4-Dinitrotoluene	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
2,6-Dinitrotoluene	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
2-Chloronaphthalene	10	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
2-Chlorophenol	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2-Methylnaphthalene		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	40	100	<5.0	5.0
2-Methylphenol (o-cresol)	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
2-Nitroaniline	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<500	500	<5.0	5.0
2-Nitrophenol	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
3&4-Methylphenol (m&p-cresol)		<1.0	1.0	1.8	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	2.2	1.0
3,3'-Dichlorobenzidine	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<200	200	<5.0	5.0
3-Nitroaniline	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<500	500	<5.0	5.0
4,6-Dinitro-2-methylphenol	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<500	500	<1.0	1.0
4-Bromophenyl phenyl ether		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
4-Chloro-3-methylphenol	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
4-Chloroaniline	5	<3.5	3.5	<3.5	3.5	<3.5	3.5	<3.5	3.5	<3.5	3.5	<200	200	<3.5	3.5
4-Chlorophenyl phenyl ether		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
4-Nitroaniline	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<500	500	<5.0	5.0
4-Nitrophenol		<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
Acetophenone		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
Aniline	5	<3.5	3.5	<3.5	3.5	<3.5	3.5	<3.5	3.5	<3.5	3.5	<500	500	<3.5	3.5
Anthracene	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Benzidine	5	<4.5	4.5	<4.5	4.5	<4.5	4.5	<4.5	4.5	<4.5	4.5	<100	100	<4.5	4.5
Benzoic acid		<25	25	25	25	<25	25	<25	25	<25	25	<500	500	29	25
Benzyl butyl phthalate	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Bis(2-chloroethoxy)methane	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
Bis(2-chloroethyl)ether	1	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
Bis(2-chloroisopropyl)ether		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
Carbazole		<25	25	<25	25	<25	25	<25	25	<25	25	<500	500	<25	25
Dibenzofuran		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
Diethyl phthalate	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Dimethylphthalate	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Di-n-butylphthalate	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Di-n-octylphthalate	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Fluoranthene	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	2.2	5.0
Fluorene	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<20	20	<5.0	5.0
Hexachlorobutadiene	0.5	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	<0.40	0.40	<100	100	<0.40	0.40
Hexachlorocyclopentadiene	5	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
Isophorone	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Naphthalene	10	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	720	100	<5.0	5.0
Nitrobenzene	0.4	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<100	100	<0.10	0.10
N-Nitrosodimethylamine		<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
N-Nitrosodi-n-propylamine		<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<100	100	<5.0	5.0
N-Nitrosodiphenylamine	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	<5.0	5.0
Phenol	50	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
Pyrene	50	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<40	40	2.2	5.0
1,2,4,5-Tetrachlorobenzene		<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<100	100	<0.50	0.50
Acenaphthene	20	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<5.0	5.0	<20	20	<5.0	5.0
Acenaphthylene		<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<20	20	<0.10	0.10
Benz(a)anthracene	0.002	0.51	0.02	0.66	0.02	0.09	0.02	<0.02	0.02	0.16	0.02	<100	100	1.2	0.02
Benzo(a)pyrene		0.51	0.02	0.58	0.02	0.08	0.02	<0.02	0.02	0.16	0.02	<100	100	1.1	0.02
Benzo(b)fluoranthene	0.002	0.38	0.02	0.46	0.02	0.06	0.02	<0.02	0.02	0.12	0.02	<100	100	0.9	0.02
Benzo(ghi)perylene		0.28	0.02	0.31	0.02	0.04	0.02	<0.02	0.02	0.09	0.02	<100	100	0.56	0.02
Benzo(k)fluoranthene	0.002	0.41	0.02	0.48	0.02	0.06	0.02	<0.02	0.02	0.12	0.02	<100	100	0.91	0.02
Bis(2-ethylhexyl)phthalate	5	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	<100	100	<1.0	1.0
Chrysene	0.002	0.53	0.02	0.63	0.02	0.08	0.02	<0.02	0.02	0.15	0.02	<100	100	1.2	0.02
Dibenz(a,h)anthracene		0.08	0.02	0.11	0.02	<0.02	0.02	<0.02	0.02	0.02	0.02	<40	40	0.2	0.02
Hexachlorobenzene	0.04	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<0.02	0.02	<100	100	<0.02	0.02
Hexachloroethane	5	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<0.50	0.50	<100	100	<0.50	0.50
Indeno(1,2,3-cd)pyrene	0.002	0.26	0.02	0.3	0.02	0.04	0.02	<0.02	0.02	0.08	0.02	<100	100	0.57	0.02
Pentachloronitrobenzene		<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<0.10	0.10	<100	100	<0.10	0.10
Pentachlorophenol	1	<0.80	0.80	<0.80	0.80	<0.80	0.80	<0.80	0.80	<0.80	0.80	<100	100	<0.80	0.80
Phenanthrene	50	0.79	0.10	0.91	0.10	0.16	0.10	<0.10	0.10	0.25	0.10	<40	40	1.4	0.10
Pyridine	50	<10	10	<10	10	<10	10	<10	10	<10	10	<50	50	<10	10

Notes:

RL- Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 10
Groundwater Analytical Results
Pesticides/PCBs

	Compound	NYSDEC Groundwater Quality Standards µg/L	MW1 12/8/2015 µg/L		MW2 12/8/2015 µg/L		MW3 12/8/2015 µg/L		MW4 12/8/2015 µg/L		MW5 12/8/2015 µg/L		MW6 12/8/2015 µg/L		Duplicate 12/8/2015 µg/L			
			Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL
			PCBs	PCB-1016	0.09	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050
PCB-1221	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
PCB-1232	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
PCB-1242	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
PCB-1248	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
PCB-1254	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
PCB-1260	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
PCB-1262	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
PCB-1268	0.09	< 0.050		0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.077	0.077	< 0.050	0.050	< 0.050	0.050		
Pesticides	4,4-DDD	0.3	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.025	0.025	< 0.25	0.25	< 0.010	0.010		
	4,4-DDE	0.2	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.025	0.025	< 0.25	0.25	< 0.010	0.010		
	4,4-DDT	0.11	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.025	0.025	< 0.25	0.25	< 0.010	0.010		
	a-BHC	0.94	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.012	0.012	< 0.13	0.13	< 0.005	0.005		
	a-Chlordane		< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.050	0.050	< 0.50	0.50	< 0.010	0.010		
	Alachlor		< 0.075	0.075	< 0.075	0.075	< 0.075	0.075	< 0.075	0.075	< 0.38	0.38	< 3.8	3.8	< 0.075	0.075		
	Aldrin		< 0.002	0.002	< 0.002	0.002	< 0.002	0.002	< 0.002	0.002	< 0.008	0.008	< 0.075	0.075	< 0.002	0.002		
	b-BHC	0.04	< 0.010	0.010	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.025	0.025	< 0.13	0.13	< 0.005	0.005		
	Chlordane	0.05	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.050	0.050	< 0.25	0.25	< 2.5	2.5	< 0.050	0.050		
	d-BHC	0.04	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.025	0.025	< 0.25	0.25	< 0.005	0.005		
	Dieldrin	0.004	< 0.004	0.004	< 0.002	0.002	< 0.002	0.002	< 0.002	0.002	< 0.008	0.008	0.49	0.075	< 0.004	0.004		
	Endosulfan I		< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.050	0.050	< 0.25	0.25	< 0.010	0.010		
	Endosulfan II		< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.050	0.050	< 0.25	0.25	< 0.010	0.010		
	Endosulfan Sulfate		< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.050	0.050	< 0.25	0.25	< 0.010	0.010		
	Endrin		< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.025	0.025	< 0.25	0.25	< 0.010	0.010		
	Endrin aldehyde	5	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.050	0.050	< 0.25	0.25	< 0.010	0.010		
	Endrin ketone		< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.050	0.050	< 0.25	0.25	< 0.010	0.010		
	gamma-BHC	0.05	< 0.020	0.020	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.025	0.025	< 0.13	0.13	< 0.005	0.005		
	g-Chlordane		< 0.020	0.020	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.050	0.050	< 0.25	0.25	< 0.010	0.010		
	Heptachlor	0.04	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.025	0.025	< 0.25	0.25	< 0.010	0.010		
	Heptachlor epoxide	0.03	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.010	0.010	< 0.025	0.025	< 0.25	0.25	< 0.010	0.010		
Methoxychlor	35	< 0.10	0.10	< 0.10	0.10	< 0.10	0.10	< 0.10	0.10	< 0.50	0.50	< 0.25	0.25	< 0.10	0.10			
Toxaphene		< 0.25	0.25	< 0.25	0.25	< 0.20	0.20	< 0.25	0.25	< 1.3	1.3	< 13	13	< 0.25	0.25			

Notes:

RL- Reporting limit

ND - Non-detect

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

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Compound Total Metals	NYSDEC Groundwater Quality Standards mg/L	MW1		MW2		MW3		MW4		MW5		MW6		Duplicate	
		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015	
		Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL
Aluminum	NS	54.9	0.050	7.12	0.050	20.9	0.050	0.442	0.050	74.4	0.050	72.3	1.0	5.9	1.0
Antimony	0.003	< 0.002	0.002	< 0.002	0.002	0.004	0.002	0.008	0.002	0.005	0.002	0.01	0.002	< 0.002	0.002
Arsenic	0.025	0.025	0.020	< 0.020	0.020	0.005	0.020	< 0.020	0.020	0.062	0.020	0.113	0.020	< 0.020	0.020
Barium	1	0.697	0.050	0.134	0.050	0.418	0.050	0.025	0.050	0.981	0.050	2.92	0.050	0.131	0.050
Beryllium	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003
Cadmium	0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	0.011	0.020	0.009	0.020	< 0.005	0.005
Calcium	NS	400	0.050	161	0.050	415	0.050	216	0.050	337	0.050	597	0.050	160	0.050
Chromium	0.05	0.098	0.005	0.014	0.005	0.027	0.005	< 0.005	0.005	0.15	0.005	0.273	0.005	0.014	0.005
Cobalt	NS	0.028	0.025	0.008	0.025	0.01	0.025	< 0.025	0.025	0.045	0.025	0.068	0.025	0.007	0.025
Copper	0.2	0.213	0.025	0.015	0.025	0.054	0.025	< 0.025	0.025	0.409	0.025	1.07	0.025	0.011	0.025
Iron	0.5	86.4	0.05	11	0.05	24.6	0.05	0.22	0.05	344	0.05	442	0.05	11.1	0.05
Lead	0.025	1.34	0.010	0.041	0.010	0.398	0.010	0.016	0.010	1.9	0.010	3.3	0.010	0.034	0.010
Magnesium	35	137	0.05	61.7	0.05	434	1.0	606	1.0	459	1.0	172	0.05	61.9	0.05
Manganese	0.3	2.02	0.025	4.21	0.025	0.62	0.025	0.149	0.025	2.89	0.025	3.83	0.025	4.2	0.025
Mercury	0.0007	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002
Nickel	0.1	0.07	0.020	0.005	0.020	0.014	0.020	< 0.020	0.020	0.174	0.020	0.231	0.020	< 0.020	0.020
Potassium	NS	107	0.5	51.3	0.5	176	0.5	191	0.5	170	0.5	67	10	46.9	0.5
Selenium	0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	0.01	< 0.01	0.01
Silver	0.05	< 0.025	0.025	< 0.025	0.025	< 0.025	0.025	< 0.025	0.025	< 0.025	0.025	< 0.025	0.025	< 0.025	0.025
Sodium	2	982	10	343	10	4,720	10	5,470	10	4,040	10	745	10	318	10
Thallium	0.0005	< 0.0005	0.0005	0.0006	0.0005	< 0.0005	0.0005	< 0.0005	0.0005	< 0.0005	0.0005	< 0.0005	0.0005	< 0.0005	0.0005
Vanadium	NS	0.104	0.050	0.015	0.050	0.029	0.050	< 0.050	0.050	0.184	0.050	0.207	0.050	0.009	0.050
Zinc	2	0.545	0.050	0.037	0.050	0.257	0.050	0.019	0.050	1.21	0.050	3.78	0.050	0.032	0.050

Notes:

RL- Reporting limit

NS - No Standard

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 12
 Groundwater Analytical Results
 Dissolved Metals

Compound Dissolved Metals	NYSDEC Groundwater Quality Standards mg/L	MW1		MW2		MW3		MW4		MW5		MW6	
		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015	
		Results	RL	Results	RL	Results	RL	Results	RL	Results	RL	Results	RL
Aluminum	NS	0.029	0.011	0.014	0.011	0.045	0.011	0.015	0.011	0.021	0.011	0.02	0.011
Antimony	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003
Arsenic	0.025	0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003	< 0.003	0.003
Barium	1	0.24	0.011	0.098	0.011	0.242	0.011	0.026	0.011	0.311	0.011	0.598	0.011
Beryllium	0.003	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001
Cadmium	0.005	< 0.004	0.004	< 0.004	0.004	< 0.004	0.004	< 0.004	0.004	0.002	0.004	< 0.004	0.004
Calcium	NS	325	0.11	164	0.11	399	0.11	220	0.11	327	0.11	284	0.11
Chromium	0.05	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001	< 0.001	0.001
Cobalt	NS	0.002	0.005	0.004	0.005	< 0.005	0.005	< 0.005	0.005	0.002	0.005	0.003	0.005
Copper	0.2	0.002	0.005	0.001	0.005	0.001	0.005	0.004	0.005	< 0.005	0.005	< 0.005	0.005
Iron	0.5	0.03	0.01	0.02	0.01	< 0.05	0.05	< 0.01	0.01	82.9	0.01	0.2	0.01
Lead	0.025	0.005	0.002	0.001	0.002	0.005	0.002	< 0.002	0.002	0.003	0.002	< 0.002	0.002
Magnesium	35	105	0.11	61	0.11	445	0.11	639	0.11	471	0.11	115	0.11
Manganese	0.3	0.566	0.005	4.11	0.053	0.164	0.005	0.147	0.005	1.3	0.005	1.43	0.005
Mercury	0.0007	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002	< 0.0002	0.0002
Nickel	0.1	0.003	0.004	0.004	0.004	< 0.004	0.004	0.004	0.004	0.003	0.004	0.032	0.004
Potassium	NS	98.2	1.1	51.2	0.1	226	1.1	267	1.1	194	1.1	57.6	1.1
Selenium	0.01	< 0.004	0.004	< 0.004	0.004	< 0.004	0.004	< 0.004	0.004	< 0.004	0.004	< 0.004	0.004
Silver	0.05	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.005
Sodium	2	972	11	295	1.1	4,270	11	4,860	11	3,480	11	704	11
Thallium	0.0005	< 0.0005	0.0005	< 0.0005	0.0005	< 0.0005	0.0005	< 0.0005	0.0005	< 0.0005	0.0005	< 0.0005	0.0005
Vanadium	NS	< 0.011	0.011	< 0.011	0.011	0.003	0.011	0.002	0.011	< 0.011	0.011	0.002	0.011
Zinc	2	0.006	0.053	0.006	0.053	< 0.053	0.053	0.017	0.053	0.008	0.053	0.007	0.053

Notes:

RL- Reporting limit

NS - No Standard

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Former Bronx Freight Terminal
 101 Lincoln Avenue
 Bronx, New York

TABLE 13
 Parameters Detected Above Ambient Water Quality Standards

VOCs

COMPOUND	Range in Detections	Number of Occurrences	MW6	
			12/8/2015	
<i>Sample Results in (µg/L)</i>				
Benzene	9.2	1	9.2	
Ethylbenzene	280	1	280	
Isopropylbenzene	95	1	95	
Naphthalene	1,300	1	1,300	
n-Propylbenzene	20	1	20	
Toluene	12	1	12	

SVOCs

COMPOUND	Range in Detections	Number of Occurrences	MW1		MW2		MW3		MW5		MW6		Duplicate	
			12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015	
<i>Sample Results in (µg/L)</i>														
Naphthalene	720	1	-		-		-		-		720		-	
Benz(a)anthracene	0.09-1.2	5	0.51		0.66		0.09		0.16		-		1.2	
Benzo(b)fluoranthene	0.06-0.9	5	0.38		0.46		0.06		0.12		-		0.9	
Benzo(k)fluoranthene	0.06-0.91	5	0.41		0.48		0.06		0.12		-		0.91	
Chrysene	0.08-1.2	5	0.53		0.63		0.08		0.15		-		1.2	
Indeno(1,2,3-cd)pyrene	0.04-0.57	5	0.26		0.3		0.04		0.08		-		0.57	

TABLE 13
 Parameters Detected Above Ambient Water Quality Standards

Pesticides/PCBs

COMPOUND	Range in Detections	Number of Occurrences	MW6	
			12/8/2015	
<i>Sample Results in (µg/L)</i>				
Dieldrin	0.49	1	0.49	

Metals (Total)

COMPOUND	Range in Detections	Number of Occurrences	MW1		MW2		MW3		MW4		MW5		MW6		Duplicate	
			12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015	
<i>Sample Results in (mg/L)</i>																
Antimony	0.004-0.01	4	-		-		0.004		0.008		0.005		0.01		-	
Arsenic	0.062-0.113	2									0.062		0.113			
Barium	3	1											2.92			
Cadmium	0.009-0.011	2									0.011		0.009			
Chromium	0.098-0.273	2	0.098								0.15		0.273			
Copper	0.213-1.07	3	0.213								0.409		1.07			
Iron	11-442	6	86.4		11		24.6				344		442		11.1	
Lead	0.034-3.3	6	1.34		0.041		0.398				1.9		3.3		0.034	
Magnesium	61.7-606	7	137		61.7		434		606		459		172		61.9	
Manganese	0.62-4.21	6	2.02		4.21		0.62				2.89		3.83		4.2	
Nickel	0.174-0.231	2	-		-		-		-		0.174		0.231		-	
Sodium	318-5,740	7	982		343		4,720		5,740		4,040		745		318	
Thallium	0.0006	1	-		0.0006		-		-		-		-		-	

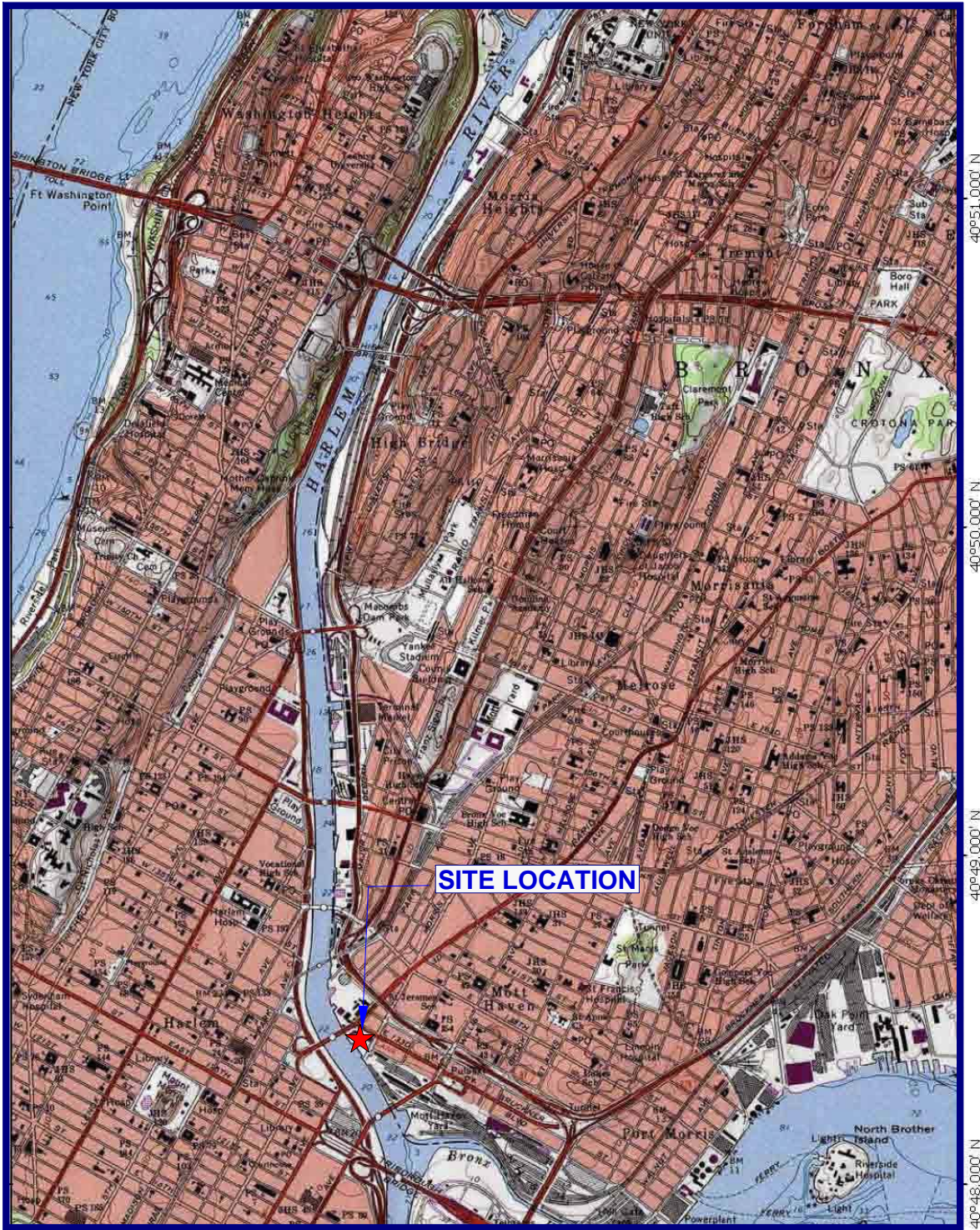
Metals (Dissolved)

COMPOUND	Range in Detections	Number of Occurrences	MW1		MW2		MW3		MW4		MW5		MW6		Duplicate	
			12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015		12/8/2015	
<i>Sample Results in (mg/L)</i>																
Iron	83	1	-		-		-		-		82.9		-		-	
Magnesium	61-639	7	105		61		445		639		471		115		67.2	
Manganese	0.566-4.52	6	0.566		4.11		0.62				1.3		1.43		4.52	
Sodium	326-4,860	7	972		295		4,270		4,860		3,480		704		326	

Table 16
Emergency Contact List

General Emergencies		911
NYC Police		911
NYC Fire Department		911
Lincoln Medical Center		(718) 579-5016
NYSDEC Spills Hotline		1-800-457-7362
NYSDEC Project Manager		(518) 402 - 9656
NYC Department of Health		(212) 676-2400
National Response Center		1-800-424-8802
Poison Control		1-800-222-1222
EBC Project Manager	Chawinie Reilly	(631) 504-6000
EBC BCP Program Manager	Charles Sosik	(631) 504-6000
EBC Site Safety Officer	Kevin Waters	(631) 504-6000
Remedial Engineer	Ariel Czemerinski	(516) 987-1662
Construction Manager	Elliot Lazarus	(516) 808-9085

FIGURES



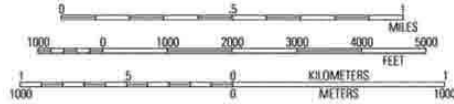
40°51.000' N
40°50.000' N
40°49.000' N
40°48.000' N

73°57.000' W

73°56.000' W

73°55.000' W

WGS84 73°54.000' W



USGS Central Park Quadrangle 1995, Contour Interval = 10 feet



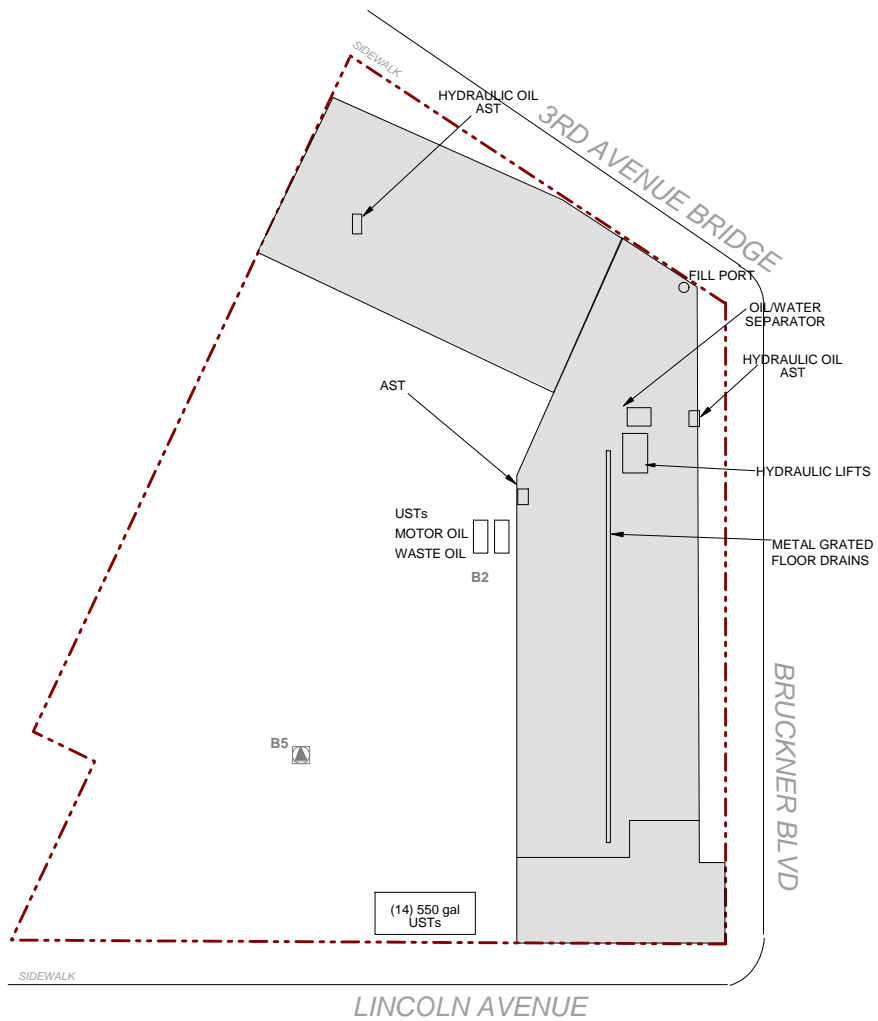
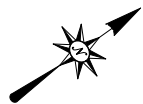
ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631.924.2870

Former Bronx Terminal
101 Lincoln Avenue, Bronx NY

FIGURE 1

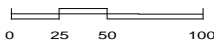
SITE LOCATION MAP




KEY:

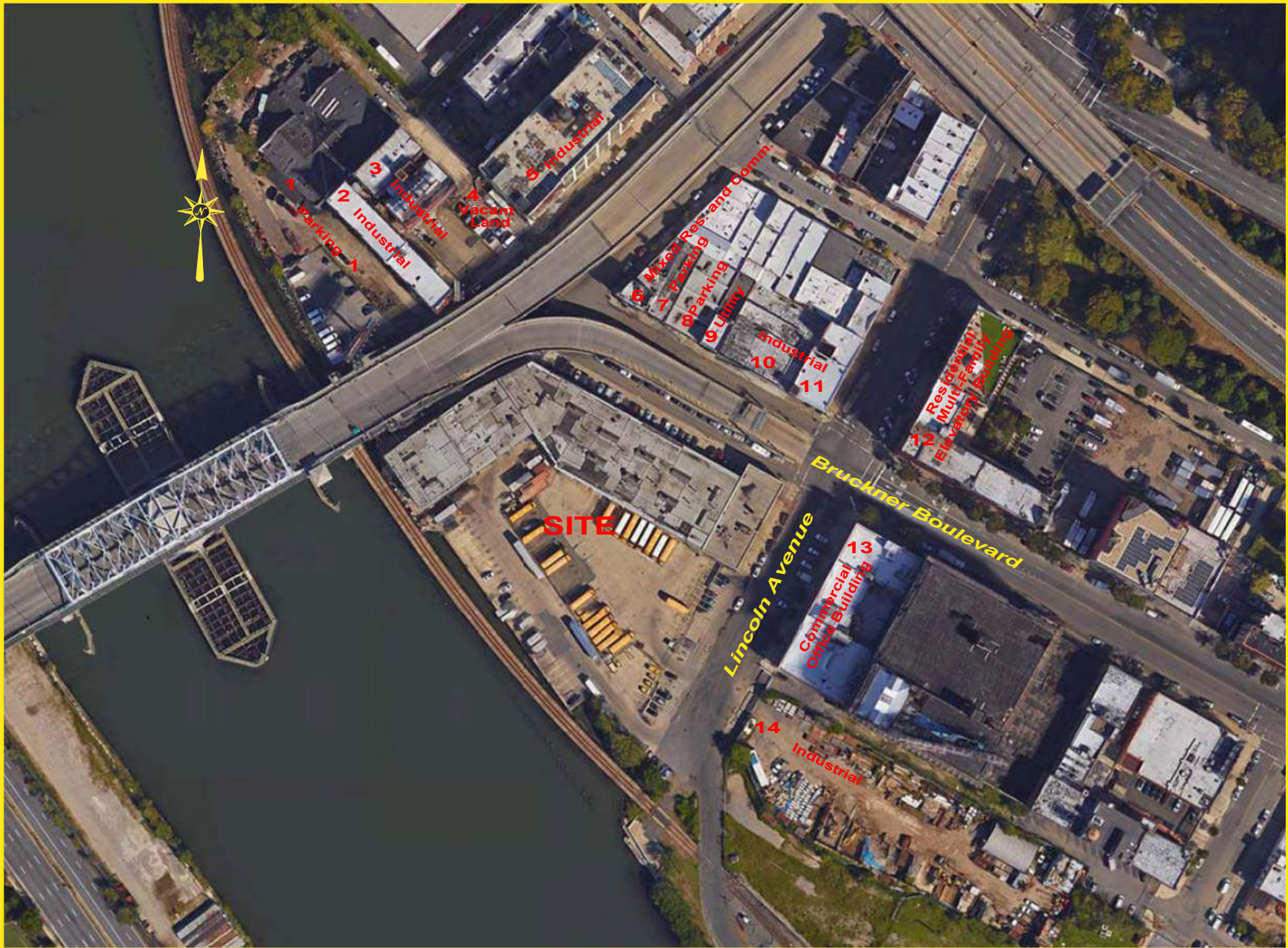
--- Site Boundary

SCALE:



Scale: 1 inch = 100 feet

	Figure No.	Site Name: FORMER BRONX FREIGHT TERMINAL
	2	Site Address: 101 LINCOLN AVENUE, BRONX, NY
		Drawing Title: SITE PLAN



EBC
 ENVIRONMENTAL BUSINESS CONSULTANTS

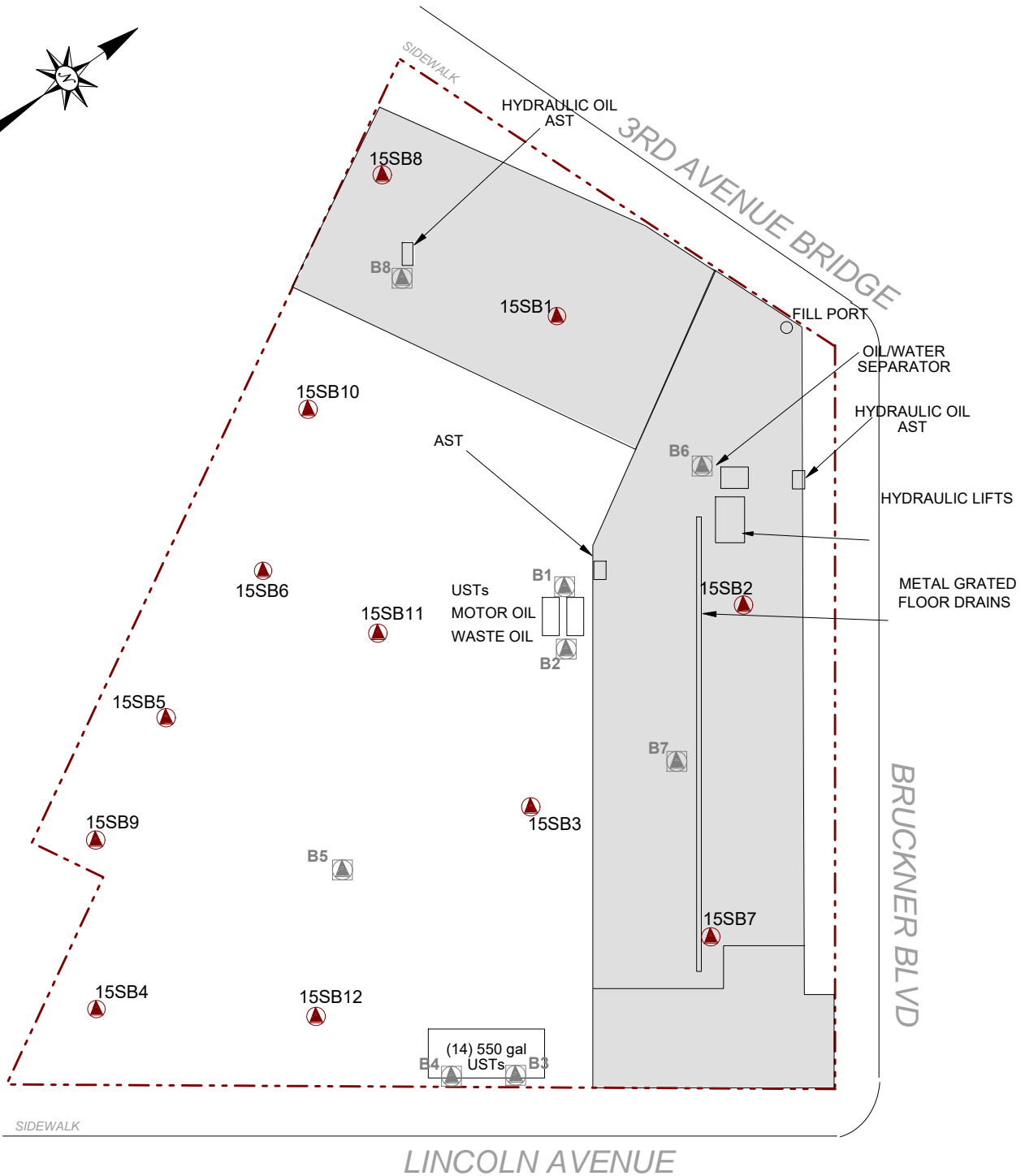
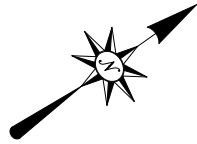
Phone 631.504.6000
 Fax 631.924.2870

Figure No.
3

Site Name: **FORMER BRONX FREIGHT TERMINAL**

Site Address: **101 LINCOLN AVENUE, BRONX, NY**

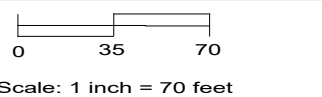
Drawing Title: **ADJACENT PROPERTIES**



KEY:

- Property Line
- Bx** RI Soil Boring Location
- 15SBx** Soil Boring Location

SCALE:



Phone 631.504.6000
Fax 631.924.2870

ENVIRONMENTAL BUSINESS CONSULTANTS

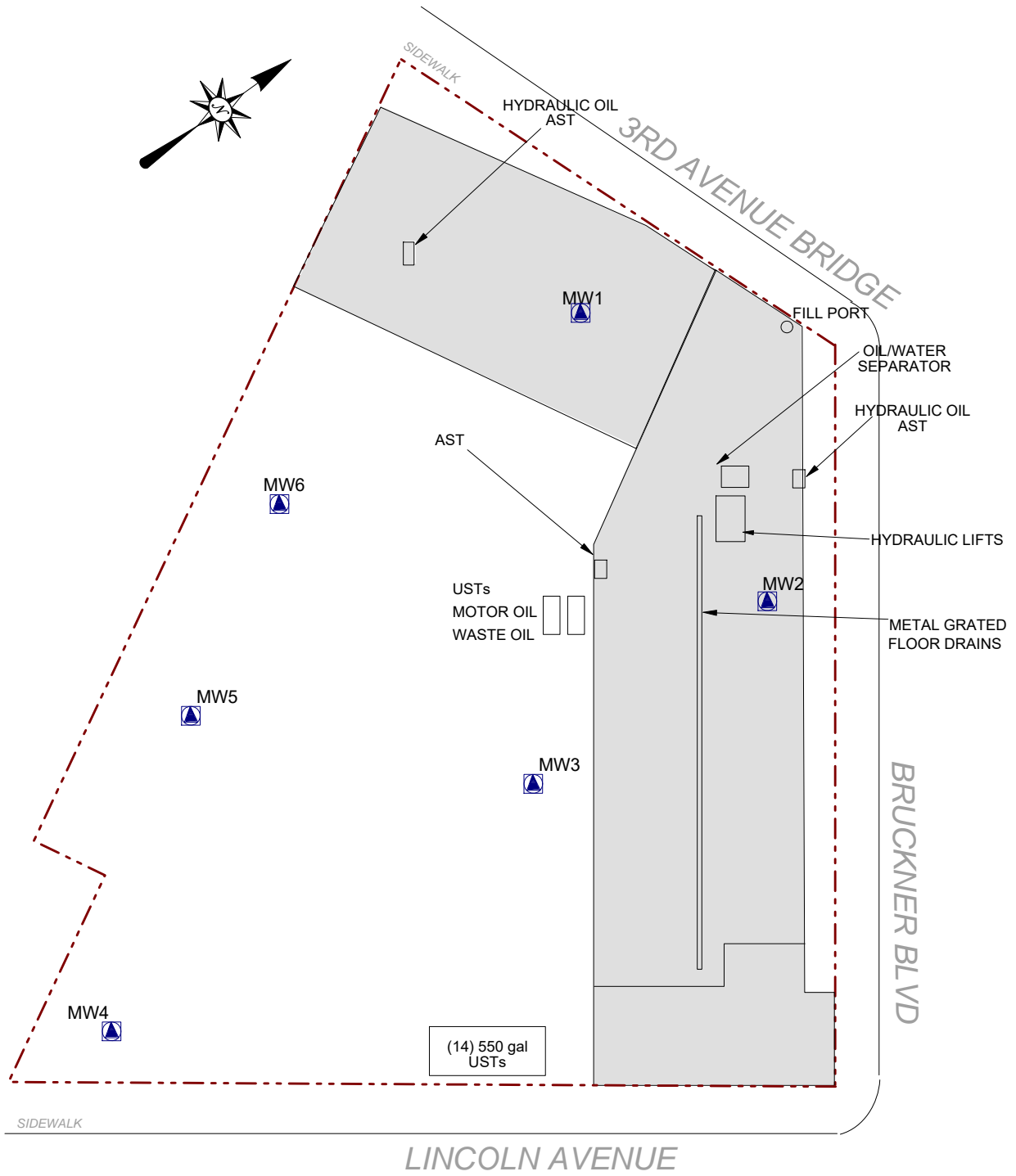
Figure No.

4

Site Name: **FORMER BRONX FREIGHT TERMINAL**

Site Address: **101 LINCOLN AVENUE, BRONX, NY**

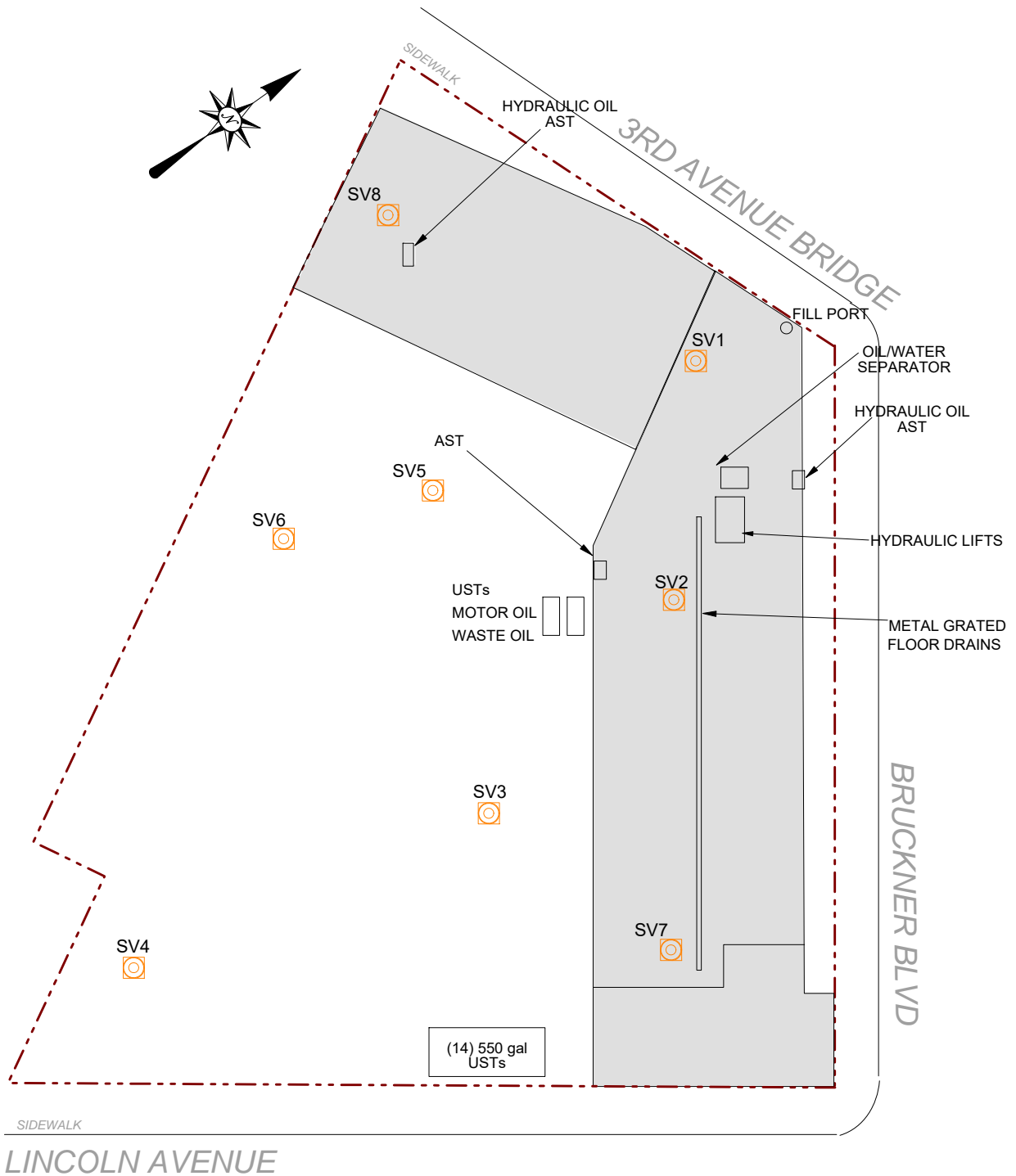
Drawing Title: **SOIL BORING LOCATIONS**



KEY:
 - - - Property Line
 MWx Groundwater Sampling Location

SCALE:

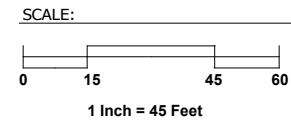
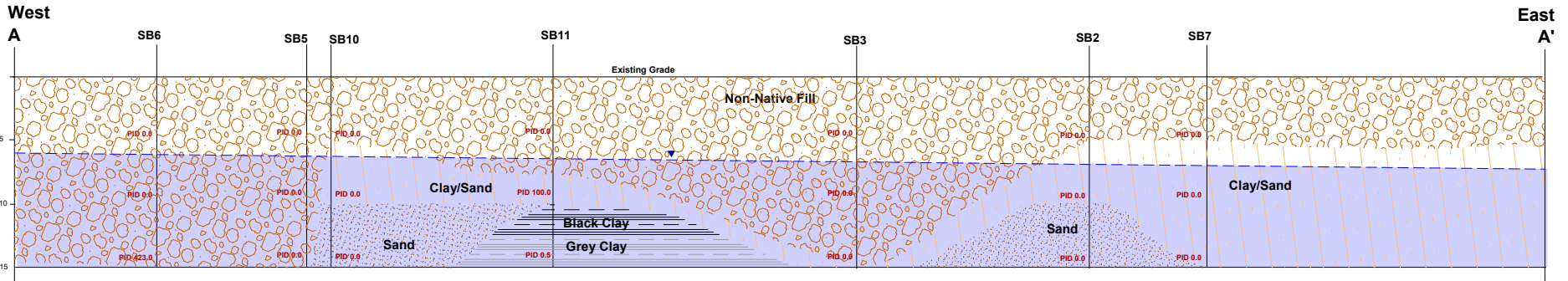
 Scale: 1 inch = 70 feet



KEY:
 - - - Property Line
 SVx Soil Gas Sampling Location

SCALE:

 Scale: 1 inch = 70 feet



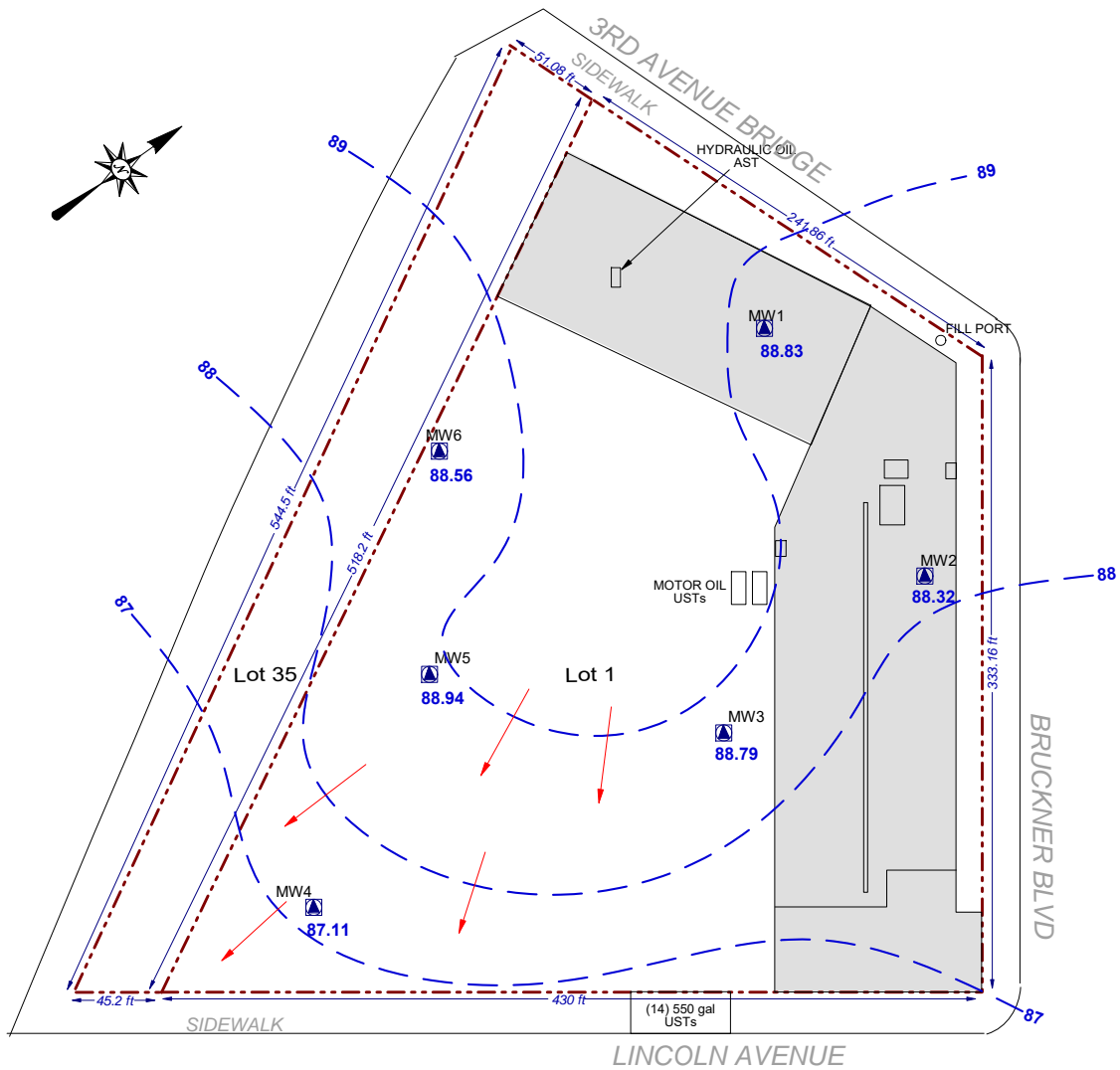
Vertical Exaggeration 4X

EBC
 ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
 Fax 631.924.2870

Figure No. 7

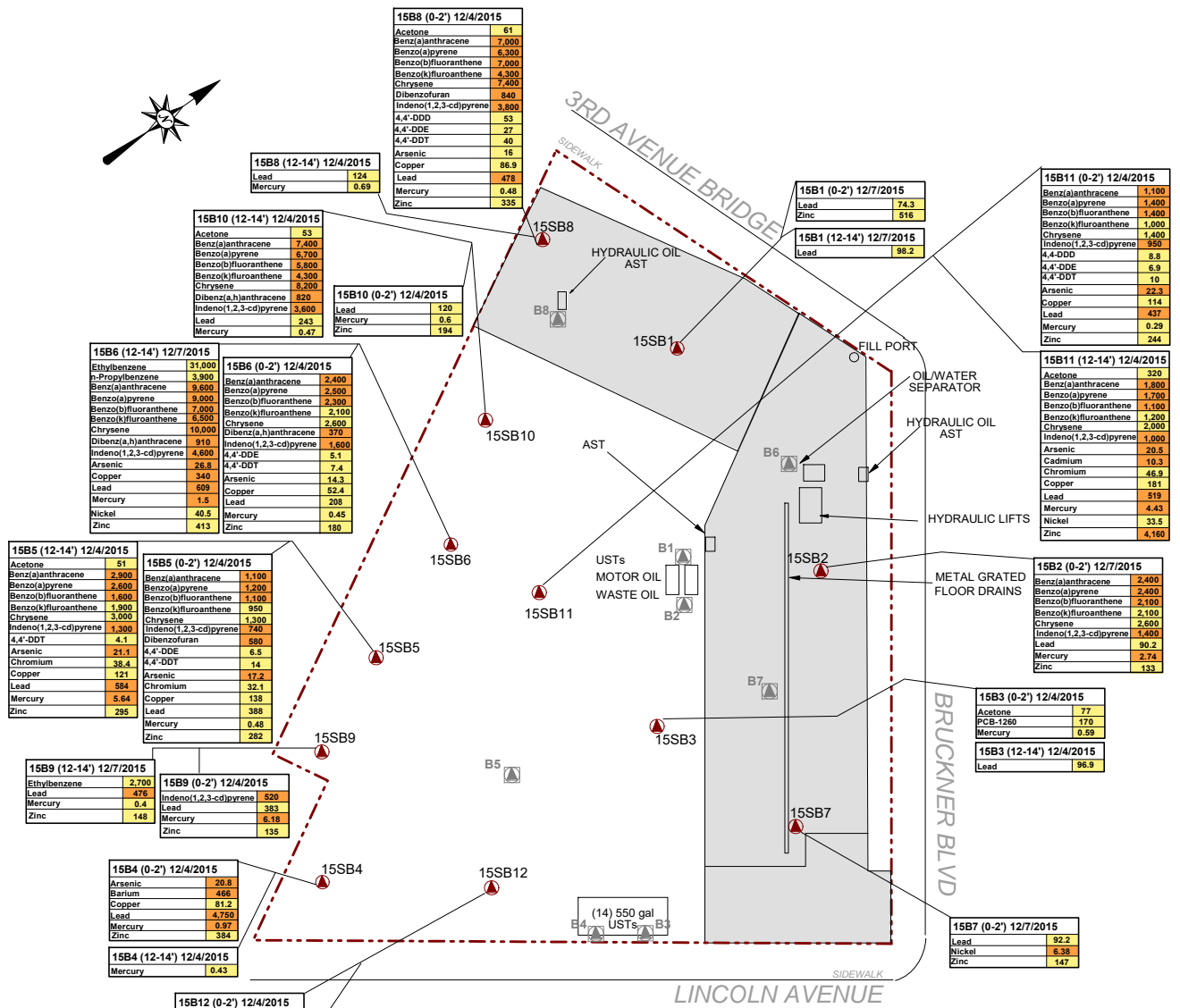
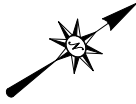
Site Name:	FORMER BRONX FREIGHT TERMINAL
Site Address:	101 LINCOLN AVENUE, BRONX, NY
Drawing Title:	GEOLOGIC CROSS SECTION



KEY:
 - - - Property Line
 MWx Groundwater Sampling Location
 → Groundwater Flow Direction

SCALE:
 0 25 50 100
 Scale: 1 inch = 100 feet

<p>Phone 631.504.6000 Fax 631.924.2870</p>	<p>Figure No. 8</p>	<p>Site Name: FORMER BRONX FREIGHT TERMINAL</p>
		<p>Site Address: 101 LINCOLN AVENUE, BRONX, NY</p>
		<p>Drawing Title: GROUNDWATER FLOW MAP</p>



15SB8 (0-2') 12/4/2015	
Acetone	61
Benz(a)anthracene	7,000
Benz(o)pyrene	6,300
Benz(o)fluoranthene	7,000
Benz(k)fluoranthene	4,300
Chrysene	7,400
Dibenzofuran	840
Indeno(1,2,3-cd)pyrene	3,600
4,4'-DDD	53
4,4'-DDE	27
4,4'-DDT	40
Arsenic	16
Copper	86.9
Lead	478
Mercury	0.48
Zinc	335

15SB10 (12-14') 12/4/2015	
Acetone	53
Benz(a)anthracene	7,400
Benz(o)pyrene	6,700
Benz(o)fluoranthene	5,800
Benz(k)fluoranthene	4,300
Chrysene	8,200
Dibenz(a,h)anthracene	820
Indeno(1,2,3-cd)pyrene	3,600
Lead	243
Mercury	0.47
Zinc	194

15SB10 (0-2') 12/4/2015	
Lead	120
Mercury	0.6
Zinc	194

15SB6 (12-14') 12/7/2015	
Ethylbenzene	37,000
p-Propylbenzene	3,900
Benz(a)anthracene	9,600
Benz(o)pyrene	9,000
Benz(o)fluoranthene	7,000
Benz(k)fluoranthene	6,500
Chrysene	10,000
Dibenz(a,h)anthracene	910
Indeno(1,2,3-cd)pyrene	4,600
Arsenic	26.8
Copper	340
Lead	609
Mercury	1.5
Nickel	40.5
Zinc	413

15SB6 (0-2') 12/4/2015	
Benz(a)anthracene	2,400
Benz(o)pyrene	2,500
Benz(o)fluoranthene	2,300
Benz(k)fluoranthene	2,100
Chrysene	2,600
Dibenz(a,h)anthracene	370
Indeno(1,2,3-cd)pyrene	1,600
4,4'-DDE	5.1
4,4'-DDT	7.4
Arsenic	14.3
Copper	52.4
Lead	208
Mercury	0.45
Zinc	180

15SB5 (12-14') 12/4/2015	
Acetone	51
Benz(a)anthracene	2,900
Benz(o)pyrene	2,600
Benz(o)fluoranthene	1,800
Benz(k)fluoranthene	1,900
Chrysene	3,000
Indeno(1,2,3-cd)pyrene	1,300
4,4'-DDT	4.1
Arsenic	21.1
Chromium	38.4
Copper	121
Lead	584
Mercury	5.64
Zinc	295

15SB5 (0-2') 12/4/2015	
Benz(a)anthracene	1,100
Benz(o)pyrene	1,200
Benz(o)fluoranthene	1,100
Benz(k)fluoranthene	950
Chrysene	1,300
Indeno(1,2,3-cd)pyrene	740
Dibenzofuran	580
4,4'-DDE	6.5
4,4'-DDT	14
Arsenic	17.2
Chromium	32.1
Copper	138
Lead	388
Mercury	0.48
Zinc	282

15SB9 (12-14') 12/7/2015	
Ethylbenzene	2,700
Lead	476
Mercury	0.4
Zinc	148

15SB9 (0-2') 12/4/2015	
Indeno(1,2,3-cd)pyrene	520
Lead	383
Mercury	0.18
Zinc	135

15SB4 (0-2') 12/4/2015	
Arsenic	20.8
Barium	466
Copper	81.2
Lead	4,750
Mercury	0.97
Zinc	384

15SB4 (12-14') 12/4/2015	
Mercury	0.43

15SB12 (0-2') 12/4/2015	
4,4'-DDT	10
Lead	73.9
Mercury	0.32

15SB12 (12-14') 12/4/2015	
4,4'-DDD	10
4,4'-DDT	48
Chromium	47.3

KEY:

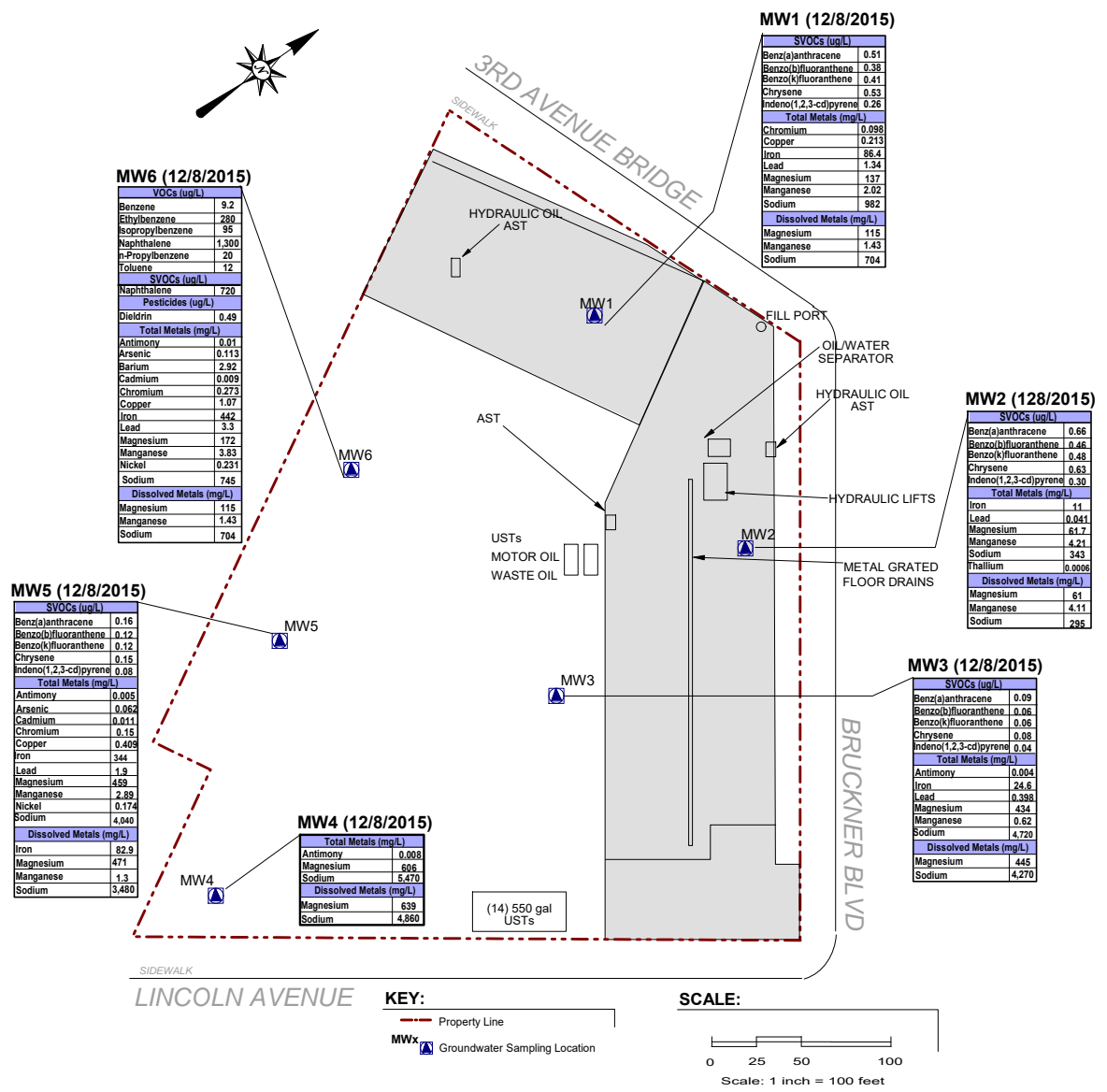
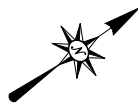
- Property Line
- RI Soil Boring Location
- Soil Boring Location
- Detections Above Unrestricted Use SCOs
- Detections Above Restricted Residential Use SCOs

VOCs, SVOCs, PCBs, and Pesticides ug/Kg
Metals mg/Kg

SCALE:

Scale: 1 inch = 100 feet

<p>BCB ENVIRONMENTAL BUSINESS CONSULTANTS</p>	Phone 631.504.6000 Fax 631.924.2870	Figure No. 9	Site Name: FORMER BRONX FREIGHT TERMINAL Site Address: 101 LINCOLN AVENUE, BRONX, NY Drawing Title: SOIL EXCEEDENCES
--	--	---------------------	---



SIDEWALK

LINCOLN AVENUE

KEY:
 --- Property Line
 MWx Groundwater Sampling Location

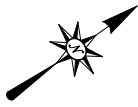
SCALE:
 0 25 50 100
 Scale: 1 inch = 100 feet

BC
 ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
 Fax 631.924.2870

Figure No.
10

Site Name: **FORMER BRONX FREIGHT TERMINAL**
 Site Address: **101 LINCOLN AVENUE, BRONX, NY**
 Drawing Title: **GROUNDWATER EXCEEDENCES**



SV8 (12/8/2015)

1,2,4-Trimethylbenzene	9.63
1,3,5-Trimethylbenzene	2.29
4-Ethyltoluene	5.21
4-Methyl-2-pentanone	1.3
Acetone	77.6
Benzene	1.5
Carbon Disulfide	2.34
Dichlorodifluoromethane	2.31
Ethanol	7.97
Ethylbenzene	1.45
Heptane	2.07
Hexane	1.94
Xylene (m&p)	5.03
Methyl Ethyl Ketone	3.21
Xylene (o)	2.38
Propylene	1.01
Tetrachloroethene	23.8
Toluene	8.4

SV6 (12/8/2015)

1,2,4-Trimethylbenzene	29.6
1,3,5-Trimethylbenzene	6.49
4-Ethyltoluene	13.4
4-Isopropyltoluene	1.34
4-Methyl-2-pentanone	2.87
Acetone	605
Benzene	2.45
Carbon Disulfide	10.7
Chloromethane	5.32
Cyclohexane	1.98
Dichlorodifluoromethane	2.2
Ethanol	17.9
Ethylbenzene	1.96
Heptane	2.43
Hexane	2.68
Xylene (m&p)	7.64
Methyl Ethyl Ketone	13.8
n-Butylbenzene	1.94
Xylene (o)	4.6
Tetrachloroethene	3.29
Toluene	10.1

SV4 (12/8/2015)

1,1,1-Trichloroethane	6.71
1,2,4-Trimethylbenzene	34.1
1,3,5-Trimethylbenzene	6.68
4-Ethyltoluene	14.6
4-Isopropyltoluene	1.79
4-Methyl-2-pentanone	1.98
Acetone	570
Carbon Disulfide	2.73
Carbon Tetrachloride	0.29
Chloroform	1.93
Cyclohexane	42.7
Dichlorodifluoromethane	2.22
Ethanol	16.5
Ethylbenzene	2.1
Heptane	3.99
Hexane	54.6
Xylene (m&p)	8.16
Methyl Ethyl Ketone	13.6
Xylene (o)	4.11
Propylene	3.18
Tetrachloroethene	30.3
Toluene	11.6
Trichloroethene	1.39

SV1 (12/8/2015)

1,1,1-Trichloroethane	1.32
1,2,4-Trimethylbenzene	19.2
1,3,5-Trimethylbenzene	4.61
4-Ethyltoluene	11.1
4-Isopropyltoluene	1.15
4-Methyl-2-pentanone	2.22
Acetone	91.2
Benzene	1.48
Carbon Disulfide	3.42
Chloroform	3.64
Dichlorodifluoromethane	2.61
Ethanol	7.14
Ethylbenzene	3.58
Heptane	1.15
Xylene (m&p)	14.5
Methyl Ethyl Ketone	13.8
Xylene (o)	5.73
Tetrachloroethene	161
Toluene	16.4
Trichloroethene	0.53

SV2 (12/8/2015)

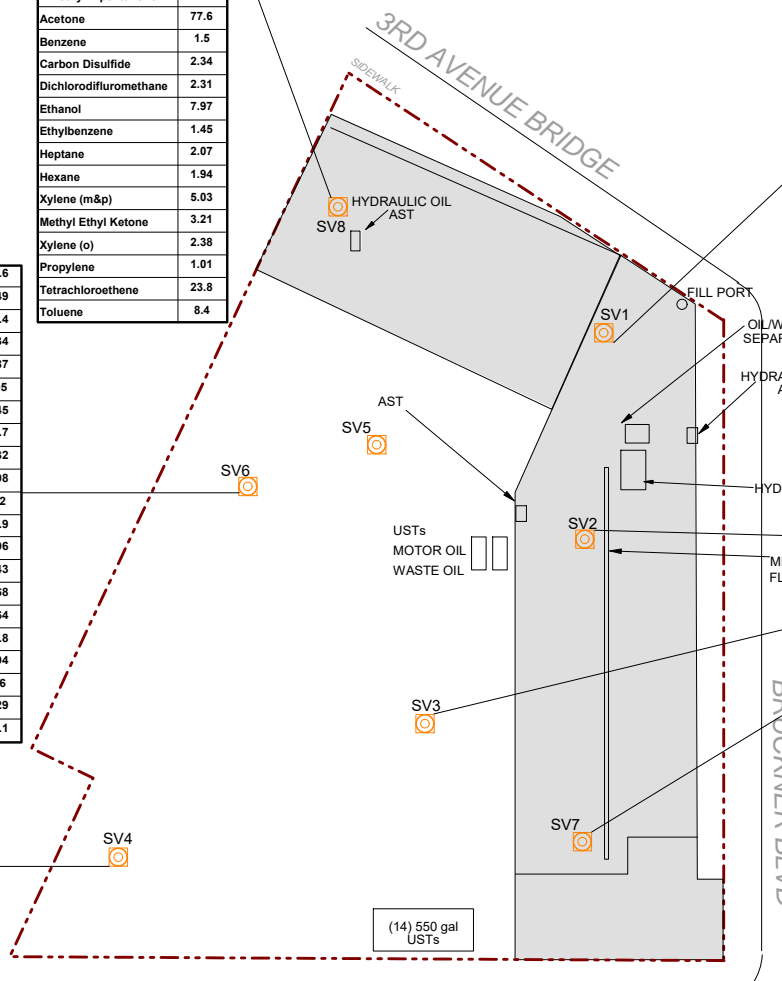
1,2,4-Trimethylbenzene	11.3
1,3,5-Trimethylbenzene	2.66
4-Ethyltoluene	6.24
Acetone	76.7
Benzene	177
Carbon Disulfide	13.9
Cyclohexane	77.1
Dichlorodifluoromethane	2.2
Ethanol	10.1
Ethylbenzene	1.51
Heptane	10.6
Hexane	25.5
Xylene (m&p)	5.81
Methyl Ethyl Ketone	8.84
Xylene (o)	2.6
Propylene	246
Tetrachloroethene	1.78
Toluene	7.83
Trichloroethene	1.06

SV3 (12/8/2015)

1,2,4-Trimethylbenzene	30.1
1,3,5-Trimethylbenzene	6.44
4-Ethyltoluene	14.3
4-Isopropyltoluene	1.48
4-Methyl-2-pentanone	1.65
Acetone	197
Benzene	2.13
Carbon Disulfide	15.8
Cyclohexane	4.99
Dichlorodifluoromethane	2.24
Ethanol	11.1
Ethylbenzene	2.04
Heptane	2.84
Hexane	12.8
Isopropylalcohol	7.39
Xylene (m&p)	8.46
Methyl Ethyl Ketone	7.81
Xylene (o)	4.43
Propylene	6.04
Tetrachloroethene	1.84
Toluene	8.96

SV7 (12/8/2015)

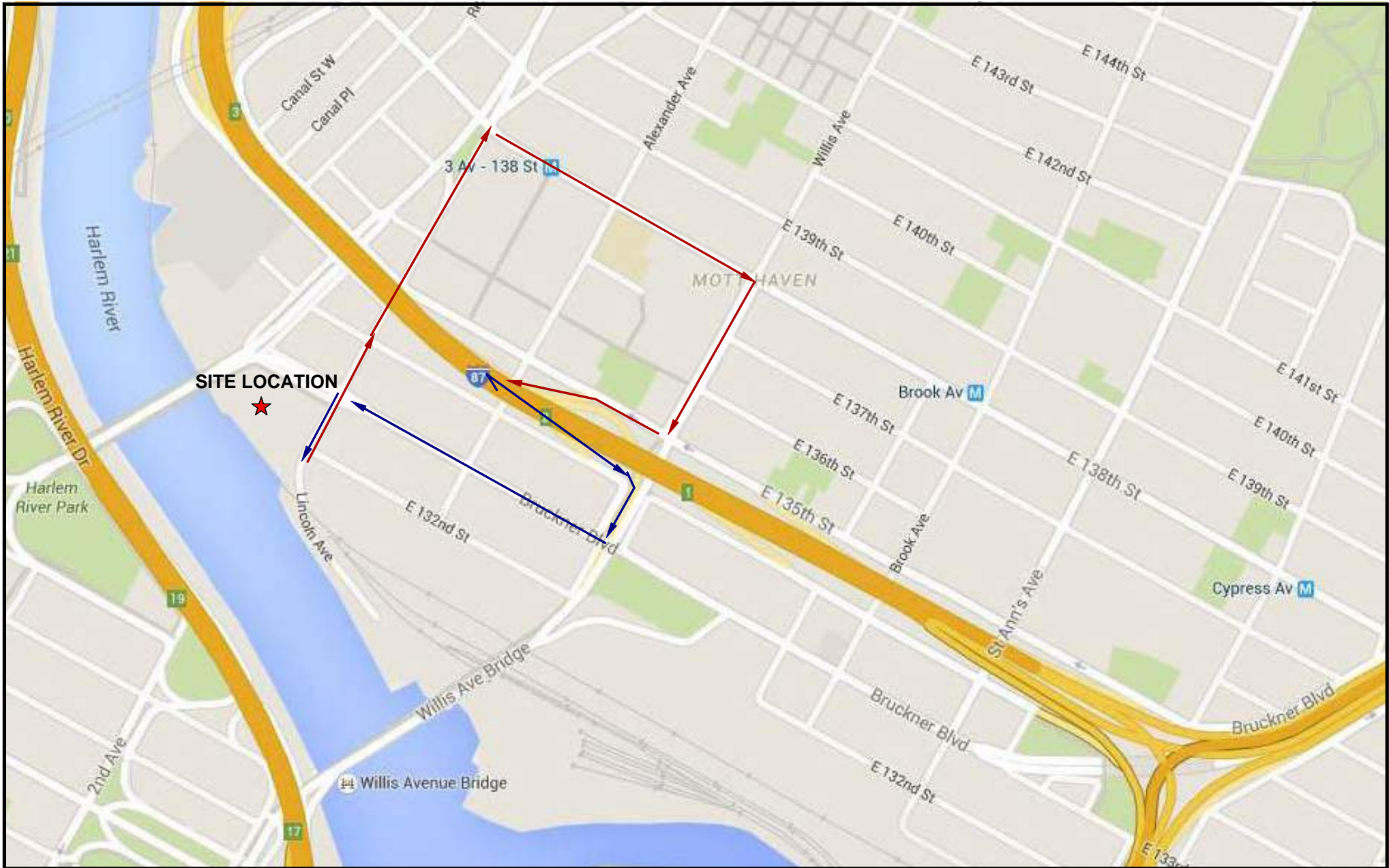
1,2,4-Trimethylbenzene	3.8
1,3,5-Trimethylbenzene	1.32
4-Ethyltoluene	2.91
Acetone	31.1
Benzene	4.25
Carbon Disulfide	12.3
Cyclohexane	8.88
Dichlorodifluoromethane	2.26
Ethanol	7.31
Ethylbenzene	2.66
Heptane	87.2
Hexane	188
Xylene (m&p)	8.81
Methylene Chloride	1.44
Xylene (o)	2.75
Tetrachloroethene	0.94
Toluene	18.4





KEY:
 - - - Property Line
 SVx Soil Gas Sampling Location

SCALE:
 0 25 50 100
 Scale: 1 inch = 100 feet

<p>Phone 631.504.6000 Fax 631.924.2870</p>	<p>Figure No. 11</p>	<p>Site Name: FORMER BRONX FREIGHT TERMINAL</p>
		<p>Site Address: 101 LINCOLN AVENUE, BRONX, NY</p>
		<p>Drawing Title: SOIL GAS DETECTIONS</p>



Key

-  Truck Route to the Site
-  Truck Route from the Site

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

Phone 631.504.6000
 Fax 631.924.2780

FORMER BRONX FREIGHT TERMINAL
 101 LINCOLN AVENUE, BRONX, NY

FIGURE 12 TRUCK ROUTES



KEY:
--- Site Boundary

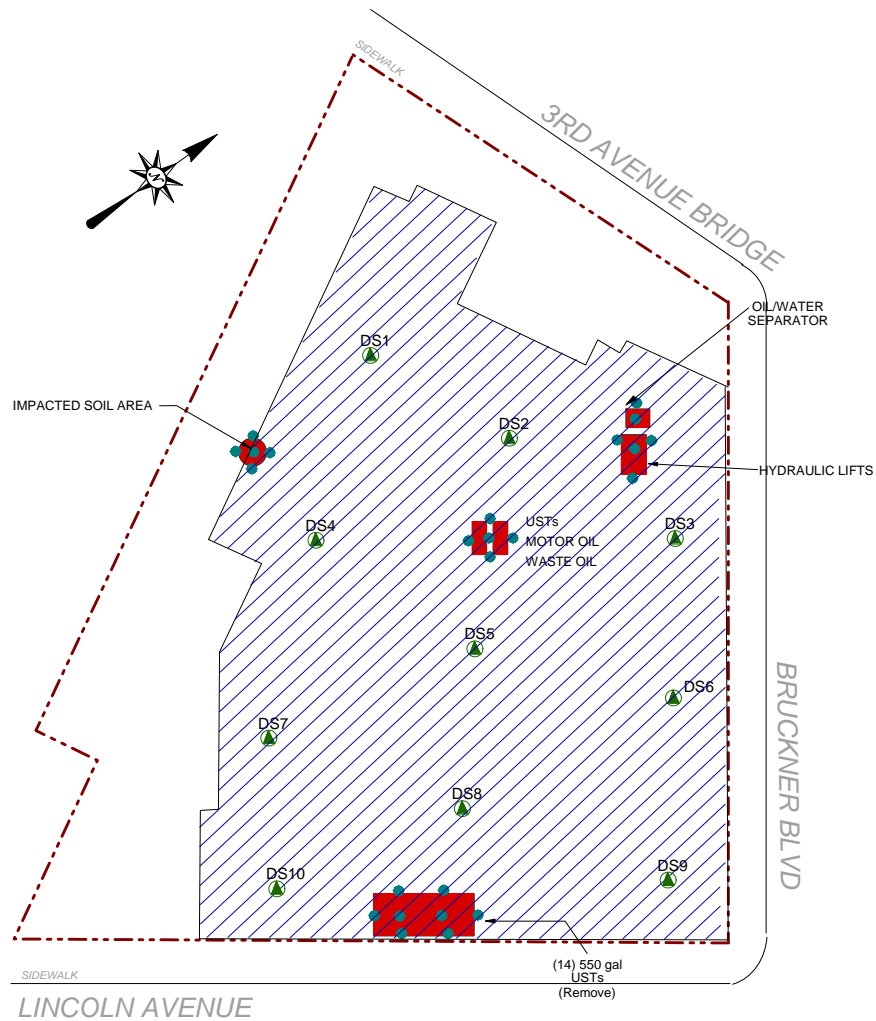
SCALE:
0 25 50 100
Scale: 1 inch = 100 feet

BBC
ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631.924.2870

Figure No.
13

Site Name: **FORMER BRONX FREIGHT TERMINAL**
Site Address: **101 LINCOLN AVENUE, BRONX, NY**
Drawing Title: **EXCAVATION PLAN**

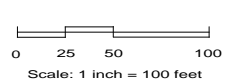


LINCOLN AVENUE

KEY:

- - - Site Boundary
- DSx Documentation Sample Locations
- Confirmation Sample

SCALE:



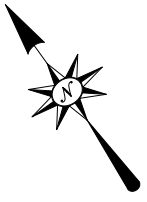
BBC

ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631.924.2870

Figure No.
14

Site Name: **FORMER BRONX FREIGHT TERMINAL**
Site Address: **101 LINCOLN AVENUE, BRONX, NY**
Drawing Title: **ENDPOINT SAMPLING PLAN**



BRUCKNER BLVD

3RD AVENUE BRIDGE

LINCOLN AVENUE



CAP WITH 2ft CLEAN SOIL

SIDEWALK

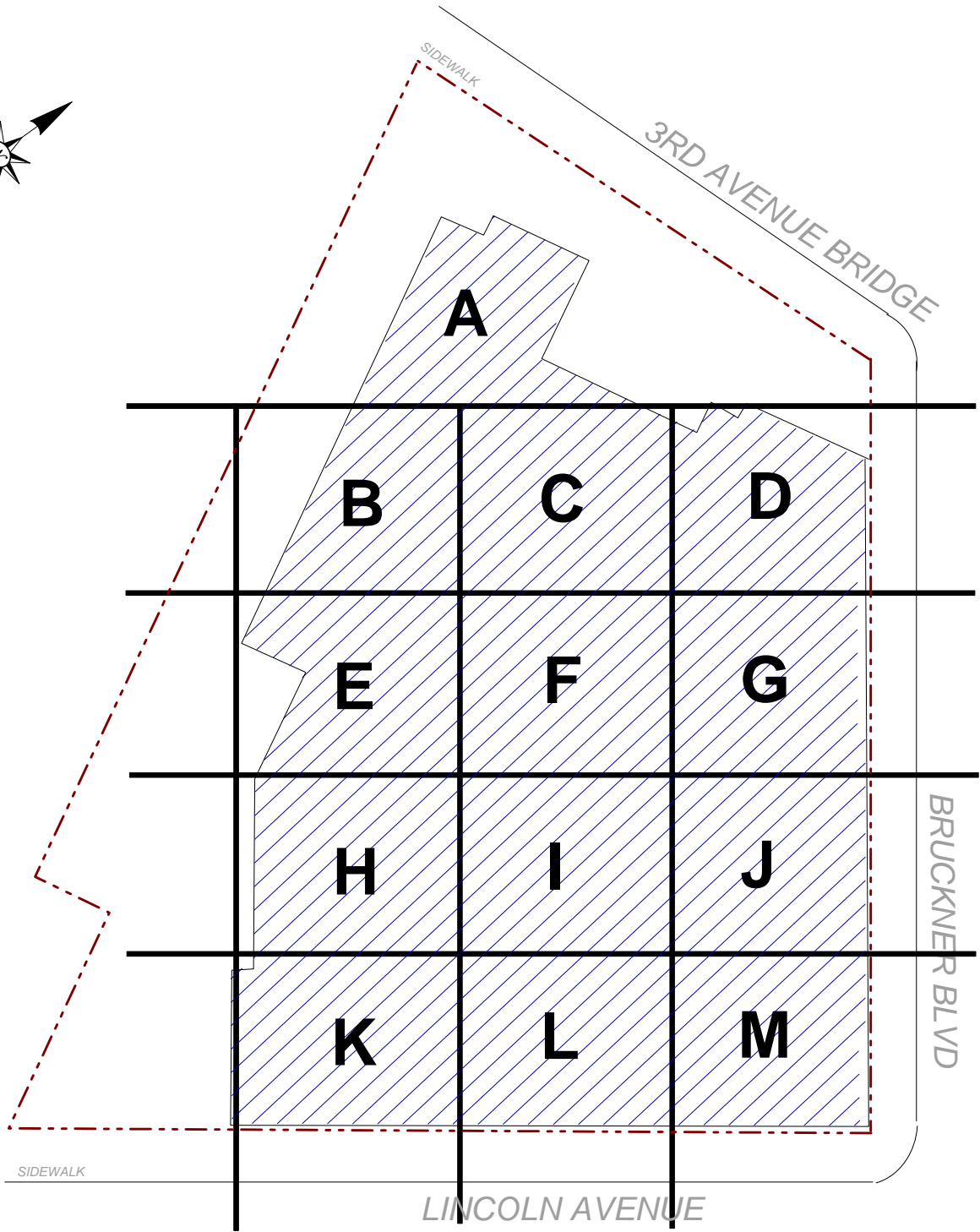
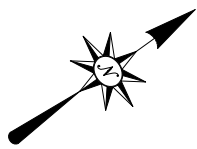
KEY:

--- Site Boundary

SCALE:



Scale: 1 inch = 70 feet



KEY:

--- Site Boundary

SCALE:



Scale: 1 inch = 70 feet

ATTACHMENT A
Metes and Bounds Description of Property

SCHEDULE A

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH AND COUNTY OF BRONX, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHWESTERLY CORNER OF BRUCKNER (FORMERLY SOUTHERN) BOULEVARD AND LINCOLN AVENUE AND RUNNING THENCE SOUTHERLY ALONG THE WESTERLY LINE OF LINCOLN AVENUE 240 FEET TO OLD HIGH WATER MARK ON THE EASTERLY SHORE OF HARLEM RIVER;

THENCE NORTHWESTERLY ALONG THE LINE OF OLD HIGH WATER MARK ABOUT 411.73 FEET TO THE EASTERLY LINE OF THE PROPERTY ACQUIRED BY THE MAYOR, ALDERMEN AND COMMONALTY OF THE CITY OF NEW YORK IN THE PROCEEDING COMMONLY KNOWN AS THE THIRD AVENUE BRIDGE PROCEEDING;

THENCE NORTHEASTERLY AND ALONG SAID EASTERLY LINE 54.893 FEET TO THE SOUTHERLY LINE OF BRUCKNER (FORMERLY SOUTHERN) BOULEVARD;

THENCE EASTERLY ALONG THE SOUTHERLY LINE OF BRUCKNER (FORMERLY SOUTHERN) BOULEVARD ABOUT 333.16 FEET TO THE POINT OR PLACE OF BEGINNING.

AND ALSO ALL THE RIGHT, TITLE AND INTEREST IN AND TO THE LANDS, RIGHTS, AND PRIVILEGES GRANTED TO LEWIS MORRIS BY LETTERS PATENT UNDER THE GREAT SEAL OF THE STATE OF NEW YORK DATED AUGUST 14, 1851, AND RECORDED IN THE BOOK OF PATENTS NO. 31, PAGE 173 AND CONVEYED BY THE EXECUTOR OF THE SAID LEWIS MORRIS TO CLARENCE S. BROWN BY DEED BEARING DATE OF NOVEMBER 16, 1865, AND RECORDED IN THE OFFICE OF THE REGISTER OF WESTCHESTER COUNTY IN LIBER 619 OF DEEDS AT PAGE 435, AND CONVEYED BY SAID CLARENCE S. BROWN TO BRYAN LAWRENCE BY DEED BEARING DATE MAY 12, 1868, AND RECORDED IN THE OFFICE OF THE REGISTER OF WESTCHESTER COUNTY IN LIBER 673 OF DEEDS AT PAGE 467 ON MAY 14, 1868, OF, IN AND TO ALL THAT PART OF THE SAME BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE LINE OF OLD HIGH WATER MARK ON THE WESTERLY LINE OF LINCOLN AVENUE AT A POINT DISTANT 240 FEET SOUTHERLY FROM THE SOUTHWESTERLY CORNER OF BRUCKNER (FORMERLY SOUTHERN) BOULEVARD AND LINCOLN AVENUE;

RUNNING THENCE SOUTHERLY ALONG THE WESTERLY LINE OF LINCOLN AVENUE 190 FEET, MORE OR LESS, TO THE OLD BOUNDARY LINE BETWEEN THE COUNTIES OF NEW YORK AND WESTCHESTER;

THENCE NORTHWESTERLY ALONG THE OLD BOUNDARY LINE BETWEEN THE COUNTIES OF NEW YORK AND WESTCHESTER ABOUT 518.205 FEET TO THE EASTERLY LINE OF THE PROPERTY ACQUIRED BY THE MAYOR, ALDERMEN, COMMONALTY OF THE CITY OF NEW YORK IN THE PROCEEDING COMMONLY KNOWN AS THE THIRD AVENUE BRIDGE PROCEEDING;

THENCE NORTHEASTERLY ALONG SAID EASTERLY LINE 186.971 FEET TO THE OLD HIGH WATER LINE OF THE EASTERLY SHORE OF THE HARLEM RIVER;

THENCE SOUTHEASTERLY ALONG OLD HIGH WATER LINE OF THE HARLEM RIVER ABOUT 411.73 FEET TO THE WESTERLY LINE OF LINCOLN AVENUE AT THE POINT OR PLACE OF BEGINNING.

ATTACHMENT B
Health and Safety Plan

FORMER BRONX FREIGHT TERMINAL SITE

101 LINCOLN AVENUE

BRONX, NEW YORK

Block 2316 Lot 1

CONSTRUCTION HEALTH AND SAFETY PLAN

MAY 2016

Prepared for:

101 Lincoln Avenue Associates, LLC.
512 Seventh Avenue 15th Floor
New York, NY 10018

Prepared by:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road
Ridge, NY 11961

TABLE OF CONTENTS
CONSTRUCTION HEALTH AND SAFETY PLAN
Former Bronx Freight Terminal Site
101 Lincoln Avenue, Bronx, New York

STATEMENT OF COMMITMENTSC-1

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS..... 1

 1.1 Training Requirements 1

 1.2 Medical Monitoring Requirements..... 2

 1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments..... 2

 1.4 Key Personnel - Roles and Responsibilities 2

2.0 SITE BACKGROUND AND SCOPE OF WORK 4

 2.1 Summary of Remedial Investigation 4

 2.2 Redevelopment Plans 5

 2.3 Scope of Remedial Action 5

3.0 HAZARD ASSESSMENT 7

 3.1 Physical Hazards..... 7

 3.1.1 Tripping Hazards 7

 3.1.2 Climbing Hazards 7

 3.1.3 Cuts and Lacerations..... 7

 3.1.4 Lifting Hazards 7

 3.1.5 Utility Hazards..... 7

 3.1.6 Traffic Hazards 7

 3.2 Work in Extreme Temperatures..... 7

 3.2.1 Heat Stress 8

 3.2.2 Cold Exposure..... 9

 3.3 Chemical Hazards..... 9

 3.3.1 Respirable Dust..... 10

 3.3.2 Dust Control and Monitoring During Earthwork 10

 3.3.3 Organic Vapors..... 10

4.0 PERSONAL PROTECTIVE EQUIPMENT 11

 4.1 Level D 11

 4.2 Level C 11

 4.3 Activity-Specific Levels of Personal Protection..... 12

5.0 AIR MONITORING AND ACTION LEVELS 13

 5.1 Air Monitoring Requirements 13

 5.2 Work Stoppage Responses 13

 5.3 Action Levels During Excavation Activities 13

6.0 SITE CONTROL..... 15

 6.1 Work Zones 15

 6.2 General Site Work 15

TABLE OF CONTENTS
CONSTRUCTION HEALTH AND SAFETY PLAN
Former Bronx Freight Terminal Site
101 Lincoln Avenue, Bronx, New York

7.0	CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN.....	16
7.1	Emergency Equipment On-site.....	16
7.2	Emergency Telephone Numbers.....	16
7.3	Personnel Responsibilities During an Emergency.....	16
7.4	Medical Emergencies.....	17
7.5	Fire or Explosion.....	17
7.6	Evacuation Routes.....	17
7.7	Spill Control Procedures.....	18
7.8	Vapor Release Plan.....	20

FIGURES

Figure 1 Route to Hospital (Appendix D)

APPENDICES

APPENDIX A	SITE SAFETY ACKNOWLEDGMENT FORM
APPENDIX B	SITE SAFETY PLAN AMENDMENTS
APPENDIX C	CHEMICAL HAZARDS
APPENDIX D	HOSPITAL INFORMATION, MAP AND FIELD ACCIDENT REPORT

STATEMENT OF COMMITMENT

This Construction Health and Safety Plan (CHASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Action at the Former Bronx Freight Terminal Site, 101 Lincoln Avenue, Bronx, NY

This CHASP, 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 CHASP 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 the Former Bronx Freight Terminal Site, 101 Lincoln Avenue, Bronx, 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 101 Lincoln Associates Property LLC and/or a regulatory agency upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's project manager, site safety officer and/or the EBC health and safety consultant.

Work performed under the remedial action will not involve confined space entry since the excavations will be large and sloped back in accordance with NYCDOB shoring requirements and will not have a limited or restricted means for entry or exit.

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.

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 CHASP. Amendments to the CHASP 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
Mrs. Chawinie Reilly	EBC- Project Manager	1808 Middle Country Rd Ridge, NY 11961	(631) 504-6000
Mr. Kevin Waters	Health and 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.

2.0 SITE BACKGROUND AND SCOPE OF WORK

The street address for the Site is 1815-1825 Ocean Avenue, Brooklyn, NY. The Site is located in the Midwood section of Kings County and is comprised of two tax parcels totaling 16,555 square feet (0.38). The Site has approximately 150.5 ft of frontage along Ocean Avenue and is approximately 110 ft deep. Currently the property is developed with a one-story gasoline service station building (Lot 55) and a parking lot (Lot 58). The building has a footprint approximately 2,190 s.f. which, according to the NYC Department of Buildings, was constructed in 1931. These building are being demolished as part of the redevelopment of the Site.

The Site has a long history of use as a gas station since the 1930's.

2.1 Summary of Remedial Investigation

A Remedial Investigation was completed at the Site in December 2015 and documented in a Remedial Investigation Report dated May 2016. 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:

- Sampling for non-petroleum contaminants such as pesticides, PCBs and metals in soil and groundwater including the analysis of soil and groundwater samples
- Soil sampling and analysis for petroleum compounds in soil samples from 12 soil boring locations;
- The installation of 6 groundwater monitoring wells
- The collection and analysis of groundwater samples for petroleum compounds;
- The collection of analysis of soil gas samples for VOCs from 8 soil gas sampling locations and 5 subslab vapor sampling locations.

The results of sampling performed during the RI, identified petroleum related contaminants in soil at a depth of 12-14 feet in the northwestern portion of the Site and to a lesser degree in the southwestern portion of the Site.

Historic fill material has been identified across the Site to depths as great as 7 feet below grade. The historic fill material contains semi-volatile organic compounds and metals including arsenic, barium, chromium, copper, lead, mercury, nickel, silver and zinc above unrestricted, restricted residential or restricted commercial use SCOs.

Several petroleum VOCs were reported at elevated concentrations in one monitoring well in the vicinity of the northwestern impacted soil area indicating that some of the VOC impacted soil has transferred to the dissolved phase in this area. The pesticide deildrin was also reported above its part per trillion standard in this area.

SVOC detections above groundwater standards were reported across the Site but limited to those polynuclear aromatic hydrocarbons (PAHs) with a 2 per trillion standard. SVOCs reported in the parts per trillion range are a function of the laboratories ability to achieve extremely low detection limits and general background conditions.

Several dissolved metals were detected above standards including sodium, iron, magnesium and manganese were detected above standards throughout the Site. The metals detected in groundwater are related to brackish conditions and are associated with the Site's proximity to the Harlem River.

Total petroleum-related VOCs were generally low in soil vapor samples across the Site. There did not appear to be any correlation in concentration or distribution of petroleum VOCs in soil vapor with the source area.

PCE was reported in all of the soil vapor samples ranging from 0.94 $\mu\text{g}/\text{m}^3$ in SG7 to 161 $\mu\text{g}/\text{m}^3$ in SG1.

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 of petroleum compounds, CVOCs, pesticides, PCBs and heavy metals 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 commercial buildings may be exposed to CVOCs through the vapor intrusion pathway, if remedial action is not taken to prevent off site vapor intrusion.

The exposure assessment indicated a limited potential exposure to residents and commercial workers in adjacent buildings which would be reduced further following the removal of the identified source areas.

Potential environmental impacts through the groundwater to surface water discharge were considered likely based on the distance to the Harlem River.

2.2 Redevelopment Plans

The proposed new building will consist of three new 25-story and one 18-story residential tower buildings. The towers will be interconnected with a common base which will include three 6-story, one 5-story, two 4-story, one 2-story and two single story buildings. The project will include 74,000 sf of underground parking, 31,199 sf of retail space, 2,872 sf of community space and 833,829 sf of residential space.

2.3 Description of Remedial Action

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

The remedy recommended for the Site is a Track 4 alternative (Alternative 2) which consists of the removal underground storage tanks and hydraulic lifts, excavation of petroleum impacted soil to a depth of 15 feet within the northwest source area, excavation and disposal of historic fill soil from the building foundation areas, excavation of the top 2 ft of soil from within the planned landscape areas and capping the entire Site with the building foundations, concrete walkways / driveways or 2 ft of soil meeting Restricted Residential SCOs.

The remedy will include the following items:

1. Removal of twelve 550 gallon diesel and two 550 gallon gasoline previously closed-in-place underground storage tanks;
2. Removal of one 1,000 gallon waste oil underground tank and one 1,000 motor oil tank previously closed-in-place;
3. Removal an underground oil /water separator and hydraulic lifts;
4. Excavate petroleum impacted soil area to a depth of 15 ft in the northwest source area;
5. Excavation of soil/fill exceeding groundwater protection SCOs for those VOC parameters in groundwater above standards as listed in **Table 1** to depths as great as 15 feet below grade in the northwest source area;
6. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
7. Excavation and disposal of historic fill materials as needed for installation of the new buildings basement level foundations;
8. Excavation and disposal of historic fill materials from planned landscaped (exposed soil) areas;
9. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of groundwater protection SCOs for VOCs present in groundwater above standards;
10. 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;
11. Capping the entire Site with the building foundations, concrete walkways / driveways or 2 ft of soil meeting Restricted Residential SCOs.
12. 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.
13. Implementation of a Site Management Plan (SMP) for long term maintenance of the Engineering Controls.
14. An Environmental Easement will be filed against the Site to ensure implementation of the SMP.

3.0 HAZARD ASSESSMENT

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

3.1 Physical Hazards

3.1.1 Tripping Hazards

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

3.1.2 Climbing Hazards

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

3.1.3 Cuts and Lacerations

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

3.1.4 Lifting Hazards

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

3.1.5 Utility Hazards

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

3.1.6 Traffic Hazards

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

3.2 Work in Extreme Temperatures

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

3.2.1 Heat Stress

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

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

1. Prevention

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

2. Recognition and Treatment

a. Heat Rash (or prickly heat):

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove source or irritation and cool skin with water or wet cloths.

b. Heat Cramps (or heat prostration)

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.

c. Heat Stroke

Cause: Same as heat exhaustion. This is also an extremely serious 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

The RI Investigation identified chlorinated and petroleum volatile organic compounds (VOCs) in soil, groundwater and soil vapor and free phase fuel oil and semi-volatile compounds in soil at the Site. In addition “Urban fill” materials which contain elevated levels of SVOCs and metals as well as other compounds were identified throughout the Site. 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), 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 include the following:

ethylbenzene	n-propylbenzene
--------------	-----------------

Semi-Volatile organic compounds expected to be in the fill materials include the following:

Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene
Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene			

PCBs and Pesticides expected to be in the fill materials include the following:

4,4'-DDE	Deildrin	4,4'-DDT	4,4'-DDS	PCB-1260
----------	----------	----------	----------	----------

Metals expected to be present in fill materials include the following:

Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury
Nickel	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. Also included under the appendix are procedures for handling and storing the chemical oxidant. These procedures will be followed to protect workers and the public.

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 high efficiency particulate air (HEPA) cartridges.

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

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 µg/m³ 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 chlorinated VOCs were detected in soil, soil gas 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.

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.

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.

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%	<ul style="list-style-type: none"> • Continue excavating • Level D protection • Continue monitoring every 10 minutes

1-5 ppm Above Background, Sustained Reading	1-10%	<ul style="list-style-type: none"> • Continue excavating • Go to Level C protection or employ engineering controls • Continue monitoring every 10 minutes
5-25 ppm Above Background, Sustained Reading	10-20%	<ul style="list-style-type: none"> • 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%	<ul style="list-style-type: none"> • 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 than 5 ppm (see Community Air Monitoring Plan).

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. If contamination is encountered then the Site Safety officer will establish the zones as follows:

Tasks requiring OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training are carried out in the exclusion zone. 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.

6.2 General Site Work

A general excavation contractor may complete the site excavation/grading as needed for the footing installation, or as deemed necessary by the Interim Remedial Measure 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.

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
New York City Police	911
Lincoln Medical and Mental Health Center	1-718-692-5300
NYSDEC Spills Division	1-800-457-7362
NYSDEC Division of Env. Remediation	1-718-482-4900
NYCDEP	1-718-699-9811
NYC Department of Health	1-212-788-4711
NYC Fire Department	911
National Response Center	1-800-424-8802
Poison Control	1-212-340-4494
Site Safety Officer	1-631-504-6000
Alternate 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 Mrs. Chawinie Reilly (631) 504-6000
- Site Safety Officer Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

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

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

7.5 Fire or Explosion

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

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

7.6 Evacuation Routes

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

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

instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

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

7.8 Vapor Release Plan

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

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

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

APPENDIX A
SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BRIEFING SIGN-IN SHEET

Date: _____ Person Conducting Briefing: _____

Project Name and Location: _____

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

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

3. ATTENDEES (Print Name):

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

APPENDIX B
SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

Alternative Procedures: _____

Required Changes in PPE: _____

Project Superintendent (signature)

Date

Health and Safety Consultant (signature)

Date

Site Safety Officer (signature)

Date

APPENDIX C
CHEMICAL HAZARDS

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

ETHYLBENZENE

ICSC: 0268



Ethylbenzol
Phenylethane
EB
 $C_8H_{10} / C_6H_5C_2H_5$
Molecular mass: 106.2

ICSC # 0268
CAS # 100-41-4
RTECS # [DA0700000](#)
UN # 1175
EC # 601-023-00-4
March 13, 1995 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, 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		PREVENT GENERATION OF MISTS!	
• INHALATION	Cough. Dizziness. Drowsiness. Headache.	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. Blurred vision.	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.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking liquid in covered containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: A filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-20 S: 2-16-24/25-29 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0268

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

ETHYLBENZENE

ICSC: 0268

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS LIQUID , WITH AROMATIC ODOUR.</p> <p>PHYSICAL DANGERS: The vapour mixes well with air, explosive mixtures are easily formed.</p> <p>CHEMICAL DANGERS: Reacts with strong oxidants. Attacks plastic and rubber.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 100 ppm as TWA 125 ppm as STEL A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 3A; (DFG 2004). OSHA PEL[†]: TWA 100 ppm (435 mg/m³) NIOSH REL: TWA 100 ppm (435 mg/m³) ST 125 ppm (545 mg/m³) NIOSH IDLH: 800 ppm 10%LEL See: 100414</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance is irritating to the eyes the skin and the respiratory tract Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system Exposure far above the OEL could cause lowering of consciousness.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis.</p>
--	--	--

PHYSICAL PROPERTIES	<p>Boiling point: 136°C Melting point: -95°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 20°C: 0.015 Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 18°C c.c. Auto-ignition temperature: 432°C Explosive limits, vol% in air: 1.0-6.7 Octanol/water partition coefficient as log Pow: 3.2</p>
--------------------------------	--	--

ENVIRONMENTAL DATA	<p>The substance is harmful to aquatic organisms.</p>	
-------------------------------	---	---

NOTES

The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-30S1175 or 30GF1-I+II
NFPA Code: H2; F3; R0

ADDITIONAL INFORMATION

--	--

ICSC: 0268 **ETHYLBENZENE**

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:	<p>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.</p>
--	--

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Propylbenzene

Product Number : P52407
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**

Combustible Liquid

Target Organs

Lungs, Eyes, Kidney

GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H335 May cause respiratory irritation.
H401 Toxic to aquatic life.

Precautionary statement(s)

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P331 Do NOT induce vomiting.

HMIS Classification

Health hazard: 0
Chronic Health Hazard: *
Flammability: 2
Physical hazards: 0

NFPA Rating

Health hazard: 1
Fire: 2
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

Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1-Phenylpropane
Formula : C₉H₁₂
Molecular Weight : 120.19 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Propylbenzene			
103-65-1	203-132-9	601-024-00-X	-

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

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES**Suitable extinguishing media**

For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

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

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

For prolonged or repeated contact use protective gloves.

Eye protection

Face shield and safety glasses

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	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point	-99 °C (-146 °F) - lit.
Boiling point	159 °C (318 °F) - lit.
Flash point	42.0 °C (107.6 °F) - closed cup
Ignition temperature	450 °C (842 °F)
Lower explosion limit	0.8 %(V)
Upper explosion limit	6 %(V)
Density	0.862 g/cm ³ at 25 °C (77 °F)
Water solubility	slightly soluble

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid

Heat, flames and sparks.

Materials to avoid

Strong oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

11. TOXICOLOGICAL INFORMATION**Acute toxicity**

LD50 Oral - rat - 6,040 mg/kg

Remarks: Behavioral:Somnolence (general depressed activity).

LC50 Inhalation - rat - 2 h - 65000 ppm

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

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.

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)

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

May be fatal if swallowed and enters airways.

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. 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

Damage to the lungs., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information

RTECS: DA8750000

12. ECOLOGICAL INFORMATION**Toxicity**

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - 1.55 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates. Immobilization EC50 - Daphnia magna (Water flea) - 2 mg/l - 24 h

Persistence and degradability

no data available

Bioaccumulative potential

no data available

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.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. 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: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propyl benzene
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN-Number: 2364 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: PROPYLBENZENE
Marine pollutant: No

IATA

UN-Number: 2364 Class: 3 Packing group: III
Proper shipping name: n-Propylbenzene

15. REGULATORY INFORMATION

OSHA Hazards

Combustible Liquid

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

Fire Hazard

Massachusetts Right To Know Components

Propylbenzene

CAS-No.
103-65-1Revision Date
2007-03-01**Pennsylvania Right To Know Components**

Propylbenzene

CAS-No.
103-65-1Revision Date
2007-03-01**New Jersey Right To Know Components**

Propylbenzene

CAS-No.
103-65-1Revision Date
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**

Copyright 2010 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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

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

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS:</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2 (as pyrolysis product of organic materials) (DFG 2005).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is probably carcinogenic to humans.</p>
--	---	---

<p>PHYSICAL PROPERTIES</p>	<p>Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274 Solubility in water: none</p>	<p>Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61</p>
-----------------------------------	--	--

<p>ENVIRONMENTAL DATA</p>	<p>Bioaccumulation of this chemical may occur in seafood.</p>	
----------------------------------	---	---

NOTES

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

<p>ICSC: 0385</p>	<p>BENZ(a)ANTHRACENE</p>
<p>(C) IPCS, CEC, 1994</p>	

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

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

<p>I M P O R T A N T A D V I S I O N</p>	<p>PHYSICAL STATE; APPEARANCE: PALE-YELLOW CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts with strong oxidants causing fire and explosion hazard.</p> <p>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).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>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.</p>
---	---	---

<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm³</p>	<p>Solubility in water: none (<0.1 g/100 ml) Vapour pressure : negligible Octanol/water partition coefficient as log Pow: 6.04</p>
---------------------------------------	--	---

<p>ENVIRONMENTAL DATA</p>	<p>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.</p>	
--------------------------------------	---	---

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

--	--

ICSC: 0104	(C) IPCS, CEC, 1994	BENZO(a)PYRENE
-------------------	---------------------	-----------------------

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---	--

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720



Benz(e)acephenanthrylene
2,3-Benzofluoranthene
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
----------	---	---

M
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: 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.



NOTES

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/m³. 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

(C) IPCS, CEC, 1994

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

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.



NOTES

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/m³. 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

(C) IPCS, CEC, 1994

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

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


International Chemical Safety Cards

CHRYSENE

ICSC: 1672

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS TO BEIGE CRYSTALS OR POWDER</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: The substance decomposes on burning producing toxic fumes Reacts violently with strong oxidants</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006). MAK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
--	--	---

<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm³</p>	<p>Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9</p>
-----------------------------------	--	---

<p>ENVIRONMENTAL DATA</p>	<p>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.</p>	
----------------------------------	--	---

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

--	--

ICSC: 1672

CHRYSENE

(C) IPCS, CEC, 1994

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

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	PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALLINE POWDER.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
M	PHYSICAL DANGERS:	INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration
P		
O		

R
T
A
N
T
D
A
T
A

CHEMICAL DANGERS:

of airborne particles can, however, be reached quickly.

OCCUPATIONAL EXPOSURE LIMITS:

TLV not established.

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.



NOTES

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

(C) IPCS, CEC, 1994

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

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	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.
M	PHYSICAL DANGERS:	INHALATION RISK:
P		

O
R
T
A
N
T
D
A
T
A

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed.

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

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.
MAK:
Carcinogen category: 2;
(DFG 2004).

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.



NOTES

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/m³. 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

(C) IPCS, CEC, 1994

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.



Sprayon® LU711 Lubricant
Because your environment demands a
TRUE Industrial Lubricant
Sprayon.com

CYTOP Phosphines by Cytec
Buy from one of the global leaders.
Discover Cytec's full product range
www.cytec.com

AdChoices ▶

· [Ads by Google](#) [MSDS Sheets](#) [Data MSDS](#) [MSDS Search](#) [MSDS Chemical](#)

Search

72-55-9 msds



MSDS 250,000+

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)

[MSDS Safety Sheet](#)

We Get Companys In
Compliance & Keep Them
There! Custom Catalogs
www.MSDSCatalogService.com

[Hazardous Waste Disposal](#)

Free Estimates! Bulk &
Drummed Liquid & Solid Haz
& Non-Haz Waste
www.NEDTinc.com

AdChoices ▶

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

[Sprayon® LU711 Lubricant](#) Because your environment demands a TRUE Industrial Lubricant Sprayon.com

[MSDS Safety Sheet](#) We Get Companys In Compliance & Keep Them There! Custom Catalogs www.MSDSCatalogService.com

[Hazardous Waste Disposal](#) Free Estimates! Bulk & Drummed Liquid & Solid Haz & Non-Haz Waste www.NEDTinc.com

AdChoices ▶

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

```

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

```

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.

[Search More](#)



ALL MSDS PAGES IN THIS GROUP

NAME	CAS
M-Benzoyloxybenzyl Alcohol, 97%	1700-30-7
Octaphenylcyclotetrasiloxane, 98%	546-56-5
Cetylpyridinium chloride	123-03-5
3,4-Difluorophenol, 99%	2713-33-9
1-Benzyl-4-Hydroxypiperidine, 97%	4727-72-4
4-tert-Butylbenzoyl chloride	1710-98-1
Borane-morpholine complex, 97%	4856-95-5
Benzyl Ether, 99%	103-50-4
5-Amino-1-Naphthol (Pract)	83-55-6
Pyridinium-P-Toluenesulfonate 98%	24057-28-1
Pyrogallol Red, 98% (Titr.)	32638-88-3
Amberlite ira 416	9002-26-0
3-Methoxybenzotrile, 98%	1527-89-5
1-Adamantanemethanol, 99%	770-71-8
Inosine, 99%	58-63-9
Pentafluoropropionic Acid	422-64-0
Pyruvic Acid	127-17-3
Potassium hydrogen fluoride, 99+%	7789-29-9
Aluminum Nitride, 98% Particle Size <10 Micron	24304-00-5
Nickel(II) hydroxide, c.p., 60-61% Ni	12054-48-7
1-Adamantanamine sulfate, 99%	31377-23-8
S-(Thiobenzoyl)-Thioglycolic Acid, 97%	942-91-6
N,N-Dimethyl-P-Nitroaniline	100-23-2
Benzofuroxan	480-96-6
cis-2-Aminomethyl-1-cyclohexanol hydrochloride, 99%	24947-68-0
Silver Phosphate, 98% (Titr.)	7784-09-0

4-Cyano-4-Phenylpiperidine Hydrochloride, 99% (TLC)	51304-58-6
Methanesulfonamide	3144-09-0
gamma-Octanoic lactone, 98%	104-50-7
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-Dimethylphenylcarbonyl-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

Free MSDS Search (Providing 250,000+ Material Properties)
 Chemcas Copyright Reserved
 Last modified: 11/29/2011 16:11:11

International Chemical Safety Cards

DDT

ICSC: 0034



Dichlorodiphenyltrichloroethane
 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane
 2,2-bis(p-Chlorophenyl)-1,1,1-trichloroethane
 1,1'-(2,2,2-Trichloroethylidene)bis(4-chlorobenzene)
 p,p'-DDT
 $C_{14}H_9Cl_5$
 Molecular mass: 354.5



ICSC # 0034
 CAS # 50-29-3
 RTECS # [KJ3325000](#)
 UN # 2761
 EC # 602-045-00-7
 April 20, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety goggles, 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	Tremors. Diarrhoea. Dizziness. Headache. Vomiting. Numbness. Paresthesias. Hyperexcitability. Convulsions.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT let this chemical enter the environment. Sweep spilled substance into sealable non-metallic containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Provision to contain effluent from fire extinguishing. Separated from iron, aluminum and its salts, food and feedstuffs See Chemical Dangers.	Do not transport with food and feedstuffs. Severe marine pollutant. T symbol N symbol R: 25-40-48/25-50/53 S: 1/2-22-36/37-45-60-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0034

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: 0034

DDT

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS WHITE POWDER. TECHNICAL PRODUCT IS WAXY SOLID.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: On combustion, forms toxic and corrosive fumes including hydrogen chloride. Reacts with aluminium and iron.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 1 mg/m³ as TWA A3 (ACGIH 2004). MAK: 1 mg/m³ H Peak limitation category: II(8) (DFG 2003). OSHA PEL: TWA 1 mg/m³ skin NIOSH REL: Ca TWA 0.5 mg/m³ See Appendix A NIOSH IDLH: Ca 500 mg/m³ See: 50293</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly especially if powdered.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: May cause mechanical irritation. The substance may cause effects on the central nervous system, resulting in convulsions and respiratory depression. Exposure at high levels may result in death. Medical observation is indicated.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the central nervous system and liver. This substance is possibly carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
---	---	---

<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 260°C Melting point: 109°C Density: 1.6 g/cm³</p>	<p>Solubility in water: poor Octanol/water partition coefficient as log Pow: 6.36</p>
-----------------------------------	--	---

<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to birds. Bioaccumulation of this chemical may occur along the food chain, for example in milk and aquatic organisms. This substance does enter the environment under normal use. Great care, however, should be given to avoid any additional release, e.g. through inappropriate disposal.</p>	
----------------------------------	---	---

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Consult national legislation. Agritan, Azotox, Anofex, Ixodex, Gesapon, Gesarex, Gesarol, Guesapon, Clofenotane, Zeidane, Dicophane, Neocid are trade names.

Transport Emergency Card: TEC (R)-61GT7-III

ADDITIONAL INFORMATION	

ICSC: 0034	DDT
-------------------	------------

(C) IPCS, CEC, 1994

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

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

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

ARSENIC

ICSC: 0013

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.</p> <p>PHYSICAL DANGERS:</p> <p>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</p> <p>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/m³ NIOSH REL: Ca C 0.002 mg/m³ 15-minute See Appendix A NIOSH IDLH: Ca 5 mg/m³ (as As) See: 7440382</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly, when dispersed.</p> <p>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.</p> <p>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.</p>
---	--	--

<p>PHYSICAL PROPERTIES</p>	<p>Sublimation point: 613°C Density: 5.7 g/cm³</p>	<p>Solubility in water: none</p>
-----------------------------------	---	--------------------------------------

<p>ENVIRONMENTAL DATA</p>	<p>The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.</p>	
----------------------------------	--	---

NOTES

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

ICSC: 0013 **ARSENIC**

(C) IPCS, CEC, 1994

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827



Barium sulphate
Blanc fixe
Artificial barite
BaSO₄

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

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

BARIUM SULFATE

ICSC: 0827

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts violently with aluminium powder.</p> <p>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/m³ (total) TWA 5 mg/m³ (resp) NIOSH REL: TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) NIOSH IDLH: N.D. See: IDLH INDEX</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>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).</p>
---	--	--

PHYSICAL PROPERTIES	<p>Melting point (decomposes): 1600°C Density: 4.5 g/cm³</p>	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

--	--

ICSC: 0827	BARIUM SULFATE
(C) IPCS, CEC, 1994	

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

International Chemical Safety Cards

CADMIUM

ICSC: 0020



Cd
Atomic mass: 112.4

ICSC # 0020
CAS # 7440-43-9
RTECS # [EU980000](#)
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 ignition 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

<p>I M P O R T A N T A D D I T I O N</p>	<p>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.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>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.</p> <p>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/m³ *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/m³ (as Cd) See: IDLH INDEX</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p>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.</p> <p>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.</p>
---	---	---

<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 765°C Melting point: 321°C Density: 8.6 g/cm³</p>	<p>Solubility in water: none Auto-ignition temperature: (cadmium metal dust) 250°C</p>
-----------------------------------	--	--

<p>ENVIRONMENTAL DATA</p>	
----------------------------------	--

NOTES

Reacts violently with fire extinguishing agents such as water, foam, carbon dioxide and 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

--	--

<p>ICSC: 0020</p>	<p>CADMIUM</p>
--------------------------	-----------------------

(C) IPCS, CEC, 1994

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

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

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

CHROMIUM

ICSC: 0029

I	PHYSICAL STATE; APPEARANCE: GREY POWDER	ROUTES OF EXPOSURE:
M	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed.
P		

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.

EFFECTS OF SHORT-TERM EXPOSURE:

May cause mechanical irritation to the eyes and the respiratory tract.

OCCUPATIONAL EXPOSURE LIMITS:

TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m³ as TWA A4 (ACGIH 2004).
MAK not established.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

OSHA PEL*: TWA 1 mg/m³ [See Appendix C](#) *Note: The PEL also applies to insoluble chromium salts.

NIOSH REL: TWA 0.5 mg/m³ [See Appendix C](#)

NIOSH IDLH: 250 mg/m³ (as Cr) See: [7440473](#)

PHYSICAL PROPERTIES

Boiling point: 2642°C
Melting point: 1900°C
Density: 7.15 g/cm³

Solubility in water:
none

ENVIRONMENTAL DATA

NOTES

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

(C) IPCS, CEC, 1994

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

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

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

COPPER

ICSC: 0240

<p>I</p> <p>M</p> <p>P</p>	<p>PHYSICAL STATE; APPEARANCE: RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS:</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p>
---	---	--

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.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of fumes may cause metal fume fever. See Notes.

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/m³ *Note: The PEL also applies to other copper compounds (as Cu) except copper fume.
NIOSH REL*: TWA 1 mg/m³ *Note: The REL also applies to other copper compounds (as Cu) except Copper fume.
NIOSH IDLH: 100 mg/m³ (as Cu) See: [7440508](https://www.cdc.gov/niosh/docs/2005-109/)

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	
---------------------------	--

NOTES

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

ADDITIONAL INFORMATION

--	--

ICSC: 0240

COPPER

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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

International Chemical Safety Cards

LEAD

ICSC: 0052



Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)


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

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.		Separated from food and feedstuffs incompatible materials See Chemical Dangers.	R: S:
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0052		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

<p>I M P O R T A N T T A D A</p>	<p>PHYSICAL STATE; APPEARANCE: BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>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.</p> <p>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/m³ See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH REL*: TWA 0.050 mg/m³ See Appendix C *Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH IDLH: 100 mg/m³ (as Pb) See: 7439921</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>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.</p>
---	--	---

PHYSICAL PROPERTIES	<p>Boiling point: 1740°C Melting point: 327.5°C</p>	<p>Density: 11.34 g/cm³ Solubility in water: none</p>
----------------------------	---	--

ENVIRONMENTAL DATA	<p>Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.</p>	
---------------------------	--	---

NOTES

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
(C) IPCS, CEC, 1994	

IMPORTANT LEGAL NOTICE:	<p>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.</p>
--------------------------------	--

International Chemical Safety Cards

MERCURY

ICSC: 0056



Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

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



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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0056

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


International Chemical Safety Cards

MERCURY

ICSC: 0056

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.</p> <p>PHYSICAL DANGERS:</p> <p>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.</p> <p>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_f: C 0.1 mg/m³ NIOSH REL: Hg Vapor: TWA 0.05 mg/m³ skin Other: C 0.1 mg/m³ skin NIOSH IDLH: 10 mg/m³ (as Hg) See: 7439976</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!</p> <p>INHALATION RISK: A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.</p> <p>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 system and kidneys. The effects may be delayed. Medical observation is indicated.</p> <p>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.</p>
---	---	--

<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none</p>	<p>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</p>
-----------------------------------	---	--

<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.</p>	
----------------------------------	--	---

NOTES

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	(C) IPCS, CEC, 1994	MERCURY
-------------------	---------------------	----------------

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

International Chemical Safety Cards

NICKEL

ICSC: 0062



Ni
Atomic mass: 58.7
(powder)

ICSC # 0062
CAS # 7440-02-0
RTECS # [QR5950000](#)
EC # 028-002-00-7
October 17, 2001 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Dry sand. NO carbon dioxide. NO water.
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!	
•INHALATION	Cough. Shortness of breath.	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.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Separated from strong acids.	Xn symbol R: 40-43 S: 2-22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

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

NICKEL

ICSC: 0062

I	<p>PHYSICAL STATE; APPEARANCE: SILVERY METALLIC SOLID IN VARIOUS FORMS.</p> <p>PHYSICAL DANGERS:</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of the dust.</p>
---	--	--

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

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

CHEMICAL DANGERS:

Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel.

OCCUPATIONAL EXPOSURE LIMITS:

TLV:
(Inhalable fraction)
1.5 mg/m³ as TWA A5 (not suspected as a human carcinogen); (ACGIH 2004).
MAK: (Inhalable fraction) sensitization of respiratory tract and skin (Sah);
Carcinogen category: 1;
(DFG 2004).
OSHA PEL*†: TWA 1 mg/m³ *Note: The PEL does not apply to Nickel carbonyl.
NIOSH REL*: Ca TWA 0.015 mg/m³ [See Appendix A](#)
*Note: The REL does not apply to Nickel carbonyl.
NIOSH IDLH: Ca 10 mg/m³ (as Ni) See: [7440020](#)

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:

May cause mechanical irritation. Inhalation of fumes may cause pneumonitis.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 2730°C
Melting point: 1455°C
Density: 8.9 g/cm³

Solubility in water:
none

ENVIRONMENTAL DATA

NOTES

At high temperatures, nickel oxide fumes will be formed. Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of asthma 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. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062

NICKEL

(C) IPCS, CEC, 1994

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

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

ICSC: 1205

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

ZINC POWDER

ICSC: 1205

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: ODOURLESS GREY TO BLUE POWDER.</p> <p>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.</p> <p>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.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of fumes may cause metal fume fever. The effects may be delayed.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis.</p>
---	---	---

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

<p>ENVIRONMENTAL DATA</p>	
----------------------------------	--

NOTES

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

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

ADDITIONAL INFORMATION

--	--

ICSC: 1205

ZINC POWDER

(C) IPCS, CEC, 1994

<p>IMPORTANT LEGAL NOTICE:</p>	<p>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.</p>
---------------------------------------	--

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 3080
SRM Name: Aroclor 1260 in Transformer Oil
Other Means of Identification: Not Applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is a solution of Aroclor 1260 in transformer oil. This SRM is intended primarily for calibrating chromatographic instrumentation and methods of analysis used for the determination of Aroclor 1260 and polychlorinated biphenyls (PCBs) in transformer oil. A unit of SRM 3080 consists of five 2 mL ampoules, each containing approximately 1.2 mL of transformer oil.

Company Information

National Institute of Standards and Technology
 Standard Reference Materials Program
 100 Bureau Drive, Stop 2300
 Gaithersburg, Maryland 20899-2300

Telephone: 301-975-2200
 FAX: 301-948-3730
 E-mail: SRMMSDS@nist.gov
 Website: <http://www.nist.gov/srm>

Emergency Telephone ChemTrec:
 1-800-424-9300 (North America)
 +1-703-527-3887 (International)

2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Not classified.
Health Hazard: Carcinogenicity Category 1B
 Reproductive Toxicity Category 2
 Aspiration Hazard Category 1

Label Elements

Symbol



Signal Word

DANGER

Hazard Statement(s)

H304 May be fatal if swallowed and enters airways.
 H350 May cause cancer <inhalation, ingestion>.
 H361 Suspected of damaging fertility or the unborn child.

Precautionary Statement(s):

P201 Obtain special instructions before use.
 P202 Do not handle until all safety precautions have been read and understood.
 P280 Wear protective gloves, protective clothing, and eye protection.

 P308+P313 If exposed or concerned: Get medical attention.
 P301+P310 If swallowed: Immediately call a doctor.
 P331 Do NOT induce vomiting.
 P405 Store locked up.
 P501 Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Aroclor 1260 in transformer oil.

Other Designations:

Transformer oil (hydrotreated light naphthenic distillate (petroleum), hydraulic petroleum oil, distillates, petroleum).

Aroclor 1260 (PCB 1260; chlorodiphenyl (60% Cl); polychlorinated biphenyl; chlorobiphenyls; PCB; PCBs)

Components are listed in compliance with OSHA 29 CFR 1910.1200.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Transformer oil	64742-53-6	265-156-6	>99
Aroclor 1260	11096-82-5	215-648-1 ^(a)	0.3

^(a) EC Number as PCB, polychlorinated biphenyl

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Wash exposed skin with soap and water for at least 15 minutes. Seek medical attention if needed.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Ingestion: Aspiration hazard. Do not induce vomiting. If vomiting occurs, keep head lower than hips to prevent aspiration. If not breathing, give artificial respiration by qualified personnel. Seek immediate medical attention.

Most Important Symptoms/Effects, Acute and Delayed: Irritation, dizziness, nausea, coughing, and aspiration.

Indication of any immediate medical attention and special treatment needed, if necessary: Not applicable.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Slight fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Regular dry chemical, carbon dioxide, regular foam.

Unsuitable: Straight streams of water.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 2

Fire = 1

Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Absorb spilled material with sand or non-combustible material and collect in appropriate container for disposal. Keep out of water supplies and sewers.

7. HANDLING AND STORAGE

Safe Handling Precautions: See Section 8, “Exposure Controls and Personal Protection”.

Storage: Store and handle in accordance with all current regulations and standards. The storage floor must be impermeable and form a collecting basin so that, in the event of an accident spillage, the liquid cannot spread beyond the storage area.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits:

Transformer oil: No occupational exposure limits established.

Aroclor 1260: NIOSH (TWA): 0.001 mg/m³ (related to 1,1'-Biphenyl, chloro derivatives)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection Measures: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties

Appearance (physical state, color, etc.):

Molecular Formula:

Molar Mass (g/mol):

Odor:

Odor threshold:

pH:

Evaporation rate:

Melting point/freezing point:

Pour point:

Density:

Vapor Pressure:

Vapor Density (air = 1):

Kinematic Viscosity:

Solubility(ies):

Partition coefficient (n-octanol/water):

Transformer oil (>99 %)

clear, yellow liquid

not applicable

not applicable

not available

not available

not available

not available

-55 °C (-67 °F)

-40 °C (-40 °F)

0.8912 g/mL at 22 °C^(b)

0.1 mmHg 20 °C^(a)

>5 at 101 kPa^(a)

12 cSt (12 mm²/s) at 40 °C

insoluble in water

>6.5^(a)

Thermal Stability Properties

Autoignition Temperature: >315 °C (599 °F)^(a)

Thermal Decomposition: not available

Initial boiling point and boiling range: 260 °C to 371 °C (500 °F to 700 °F)

Explosive Limits, LEL: not available

Explosive Limits, UEL: not available

Flash Point: >145 °C (293 °F)^(a)

Flammability (solid, gas): not applicable

^(a) Physical property listed in the NIST Certificate of Analysis. Values are not certified.

^(b) Vendor supplied health and safety information.

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: Stable Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid excessive heat; high energy ignition sources.

Incompatible Materials: Oxidizers.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Oxides of carbon, sulfur oxides, aldehydes.

Hazardous Polymerization: Will Occur Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: Inhalation Skin Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Dizziness, nausea, coughing.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Acute exposure to high levels of vapor from transformer oil may cause central nervous system depression, headache, dizziness, nausea, vomiting, anorexia, incoordination and unconsciousness. Prolonged or repeated exposure may cause irritation. Short term exposure to Aroclor 1260 may cause irritation or liver damage; long term exposure may cause rash, itching, hair loss, digestive issues, headache, dizziness, impotence, coma, and cancer.

Skin Contact: Short term and long term contact with transformer oil may cause skin irritation and dermatitis. Short-term exposure to Aroclor 1260 may cause skin irritation or liver damage; long term exposure to Aroclor 1260 may cause same effects as for inhalation, plus hair loss and reproductive effects.

Eye Contact: Acute exposure of liquid or vapor may cause irritation.

Ingestion: Acute ingestion of transformer oil may cause abdominal pain, nausea, and vomiting. Small amounts of oil aspirated during ingestion or vomiting may cause lung damage; no information available for long-term exposure to transformer oil. Short term exposure to Aroclor 1260 may cause liver damage; long term exposure to Aroclor 1260 may cause same effects as for inhalation, plus hyperactivity, menstrual disorders, reproductive effects.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified.

Component: Transformer oil

Rat, Oral LD50: >5000 mg/kg

Rat, Inhalation LC50: 2180 mg/m³ (4 h)

Rabbit, Skin LD50: >2000 mg/kg

Component: Aroclor 1260

Rat, Oral LD50: 1315 mg/kg

Skin Corrosion/Irritation: Not classified.

Transformer oil, Rabbit, skin: 0.5 mL/24 h, moderate

Serious Eye Damage/ Eye Irritation: Not classified.

Transformer oil, Rabbit, eye: 0.1 mL, mild

Respiratory Sensitization: No data available; not classified.

Skin Sensitization: No data available; not classified.

Germ Cell Mutagenicity: No data available; not classified.

Carcinogenicity: Category 1B

Listed as a Carcinogen/Potential Carcinogen X Yes No

Transformer oil is not listed by NTP, IARC, or OSHA as a carcinogen/potential carcinogen.

Aroclor 1260 is listed by NTP as *reasonably anticipated to be a human carcinogen* (as PCB, polychlorinated biphenyl, CAS number 1336-36-3) and by IARC as Group 1, *carcinogenic to humans* (related to Polychlorinated biphenyls).

Reproductive Toxicity: Category 2

Aroclor 1260: Overexposure has resulted in decreased birth weight in offspring of exposed mothers. Significant exposure to PCBs that reach the fetus can cause teratogenic effects.

Oral Rat TDLo: 210 mg/kg, pregnant 14-20 days

STOT, Single Exposure: No data available; not classified.

STOT, Repeated Exposure: Not classified; this SRM contains less than 1 % of Archlor 1260, a Category 2 target organ toxicant.

Aspiration Hazard: Category 1

Transformer oil is a human aspiration toxicity hazard.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data:

Transformer oil: Fish, Rainbow Trout (*Oncorhynchus mykiss*) LC50: >5000 mg/L (96 h)

Invertebrate, Water flea (*Daphnia magna*) EC50: >1000 mg/L (48 h)

Aroclor 1260: No data available.

Persistence and Degradability: Has the potential to biodegradable.

Bioaccumulative Potential: No data available

Mobility in Soil: Expected to migrate from land to water and vice versa.

Other Adverse effects: Keep out of water supplies.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: This material is not regulated by IATA or DOT.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Aroclor 1260, 1 lb. (0.454 kg) final RQ.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Aroclor 1260, 0.1 % supplier notification limit (related or polychlorinated biphenyls).

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes.
CHRONIC HEALTH:	Yes.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:

California Proposition 65:

WARNING! This product contains a chemical (Aroclor 1260, related to PCBs) known to the state of California to cause cancer, reproductive, and/or developmental effects.

U.S. TSCA Inventory: Transformer oil is listed.

TSCA 12(b), Export Notification: Aroclor 1260 is listed in Section 6, 50 ppm de minimus concentration (see 40 CFR 761, related to polychlorinated biphenyls).

Canadian Regulations:

WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 27 May 2015

Sources: ChemADVISOR, Inc., SDS, *Aroclor 1260*, 20 March 2015.

ChemADVISOR, Inc., SDS, *Transformer Oil*, 20 March 2015.

Vendor MSDS, Exxon Mobile Corporation, UNIVOLT N 61 B, 30 May 2014.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	RM	Reference Material
LC50	Lethal Concentration	STEL	Short Term Exposure Limit
LD50	Median Lethal Dose or Lethal Dose, 50 %	STOT	Specific Target Organ Toxicity
LEL	Lower Explosive Limit	TLV	Threshold Limit Value
MSDS	Material Safety Data Sheet	TPQ	Threshold Planning Quantity
NFPA	National Fire Protection Association	TSCA	Toxic Substances Control Act
NIOSH	National Institute for Occupational Safety and Health	TWA	Time Weighted Average
NIST	National Institute of Standards and Technology	UEL	Upper Explosive Limit
		WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at <http://www.nist.gov/srm>.

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

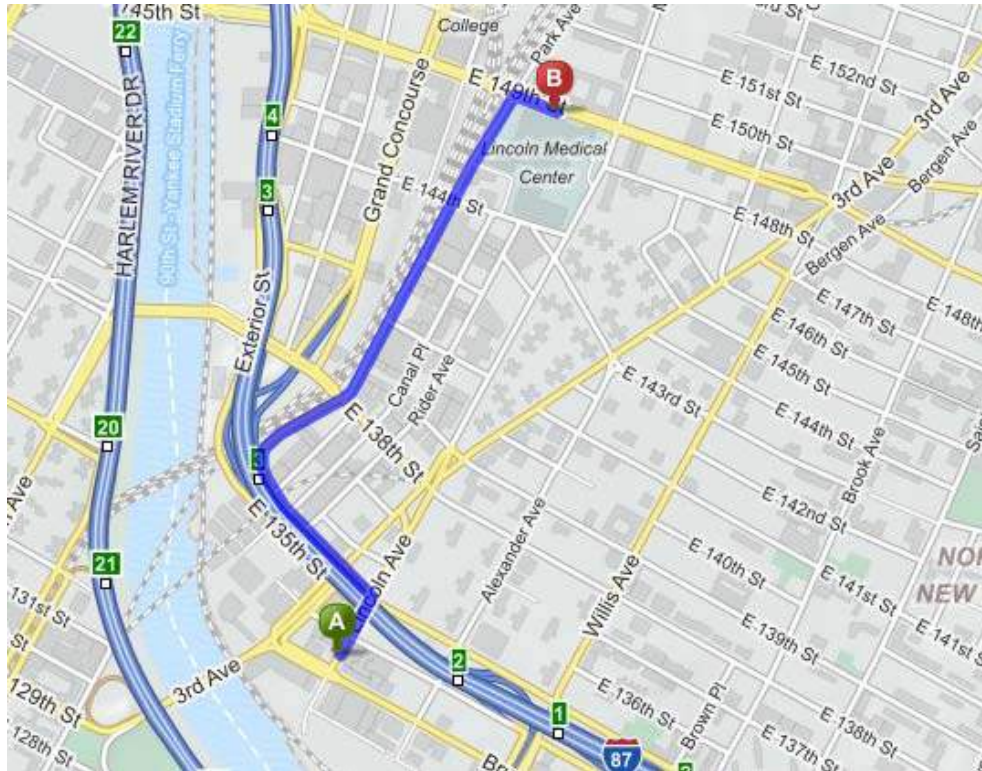
HOSPITAL INFORMATION AND MAP






The hospital nearest the site is:

LINCOLN MEDICAL AND MENTAL HEALTH CENTER

718-579-5016

0.92 Miles – About 3 Minutes



-  1. Start out going **northeast** on **Lincoln Ave** toward **E 134th St.** 0.08 mi
-  2. Turn **left** onto **E 135th St.** 0.2 mi
*New Life For Better Living is on the corner
If you reach E 136th St you've gone a little too far*
-  3. **E 135th St** becomes **Park Ave.** 0.5 mi
-  4. Turn **right** onto **E 149th St.** 0.06 mi
*E 149th St is just past E 146th St
If you reach E 151st St you've gone about 0.1 miles too far*
-  5. **234 E 149TH ST** is on the **right.**
If you reach Morris Ave you've gone a little too far

ATTACHMENT C
Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
Former Bronx Freight Terminal Site
101 Lincoln Avenue, Bronx, NY

Prepared on behalf of:

101 Lincoln Avenue Associates, LLC
512 Seventh Avenue 15th Floor
New York, NY 10018

Prepared by:

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS
RIDGE, NY 11961

TABLE OF CONTENTS

QUALITY ASSURANCE PROJECT PLAN

Former Bronx Freight Terminal Site

101 Lincoln Avenue, Bronx, NY

1.0	PROJECT ORGANIZATION AND RESPONSIBILITIES	1
1.1	Organization	1
2.0	QUALITY ASSURANCE PROJECT PLAN OBJECTIVES	2
2.1	Overview.....	2
2.2	QA/QC Requirements for Analytical Laboratory.....	2
2.2.1	Instrument calibration	2
2.2.2	Continuing Instrument calibration	2
2.2.3	Method Blanks.....	2
2.2.4	Trip Blanks	3
2.2.5	Surrogate Spike Analysis.....	3
2.2.6	Matrix Spike / Matrix Spike duplicate / Matrix Spike Blank	3
2.3	Accuracy	3
2.4	Precision.....	4
2.5	Sensitivity	4
2.6	Representativeness	4
2.7	Completeness.....	4
2.8	Laboratory Custody Procedures	5
3.0	ANALYTICAL PROCEDURES	6
3.1	Laboratory Analyses	6
4.0	DATA REDUCTION, VALIDATION, REVIEW. AND REPORTING	7
4.1	Overview.....	7
4.2	Data Reduction	7
4.3	Laboratory Data Reporting	7
5.0	CORRECTIVE ACTION	8

TABLES

Table 1	Analytical Summary Table
Table 2	Containers Preservatives and Holding Times

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. Mr. Kevin Brussee will serve as the Quality Assurance Officer (QAO) and in this role may conduct:

- conduct periodic field and sampling audits;
- interface with the analytical laboratory to resolve problems; and
- interface with the data validator and/or the preparer of the DUSR to resolve problems.

Chawinie Reilly will serve as the Project Manager and will be responsible for implementation of the Remedial Investigation and coordination with field sampling crews and subcontractors. Reporting directly to the Project Manager will be the Field Operations Officer, Kevin Waters; who will serve as the on-Site qualified environmental professional who will record observations, direct the drilling crew and be responsible for the collection and handling of all samples.

1.1 Organization

Project QA will be maintained under the direction of the Project Manager, in accordance with this QAPP. QC for specific tasks will be the responsibility of the individuals and organizations listed below, under the direction and coordination of the Project Manager

GENERAL RESPONSIBILITY	SCOPE OF WORK	RESPONSIBILITY OF QUALITY CONTROL
Field Operations	Supervision of Field Crew, sample collection and handling	K. Waters, EBC
Project Manager	Implementation of the RI according to the RIWP.	Chawinie Reilly, EBC
Laboratory Analysis	Analysis of soil samples by NYSDEC ASP methods Laboratory	NYSDOH-Certified Laboratory
Data review	Review for completeness and compliance	3 rd party validation

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), total cyanide, mercury, TPH and pesticides / PCBs in both historic fills and native soils and in groundwater and other volatile organic compounds (VOCs) in soil, soil gas. The QA requirements for all subcontracted analytical laboratory work performed on this project are described below. QA elements to be evaluated include accuracy, precision, sensitivity, representativeness, and completeness. The data generated by the analytical laboratory for this project are required to be sensitive enough to achieve detection levels low enough to meet required quantification limits as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP, 07/2005). The analytical results meeting the required quantification limits will provide data sensitive enough to meet the data quality objectives of this remedial program as described in the work plan. Reporting of the data must be clear, concise, and comprehensive. The QC elements that are important to this project are completeness of field data, sample custody, sample holding times, sample preservation, sample storage, instrument calibration and blank contamination.

2.2.1 Instrument Calibration

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of NYSDEC ASP 07/2005).

2.2.2 Continuing Instrument Calibration

The initial calibration curve will be verified every 12 hrs by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

2.2.3 Method Blanks

Method blank or preparation blank is prepared from an analyte-free matrix which includes the same reagents, internal standards and surrogate standards as the related samples. This is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12 hr period during the analysis of samples for volatiles. An acceptable method blank will contain less than two (2) times the CRQL of methylene chloride, acetone and 2-butanone. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10 percent of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

2.2.4 Trip Blanks.

Trip blanks consist of a single set of sample containers filled at the laboratory with deionized, laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same way as the samples collected that day. Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure.) A complete set of trip blanks will be provided with each shipment of samples to the certified laboratory.

2.2.5 Surrogate Spike Analysis

For organic analyses, all samples and blanks will be spiked with surrogate compounds before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the NY5DEC ASP protocols for samples falling within the quantification limits without dilution.

2.2.6 Matrix Spike / Matrix Spike Duplicate / Matrix Spike Blank (MS/MSDIMSB) Analysis

MS, MSD and MSB analyses will be performed to evaluate the matrix effect of the sample upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS / MSD / MSB samples will be analyzed for each group of samples of a similar matrix at a rate of 5% (one for every 20 field samples). The RPD will be calculated from the difference between the MS and MSD. Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

2.3 Accuracy

Accuracy is defined as the nearness of a real or the mean (x) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery and is expressed as percent recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike percent recovery (% REC) is calculated by the following equation:

$$\%REC = \frac{SSR - SR}{SA} \times 100$$

Where:

SSR = spike sample results

SR = sample results

SA = spike added from spiking mix

2.4 Precision

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:

$$\text{RPD} = \frac{D^1 - D^2}{(D^1 + D^2)/2} \times 100$$

Where:

RPD = relative percent difference

D¹ = first sample value

D² = second sample value (duplicate)

2.5 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve quantification levels low enough to meet the required detection limits specified by NYSDEC ASP and to meet all site-specific standards, criteria and guidance values (SGCs) established for this project.

2.6 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of that site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on site. The representativeness of samples is assured by adherence to sampling procedures described in the Remedial Investigation Work Plan.

2.7 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers, and should be between 70 and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form of summaries, QC data, and raw analytical data. The laboratory will be required to submit data packages that follow NYSDEC ASP reporting format which, at a minimum, will include the following components:

1. All sample chain-of-custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analytes in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate/matrix spike blank results.
7. QC check sample and standard recovery results

8. Blank results (field, trip, and method).
9. Internal standard area and RT summary.

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

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 8260C, SVOCs in soil by USEPA Method 8270D, Target Analyte List (TAL) Metals in soil by EPA Method 6010C/7471B/7472 and pesticides / PCBs by USEPA Method 8081B/8082A. 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).

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.

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.

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) and the NYSDEC project manager.

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.

**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	UST and Impacted Soil Areas	22	1 per 900 square feet of excavation base, 1 per 30 ft of sidewall	Endpoint Verification of footing excavations	VOCs EPA Method 8260B, SVOCs EPA Method 8270,	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
	Hydraulic Lift and Waste oil tank Area	6	1 per 900 square feet of excavation base, 1 per 30 ft of sidewall	Endpoint Verification of footing excavations	VOCs EPA Method 8260B, SVOCs EPA Method 8270, PCBs EPA Method 8082	1 per day	1 per 20 samples	1 per 20 samples	1 per trip
	Excavated Petroleum Impacted Soil	1	1 per 800 cy	Waste Characterization for disposal if not stockpiled on site	VOCs EPA Method 8260B, PAHs EPA Method 8270, RCRA metals, pesticides and PCBs by EPA 8081/8082, other as per disposal facility	0	0	0	0
Soil	Excavated Historic Fill Material	20	1 per 800 cy	Waste Characterization for disposal if not stockpiled on site	VOCs EPA Method 8260B, PAHs EPA Method 8270, RCRA metals, pesticides and PCBs by EPA 8081/8082, other as per disposal facility	0	0	0	0
	Excavated Uncontaminated Native Soil (if excavated)	17	7 Grabs for 1st 1,000 cy, 2 for each additional 1,000 cy As per CP51	Clean Verification for disposal if not stockpiled.	VOCs EPA Method 8260B	0	0	0	0
Soil	Excavated Uncontaminated Native Soil (if excavated)	7	2 Composites for 1st 1,000 cy, 1 for each additional 1,000 cy As per CP51	Clean Verification for disposal if not stockpiled.	SVOCs, pesticides/and PCBs by EPA 8081/8082, and RCRA metals.	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 Vial	VOCs	(1) High Level Soil VOA Vials	Cool to 4° C + Methanol	EPA Method 8260C	Compound specific (1-5 ug/kg)	14 days
Soil	Soil	Scoop Direct into Vial	VOCs	(2) Low Level Soil VOA Vials	Cool to 4° C	EPA Method 8260C	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	Compound specific (1-5 ug/kg)	14 days
Soil	Soil	Scoop Direct into Jar	Pest/PCBs	from 8oz jar above	Cool to 4° C	EPA Method 8081B/8082A	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 6010C	Compound specific (01-1 mg/kg)	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. NA = Not available or not applicable.

ATTACHMENT D
Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN
FORMER BRONX FREIGHT TERMINAL SITE
101 LINCOLN AVE
BRONX, NY

MAY- 2016

Prepared on behalf of:

101 Lincoln Associates Property LLC
512 Seventh Avenue 15th Floor
New York, NY 10018

Prepared by:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS
RIDGE, NY 11961

**COMMUNITY AIR MONITORING PLAN
TABLE OF CONTENTS**

1.0	INTRODUCTION	1
1.1	Regulatory Requirements	1
2.0	AIR MONITORING	2
2.1	Meteorological Data	2
2.2	Community Air Monitoring Requirements	2
3.0	VOC MONITORING, RESPONSE LEVELS, AND ACTIONS	3
3.1	Potential Corrective Measures and VOC Suppression Techniques	3
4.0	PARTICULATE MONITORING	4
4.1	Potential Particulate Suppression Techniques.....	4
5.0	DATA QUALITY ASSURANCE	6
5.1	Calibration	6
5.2	Operations	6
5.3	Data Review	6
6.0	RECORDS AND REPORTING	7

APPENDICES

Appendix A Action Limit Report

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for the excavation and remediation activities to be performed under a Remedial Action Work Plan (RAWP) at the Former Bronx Freight Terminal 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 redevelopment that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). These activities include excavation and tank removal. 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) DER-10 Technical Guidance for Site Investigation and Remediation: 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

Petroleum related VOCs are the constituents of concern at the Site. The appropriate method to monitor air for these constituents during investigation activities is through real-time VOC and air particulate (dust) monitoring.

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

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

The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities 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.
- If total VOC concentrations opposite the walls of occupied structures or next to the intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s) (if access is granted by owner or occupants). Background readings in the occupied spaces must be taken prior to the commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to the commencement of the work.
- If the total particulate concentrations opposite the walls of occupied structures or next to intake vents exceeds $150 \mu\text{g}/\text{m}^3$, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to $150 \mu\text{g}/\text{m}^3$ or less at the monitoring point.

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 (PM₁₀) 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 ($\mu\text{g}/\text{m}^3$). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 $\mu\text{g}/\text{m}^3$ 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 $\mu\text{g}/\text{m}^3$ 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 $\mu\text{g}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu\text{g}/\text{m}^3$ 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 $\mu\text{g}/\text{m}^3$ 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 $100 \mu\text{g}/\text{m}^3$ 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 $150 \mu\text{g}/\text{m}^3$ 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 $150 \mu\text{g}/\text{m}^3$, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

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

5.0 DATA QUALITY ASSURANCE

5.1 Calibration

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

5.2 Operations

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

5.3 Data Review

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

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

6.0 RECORDS AND REPORTING

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

APPENDIX A
ACTION LIMIT REPORT

ATTACHMENT E
Citizen Participation Plan



New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan for **FORMER BRONX FREIGHT TERMINAL SITE**

**101 Lincoln Avenue
Bronx, NY 10454**

May 2016

Contents

<u>Section</u>	<u>Page Number</u>
1. What is New York’s Brownfield Cleanup Program?	1
2. Citizen Participation Activities.....	1
3. Major Issues of Public Concern.....	6
4. Site Information	6
5. Investigation and Cleanup Process.....	8
Appendix A - Project Contacts and Locations of Reports and Information.....	11
Appendix B - Site Contact List	12
Appendix C - Site Location Map	16
Appendix D - Brownfield Cleanup Program Process.....	17

* * * * *

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: **101 Lincoln Associates Property, LLC.**
Site Name: **Former Bronx Freight Terminal (“Site”)**
Site Address: **101 Lincoln Avenue**
Site County: **Bronx**
Site Number: **C203082**

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:	
<ul style="list-style-type: none"> • Prepare site contact list • Establish document repositories 	At time of preparation of application to participate in the BCP.
<ul style="list-style-type: none"> • 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:	
<ul style="list-style-type: none"> • Prepare Citizen Participation (CP) Plan 	Before start of Remedial Investigation
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
<ul style="list-style-type: none"> • 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:	
<ul style="list-style-type: none"> • Distribute fact sheet to site contact list that describes RI results 	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
<ul style="list-style-type: none"> • 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:	
<ul style="list-style-type: none"> • Distribute fact sheet to site contact list that describes upcoming cleanup action 	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
<ul style="list-style-type: none"> • 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 Site is not located in an Environmental Justice Area. Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

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.

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 street address for the Site is 101 Lincoln Avenue, Bronx, NY. The Site is located in the South Bronx section of Bronx and is comprised of a single tax parcel totaling 133,700 square feet (3.07 acres). The Site has approximately 300 ft of street frontage on Bruckner Avenue, approximately 350 ft of street frontage on Lincoln Avenue and approximately 500 ft of frontage along the north side of the Harlem River. Currently the property developed with a one-story L-shaped warehouse building with a connected two-story office building totaling 83,064 square feet. The Site was previously occupied by the New Jersey Central Rail Bronx Freight Terminal, and the Gerosa Haulage Corporation until circa 2007. The Site is currently owned by 101 Lincoln Avenue Associates, LLC.

The area surrounding the Site is primarily commercial and industrial buildings to the east and west, several mixed use properties to the north, and the Harlem River to the south. There are no schools or daycare facilities within 1,000 ft of the project Site.

The elevation of the Site is approximately 5 feet above the National Geodetic Vertical Datum (NGVD). The area topography gradually slopes to the southwest. The depth to groundwater beneath the Site is approximately 6-7 feet below grade. Based on regional groundwater elevation maps, and measurements made at the Site, groundwater flows to the southwest toward the Harlem River.

History of Site Use, Investigation, and Cleanup

The Site is currently owned by the 101 Lincoln Avenue Associates, LLC. The property is currently developed with a single-story L-shaped warehouse building with a connected two-story office building and has been in this configuration since 1966. The Requestor purchased the property in November 2014. The property was most recently occupied the Gerosa Haulage Corporation (with uses including crane repair, paint shop, blacksmith shop, and garage repair shop).

The Site was first developed sometime before 1908. From 1908 to 1951 the Site was occupied by the New Jersey Central Rail Bronx Freight Terminal. From 1968 to 2007, the Site is identified as Gerosa Haulage Corporation (with uses including crane repair, paint shop, blacksmith shop, and garage repair shop). According to the NYC Department of Buildings, the existing building was constructed in 1966.

A Remedial Investigation was conducted by EBC in April of 2016. The field work portion of the RI was conducted by EBC from December 4, 2015 through December 8, 2015. 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 VOCs, SVOCs, pesticides, PCBs and metals;
- The installation of groundwater monitoring wells
- The collection and analysis of groundwater samples for VOCs, SVOCs, pesticides, PCBs and metals;
- The collection of analysis of soil gas and indoor air samples for VOCs from soil gas sampling locations.

Subsurface soils at the Site include a silt and sand non-native fill with bricks, concrete, coal and other rubble to a depth of approximately 5 feet below grade. A native sand and clay is present below the fill to a depth of approximately 12 feet below grade. The fill material contains elevated levels some metals, pesticides PCBs and SVOCs.

Groundwater at the Site is present at a depth of approximately 6-7 feet below surface grade and flows in a west / southwestern direction towards the Harlem River.

The results of sampling performed during the RI, identified petroleum related contaminants in soil at a depth of 12-14 feet in the northwestern portion of the Site and to a lesser degree in the southwestern portion of the Site.

Historic fill material has been identified across the Site to depths as great as 7 feet below grade. The historic fill material contains semi-volatile organic compounds and metals including arsenic, barium, chromium, copper, lead, mercury, nickel, silver and zinc above unrestricted, restricted residential or restricted commercial use SCOs.

Several petroleum VOCs were reported at elevated concentrations in one monitoring well in the vicinity of the northwestern impacted soil area indicating that some of the VOC impacted soil has transferred to the dissolved phase in this area. The pesticide deildrin was also reported above its part per trillion standard in this area.

SVOC detections above groundwater standards were reported across the Site but limited to those polynuclear aromatic hydrocarbons (PAHs) with a 2 per trillion standard. SVOCs reported in the parts per trillion range are a function of the laboratories ability to achieve extremely low detection limits and general background conditions.

Several dissolved metals were detected above standards including sodium, iron, magnesium and manganese were detected above standards throughout the Site. The metals detected in groundwater are related to brackish conditions and are associated with the Site's proximity to the Harlem River.

Total petroleum-related VOCs were generally low in soil vapor samples across the Site. There did not appear to be any correlation in concentration or distribution of petroleum VOCs in soil vapor with the source area.

PCE was reported in all of the soil vapor samples ranging from 0.94 $\mu\text{g}/\text{m}^3$ in SG7 to 161 $\mu\text{g}/\text{m}^3$ in SG1.

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 proposes that the Site will be used for the construction of a new 7-story mixed-use commercial residential building which will cover the entire Site. Plans include a full height basement level requiring excavation of the entire Site to a depth of 14 ft below grade. The basement level will be used for parking with a FRESH program super market occupying the first floor. Floors 2 to 7 will be residential apartments.

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 completed a remedial investigation before it entered into the BCP.

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.

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):

Project Manager (TBD) New York State
Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7015

Thomas Panzone
Regional Citizen Participation Specialist
NYSDEC Region 2
Office of Communications Services
47-40 21st Street
Long Island City, NY 11101-5407
Tel: (718) 482-4953
Email: thomas.panzone@dec.ny.gov

New York State Department of Health (NYSDOH):

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: bee@health.ny.gov

Locations of Reports and Information

The following locations will serve as a repository for public access to documents generated under the BCP program:

New York Public Library - Mott Haven Branch

321 East 140th Street
Bronx, NY 10454
(718) 665-4878

Hours:

Mon 10:00 AM - 6:00 PM
Tue 10:00 AM - 7:00 PM
Wed 10:00 AM - 7:00 PM
Thu 10:00 AM - 6:00 PM
Fri 10:00 AM - 5:00 PM
Sat 10:00 AM - 5:00 PM
Sun closed

Bronx 1 Community District

3024 Third Avenue

Bronx, NY, 10455

718-585-7117

brxcb1@optonline.net

Hours:

Mon 9:00 AM - 5:00 PM

Tue 9:00 AM - 5:00 PM

Wed 9:00 AM - 5:00 PM

Thu 9:00 AM - 5:00 PM

Fri 9:00 AM - 5:00 PM

Sat closed

Sun closed

Appendix B - Site Contact List

Local Government Contacts:

City of New York

William de Blasio
Mayor of New York City
City Hall
New York, NY 10007

Ruben Diaz, Jr.
Bronx Borough President
851 Grand Concourse, Suite 301
Bronx, New York 10451
Telephone (718) 590-3500

George Rodriguez
Chair, Bronx Community Board 1
3024 Third Avenue
Bronx, NY 10455
TEL: (718) 585-7117
FAX: (718) 292-0558

Cedric Loftin
District manager, Bronx Community Board 1
3024 Third Avenue
Bronx, NY 10455
TEL: (718) 585-7117
FAX: (718) 292-0558

Mellisa Mark - Viverito
New York City Council Speaker – District 8
105 East 116th Street
New York, NY 10029
Telephone (212) 828-9800
Fax (212) 722-6378

Carl Weisbrod
Chair of City Planning (Zoning)
22 Reade St.
Third Floor
New York, NY 10007

Carol Samol
Director, NYC Planning Commission – Bronx Office
1 Fordham Plz.
Bronx, New York 10458
Telephone (718) 220-8500
Fax (718) 584-8628

Constance Moran
New York City Department of Transportation
Bronx Borough Commissioner
55 Water Street, 9th Floor
New York, NY 10041
212-748-6680

Bronx County Clerk's Office
Luis M. Diaz, County Clerk
851 Grand Concourse, Room 118
Bronx, New York 10451
Telephone (866) 797-7214

Ms. Letitia James
Public Advocate
1 Centre Street, 15th Floor
New York, NY 10007
Email: kjfoyc@pubadvocate.nyc.gov

Hon. Scott M. Stringer
Office of the Comptroller
1 Centre Street
New York, NY 10007
Email: intergov@comptroller.nyc.gov

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

Daniel Walsh
NYC Department of Environmental Remediation
100 Gold Street
New York, NY 10038

New York State
Senator José M. Serrano
Senatorial District: 29
1916 Park Avenue Suite 202,
New York, NY 10037
Telephone (212) 828-5829
Fax (212) 828-2420

Asm. Carmen E. Arroyo
84th Assembly District
384 East 149th Street, Suite 301
Bronx, New York 10455
Telephone (718) 292-2901

Federal

Hon. Charles Schumer
U.S. Senator
757 Third Avenue, Suite 17-02
New York, NY 10017

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

Rep. José E. Serrano
Congressional District: 15
1231 Lafayette Avenue, 4th Floor
Bronx, New York 10474
Telephone (718) 620-0084
Fax (718) 620-0658

Adjacent Property Owner Contacts

Contact information for the identified owners, as listed in the New York City ACRIS Database, are as follows:

West

1. Owner
2401 Third Avenue Associates Property LLC
512 Seventh Avenue 15th Floor
New York, NY 10018

2. Owner
KAI DEVELOPMENT CORP.
211 W. 58TH ST. APT. 1
NEW YORK, NY 10019-1418

Occupant / Tenant
2403 3RD AVE
BRONX, NY 10451-6330

3. Owner
GLS REAL ESTATE CO.,
2413 3RD AVE.
BRONX, NY 10451-6330

Occupant / Tenant
2413 3RD AVE.
BRONX, NY 10451-6330

4-5. Owner
MADHATTERS REALTY INC.
2417 3RD AVE.
BRONX, NY 10451-6331

Occupant / Tenant
2417 3RD AVE
BRONX, NY 10451-6331

North

6. Owner / Occupant
1 BRUCKNER,
2412 3RD AVE.
BRONX, NY 10454-4401

7. Owner
ALTAMIRANO'S ENTERPRI
401 DAVENPORT AVE.
NEW ROCHELLE, NY 10805-2110

Occupant / Tenant
3 BRUCKNER BOULEVARD
BRONX, NY 10454

8. Owner / Occupant
GINO FAVA
LIVERPOOL CARTING
5 BRUCKNER BLVD.
BRONX, NY 10454-4411

9. Owner / Occupant
STEPCAR CORP.
7 BRUCKNER BLVD.
BRONX, NY 10454-4411

10. Owner / Occupant
HALMAN ENTERPRISES INC.
9 BRUCKNER BLVD.
BRONX, NY 10454-4411

11. Owner
GORDON ROTH DEVELOPMENT
11 BRUCKNER BLVD. # 1
BRONX, NY 10454-4411

Occupant / Tenant
11 BRUCKNER BOULEVARD
BRONX, NY 10454

East

12. Owner

LINCOLN CORNERS,
545 BROADWAY STE 4
BROOKLYN, NY 11206-2962

Property Manager
CARNEGIE MANAGEMENT
545 BROADWAY STE 4
BROOKLYN, NY 11206-2962

Occupant / Tenant
112 LINCOLN AVENUE
BRONX, NY 10454

13. Owner

14 BRUCKNER LLC
1536 3RD AVE. FL. 3
NEW YORK, NY 10028-2167

Occupant / Tenant
14 BRUCKNER BOULEVARD
BRONX, NY 10454

14. Owner

FM PROPERTIES, LLC
335 CENTER AVE.
MAMARONECK, NY 10543-2304

Occupant / Tenant
290 E. 132nd STREET
BRONX, NY 10454

Local News Media

Bronx Times

900 E. 132nd Street
Bronx, NY 10454
(718) 597-1116

New York Times

620 Eighth Ave.
New York, NY 10018

New York Daily News

450 W. 33 Street
New York, NY 10001

New York Post

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

Public Water Supplier

New York City Department of Environmental Protection
Bureau of Water Supply
1250 Broadway - 8th Floor
Manhattan, NY 10001

Requested Contacts

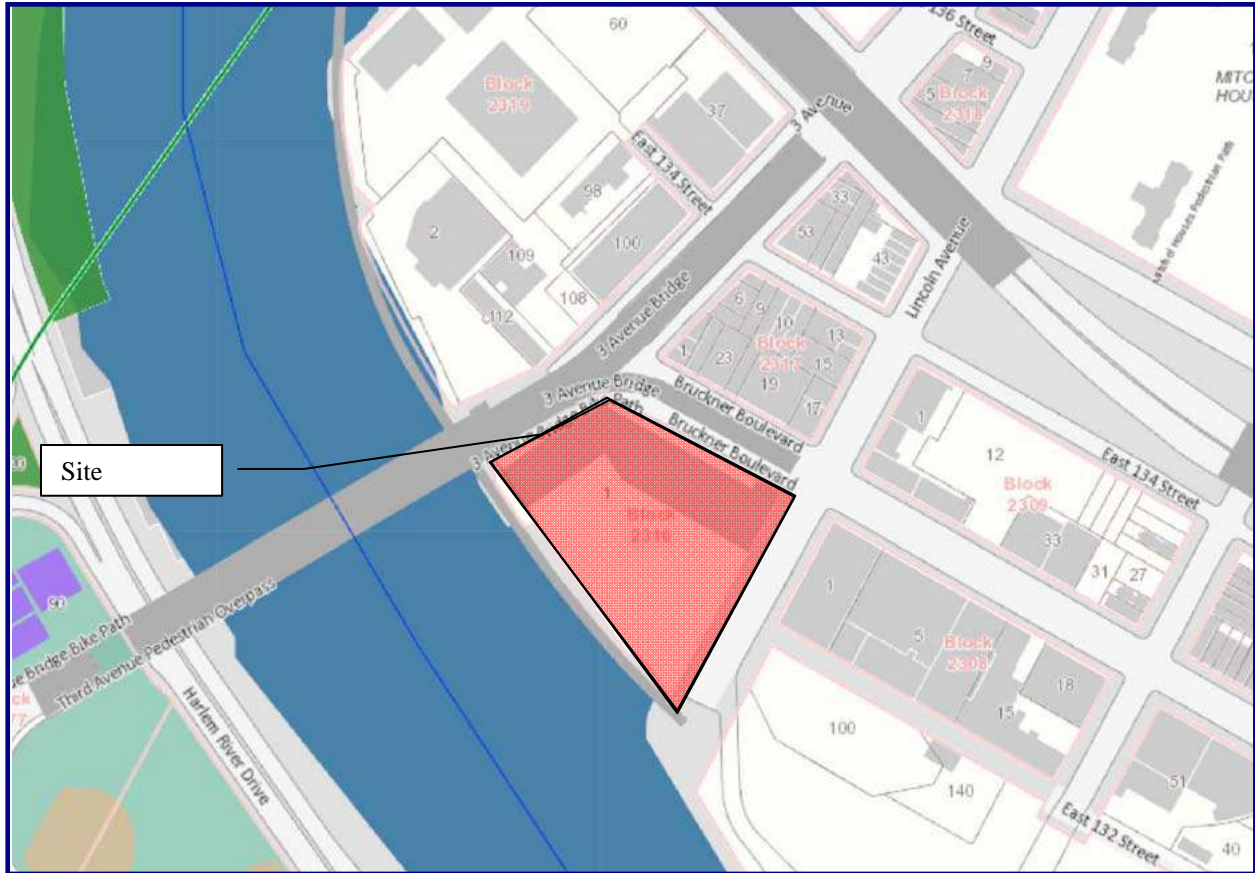
No requests have been made at this time.

Schools and Daycare Facilities

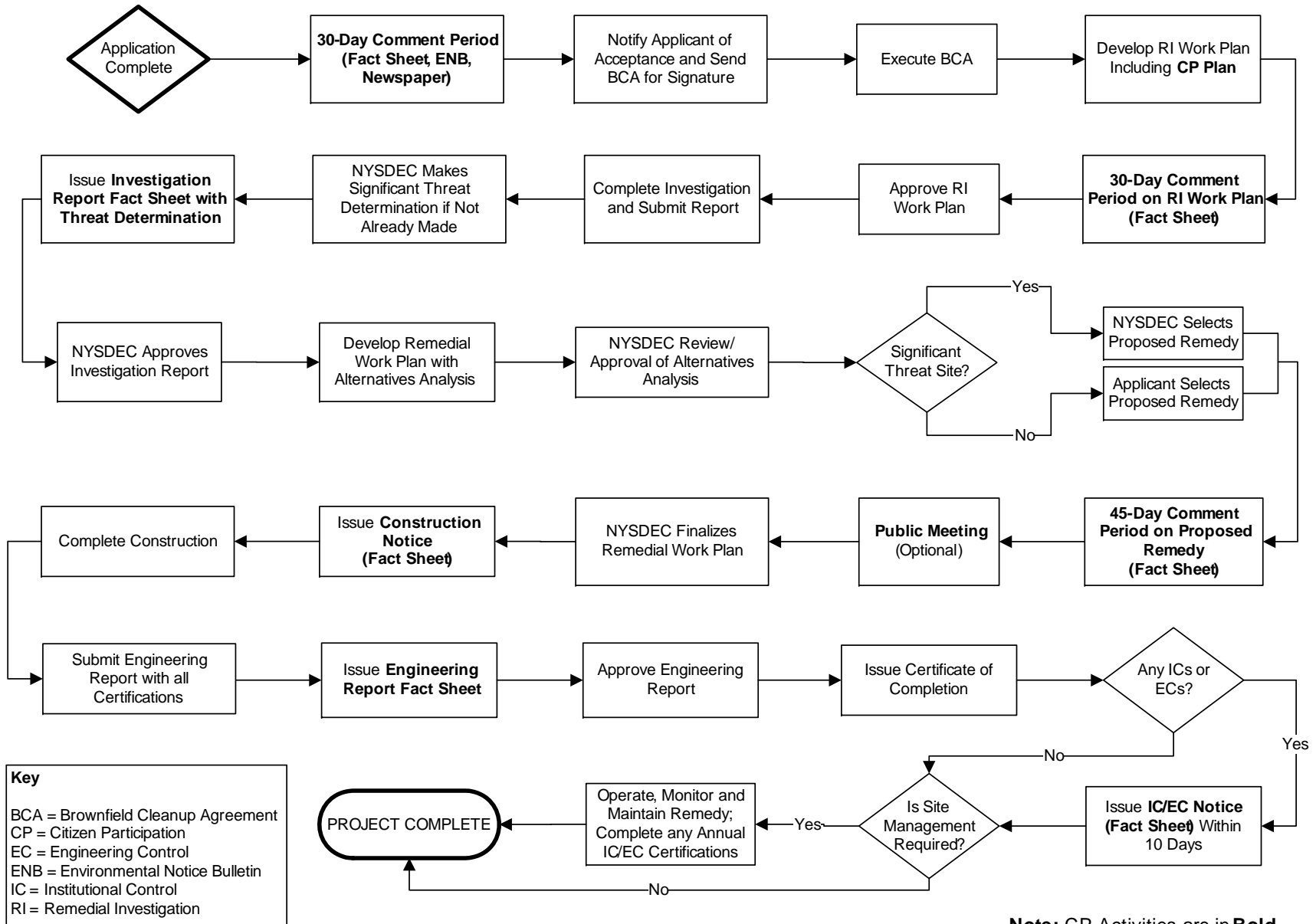
There are no Schools or Daycare facilities within a 1,000 ft of the project Site. Schools nearest the Site include:

- 1 City of New York: PS 154 Jonathan D Hyatt
333 East 135th Street, Bronx, NY 10454
Principal: Dr. Alison Coviello
(718) 292-4742
- 2 Success Academy Harlem 2
144 East 128th Street
New York, NY 10035
Principal: Kaitlin McDermott
(646) 442-6600
- 3 King's Academy
2345 Third Avenue
New York, NY 10035
Principal: Elder T. Streitferdt, Jr.
(212) 348-7331
- 4 Citizens Care Daycare Center #2
2322 3rd Avenue
New York, NY 10035
Director: Ms. Moore
(212) 348-7331

Appendix C - Site Location Map



Appendix D– Brownfield Cleanup Program Process



ATTACHMENT F
Resumes



ENVIRONMENTAL BUSINESS CONSULTANTS

Charles B. Sosik, PG, PHG, Principal

Professional Experience

24 years

Education

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

Areas of Expertise

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

Professional Certification

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

Professional Affiliation / Committees

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

PROFILE

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

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

SELECTED PROJECTS

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

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

Advanced Residential Communities, Rockville Centre, NY

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

plan. This will allow the developer to begin remedial work approximately 5 months ahead of schedule.

Former Temco Uniform site, West Haverstraw, NY

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

Grovick Properties, Jackson Heights, NY

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



Charles B. Sosik, PG, PHG, Principal

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

Metro Management, Bronx, NY

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

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

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

Brandt Airflex, NY

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

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

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

KeySpan – Former LILCO Facilities, Various NY Locations

Pesticide Impact Evaluation - Mr. Sosik developed, negotiated and implemented a site screening procedure to evaluate impact to public health and the environment as the result of past herbicide use at 211 utility sites. Using an unsaturated zone leaching model (PRZM) on a small subset of the sites, he was able to establish mass loading schedules for the remaining sites. This was combined with public well data in a GIS environment to perform queries with respect to mass

loading, time transport and proximity to vulnerable public supply wells. Using this approach Mr. Sosik was able to show that there were no concerns for future impact. This effort satisfied the public health and resource concerns of the state environmental agency and county health department in a reasonable amount of time and at a fraction of the cost of a full scale investigation.

Former Computer Circuits (Superfund) Site, Hauppauge, NY

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

Sun Oil, Seaford, NY

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

Con Edison, Various Locations, NY

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

Keyspan - Tuthill Substation, Aqueboque, NY

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

NYSDEC Spill, East Moriches, NY

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



Charles B. Sosik, PG, PHG, Principal

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

Minmilt Realty, Farmingdale, NY

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

Sebonack Golf Course Project, Town of Southampton, NY

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

NYSDEC, Spills Division, Regions 1 - 4

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

Sun Oil, E. Meadow, NY

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

transport model to show that degradation processes would achieve standards within a reasonable time.

Sand & Gravel Mine, NY

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

NYSDEC, Mamaroneck, NY

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

Riverhead Municipal Water District, NY

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

Montauk Fire Department, NY

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

PREVIOUS EXPERIENCE

P.W. Grosser Consulting, Bohemia, NY

Senior Project Manager, 1999-2006

Environmental Assessment & Remediation, Patchogue, NY

Senior Project Manager, 1994-1999

Miller Environmental Group, Calverton, NY

Project Manager, 1989-1994

DuPont Biosystems, Aston, PA

Hydrogeologist, 1988-1989



Charles B. Sosik, PG, PHG, Principal

EXPERT WITNESS TESTIMONY AND DEPOSITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

MODELING EXPERIENCE (PARTIAL LISTING)

Table with 3 columns: PROJECT, MODEL, APPLICATION. Rows include Riverhead Water District, NYSDEC - Region 1, AMOCO, Keyspan Energy, Saboneck Golf Club, Suffolk County Department of Public Works, SCDPW SUNY Waste Water Treatment Plant, and Water Authority of Great Neck North.

PUBLICATIONS / PROFESSIONAL PAPERS

- Smart Pump & Treat Strategy for MTBE Impacting a Public Water Supply (14th Annual Conference on Contaminated Soils Proceedings, 1998)
Transport & Transformation of BTEX & MTBE in a Sand Aquifer (Groundwater Monitoring & Remediation 05/1998)
Characteristics of Gasoline Releases in the Water Table Aquifer of Long Island (Petroleum Hydrocarbons Conference Proceedings, 1999)
Field Applications of the Hydrocarbon Spill Screening Model (HSSM) (USEPA Interactive Modeling Web Course www.epa.gov/athens/software/training/webcourse Authored module on model application and applied use of calculators, 02/2000)
Comparative Evaluation of MTBE Sites on Long Island, US EPA Workshop on MTBE Bioremediation (Cincinnati, 02/2000)
Comparison of Four MTBE Plumes in the Upper Glacial Aquifer of Long Island (American Geophysical Union, San Francisco, 12/1996)
Analysis and Simulation of the Gasoline Spill at East Patchogue, New York (American Geophysical Union, San Francisco, 12/1998)



AMC Engineering
99 Jericho Turnpike, Suite 300J
Jericho, NY 11590
Phone: (516) 417-8588

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 20 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

AMC: 14

Prior: 6 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
- Dewatering & Treatment System Design
- NYCDEP Sewer Discharge Permitting
- 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
- Waste Management Plans

Professional Certifications

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



ENVIRONMENTAL BUSINESS CONSULTANTS

Robert Bennett, Project Manager

Professional Experience

EBC: February 2015 - Present

Prior: 7 years

Education

Bachelor of Science, Environmental Science, State University of New York College at Oneonta, Oneonta, NY

Associates in Applied Sciences, Field Biology, State University of New York College at Delhi, Delhi, NY

Areas of Expertise

- Phase I / Phase II Property Assessments
- Waste Characterization / Soil Management
- Brownfield Closure and Planning Board
- Remedial Investigations
- Groundwater, Soil and Soil Vapor Remediation
- Indoor Air Quality (IAQ) Investigations
- Lead-Based Pain Risk Assessor
- Asbestos-Containing Materials Investigator/Inspector
- Landfill Closure and Monitoring
- Dredging Monitoring and Management
- Hazardous Materials Assessments
- Title V & NY Air Permitting and Registrations
- NYS / Nassau & Suffolk County Sanitary Code Compliance

Professional Certification

- OSHA 40-hr HAZWOPER
- OSHA 10-hr Construction Safety
- NYSDOH Asbestos Inspector
- NYCDEP Asbestos Investigator
- EPA Lead-Based Paint Inspector & Risk Assessor

PROFILE

Mr. Bennett has 8 years experience as an environmental consultant and is responsible for assessment and investigative services for a wide variety of projects, including industrial and commercial properties, mass transit facilities, parking structures, and sanitary and wastewater treatment facilities. Mr. Bennett has conducted Phase I, II and III Environmental Site Assessments for commercial, industrial, and residential properties in New York, New Jersey, and Massachusetts.



ENVIRONMENTAL BUSINESS CONSULTANTS

Robert Bennett, Project Manager

Mr. Bennett conducts research and provides support for various projects on a daily basis and coordinates with clients, regulatory agencies, attorneys and sub-contractors to provide cost-effective business solutions for a plethora of environmental concerns. Mr. Bennett's field experience includes tank removal and installations, dredging oversight and monitoring, asbestos and lead inspections, compliance audits, spill management and closure, soil and groundwater sampling, and both the oversight and operation of soil boring and well installation equipment. In addition, Mr. Bennett has performed project research, data reduction and evaluation, and has prepared reports for both regulatory and client use.

PREVIOUS EXPERIENCE

Dvirka & Bartilucci Engineers and Architects, P.C., Woodbury, NY
Environmental Scientist II, 2014-2015

Gannett Fleming Engineers and Architects, P.C., Woodbury, NY
Environmental Scientist, 2012-2014

Apex Companies L.L.C., Bohemia, NY
Environmental Scientist / Project Manager, 2008-2012

SELECT PROJECT EXPERIENCE

Project: Fulton Street Redevelopment Project - 1134 Fulton Street, Brooklyn NY
Description: NYC E-Designation. Soil contaminated with chlorinated solvents and heavy metals requiring excavation, soil management and disposal as well as a Soil Vapor Extraction System under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: Porter Avenue Holdings
Authority: NYSDEC, NYSDOH & NYCOER
Role: Mr. Bennett served as the Project Manager for the project.

Project: Redevelopment Project - 391 Meeker Avenue, Brooklyn NY
Description: NYC E-Designation. Historic Fill Material requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: Draftex Architectural Drafting & As Built Services
Authority: NYCOER
Role: Mr. Bennett serves as the Project Manager for the project.

Project: Redevelopment Project - 1555-1557 Fulton Street, Brooklyn NY



ENVIRONMENTAL BUSINESS CONSULTANTS

Robert Bennett, Project Manager

Description: NYC E-Designation. Historic Fill Material requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan

Client: Waterfront Property Management, LLC.

Authority: NYCOER

Role: Mr. Bennett serves as the Project Manager for the project.

Project: Governor's Office of Storm Recovery (GOSR) New York Rising Buyout and Acquisition Program / Superstorm Sandy Relief Program

Location: Long Island and New York City

Type: Phase I Environmental Site Assessments (ESAs) and Property Evaluation

Contamination: Asbestos, Lead, Mold and PCBs

Role: Environmental Scientist II responsible for the creation and review of a high volume of Phase I ESAs

Project: WMATA Metrorail System Assessment Program

Location: Washington D.C. Area

Type: Hazardous materials inspection and evaluation for planning and engineering design purposes.

Contamination: Asbestos, Lead and PCBs

Role: Environmental Scientist and Inspection Team Leader

Project: Armonk Square Redevelopment Plan

Location: Armonk Square, Armonk, NY

Type: Monitoring well and recovery well installation. Sub-slab depressurization system (SSDS) installation and operational modifications.

Contamination: Chlorinated Solvents

Role: Environmental Scientist responsible for the planning and oversight of monitoring well and recovery well installation. Planning, oversight, and modifications to SSDS.

Project: Newtown Creek Dredging Project for NYCDEP

Location: NYCDEP Newtown Creek Wastewater Treatment Facility, Brooklyn, NY

Type: Navigational waterway dredging

Contamination: Hazardous and biological pollutants in bottom sediment.

Role: Environmental Scientist responsible for the implementation and operation of engineering controls and turbidity monitoring.

Project: Boring / Coring Program, Northeast U.S. Region

Location: New Bedford Harbor, New Bedford, MA. Long Island and Massachusetts.



ENVIRONMENTAL BUSINESS CONSULTANTS

Robert Bennett, Project Manager

- Type: Bathymetric surveys. Borings and Corings advanced through deep sediment and bedrock to determine the proper allocation dredge areas and confined aquatic disposal zones. Additionally, Vibracore drilling was conducted in shallow and easily accessible areas.
- Contamination: PCBs
- Role: Environmental Scientist / Project Manager serving as an on-site geologist to interpret and record geological investigations.
- Project: New York State Air Permit Facilities
- Location: Westchester, Orange and Rockland County, NY
- Type: Title V Air Permits, state registration and permitting for multiple industrial laundering facilities.
- Contamination: Hazardous Air Pollutants
- Role: Environmental Scientist / Project Manager responsible for all air permitting work for a NY-branch office.
- Project: Dredging Oversight and Water Quality Monitoring
- Location: New Bedford Harbor, New Bedford, MA
- Type: Bathymetric surveys. Supervised maintenance dredging and confined aquatic disposal zone excavation operations. Turbidity and sediment flocculation monitoring.
- Contamination: PCBs
- Role: Environmental Scientist providing project oversight, coordinating daily with Mass DEP and sub-contractors. Documenting geological data.
- Project: Stormwater Abatement System Inspections, Repairs and Reporting
- Location: Multiple retailer locations throughout New York State
- Type: Stormwater drainage system and stormwater control structure inspections and repairs
- Contamination: PCBs
- Role: Environmental Scientist / Project Manager assigned to coordinate and perform routine inspections of drainage systems and stormwater control structures. Made repairs to stormwater appurtenances where necessary.
- Project: ConEdison Truck-flush facility, effluent discharge monitoring.
- Location: Multiple ConEdison truck-flush facilities located throughout New York City, NY.
- Type: Compliance sampling and evaluation with regard to New York City Sewer Effluent Limitations.
- Contamination: Oil & Grease, Metals, Pesticides/PCBs, VOCs, SVOCs
- Role: Effluent sampling. Coordinating with client and laboratory to conduct quarterly sampling events.
- Project: RCRA Closure Support



ENVIRONMENTAL BUSINESS CONSULTANTS

Robert Bennett, Project Manager

Location: Pall Corporation Former Headquarters, East Hills, NY
Type: Environmental closure of a medical equipment manufacturing facility
Contamination: Formic Acid, Dimethylacetamide (DMAC)
Role: Environmental Scientist / Project Manager responsible for the supervision of the removal of all process tanks, piping and associated appurtenances. Accomplished final decommissioning activities. RCRA Closure Report.

Project: Brownfield Closure Support
Location: Multiple locations throughout New York City
Type: Remedial investigations. Interim remedial measures. Soil vapor intrusion studies. RCRA Closure.
Contamination: VOCs, SVOCs, Oil & Grease, Pesticides/PCBs, Metals
Role: Environmental Scientist / Project Manager responsible for preparing and conducting remedial investigations, interim remedial measures, soil vapor intrusion studies and RCRA closure.

Project: Mirant Bowline Power Plant Asbestos Survey
Location: West Haverstraw, NY
Type: Asbestos inspection. Personal exposure monitoring. Asbestos labeling Program. Reporting.
Contamination: Asbestos
Role: Environmental Scientist / Project Manager serving as a team leader to conduct large scale asbestos inspection, labeling program and reporting.

Project: Estee Lauder SPCC Facilities
Location: Multiple manufacturing facilities throughout Long Island
Type: Spill Prevention Control & Countermeasures (SPCC) inspections, evaluation and reporting.
Contamination: N/A
Role: Environmental Scientist / Project Manager responsible for conducting inspections, facility engineering review, and reporting.

Project: Nassau and Suffolk County Sanitary Code Facility Compliance Audits
Location: Multiple medical equipment manufacturing facilities throughout Long Island.
Type: Article XI and XII Sanitary Code Compliance Audits and multiple medical equipment manufacturing facilities.
Contamination: N/A
Role: Environmental Scientist / Project Manager responsible for conducting inspections, facility engineering review, and reporting.

PUBLICATIONS

Dredging and Beach Nourishment Public Notices
(Cape Cod Times, 2008-2010)



ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin Waters, Field Manager

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 10 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



ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin Waters, Field Manager

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



ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin R. Brussee, Senior 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



ENVIRONMENTAL BUSINESS CONSULTANTS

Kevin R. Brussee, Senior Project Manager

SELECT PROJECT EXPERIENCE

- Project: Former Dico G, Auto 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.)



ENVIRONMENTAL BUSINESS CONSULTANTS

Chawinie Reilly, Project Manager / Industrial Hygienist

Professional Experience

EBC: March 2013

Prior: 8 years

Education

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

Areas of Expertise

- Phase I / Property Condition Assessments
- Occupational Health and Safety Sampling
- Indoor Air Quality (IAQ) Investigations
- Mold Investigations and Remediation
- Soil and Ground Water Investigations
- Noise Studies
- Lead Paint and Asbestos Surveys
- Hazardous Materials Assessments

Professional Certification

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

PROFILE

Mrs. Reilly has 9 year's experience as an environmental consultant/contractor and has worked on and managed a wide range of environmental projects. Ms. Miller has conducted Phase Is and Property Condition Assessments for commercial, industrial, and residential properties in New York, New Jersey and Connecticut. In addition, Ms. Miller has conducted various IAQ, asbestos, mold and occupational health and safety sampling investigations for a variety of city, state, federal and private clients.

PREVIOUS EXPERIENCE

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

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

ATTACHMENT G
BCP Signage Specifications



Department of
Environmental
Conservation

New York State Brownfield Cleanup Program

FORMER BRONX FREIGHT TERMINAL SITE

BCP Site No. C203082

101 Lincoln Associates Property LLC

Governor Andrew M. Cuomo

NYSDEC Acting Commissioner Basil Seggos

Mayor Bill de Blasio

Transform the Past... Build for the Future.

Sign Requirements

Size: Horizontal format – 96” wide by 48” high

Construction

Materials: Aluminum or wood blank sign boards with vinyl sheeting.

Inserts: “New York State and DEC logo”, “Program Name”, “Site Name”, “Site No.”, “Name of Party Performing Remedial Activities or New York State Department of Environmental Conservation”, “Governor”, “DEC Commissioner”, “Municipal Executive”, “Transform the Past...Build for the Future”.

Color Scheme: All body font should be black or green Pantone 350 C or CMYK 80/43/83/42. If blue is desired, use following values: Pantone 288 C or CMYK 100/87/27/19.

New York State and DEC logo: use eps file [here](#) (it is high resolution and scalable. If vendor needs a different format, use jpg file [here](#) . Both utilize the correct color.

Text:

Program Name (choose one):

State Superfund Program	}	Green text (PANTONE 350C or CMYK 100/43/83/42
Brownfield Cleanup Program		
1996 Clean Water/Clean Air Bond Act –		
Environmental Restoration Program		
Voluntary Cleanup Program		
Petroleum Remediation Program		

Site Name: Blue text (PANTONE 288C or CMYK 100/87/27/19)

Site Number: Blue text (PANTONE 288C or CMYK 100/87/27/19)

Name of Party Performing Remedial Activities or New York State Department of Environmental Conservation: Green text (PANTONE 350C or CMYK 100/43/ 83/42

Governor: Black text

DEC Commissioner: Black text

Municipal Executive: Black text

Transform the Past....Build for the Future: Blue text (PANTONE 288C or CMYK 100/87/27/19)

Type

Specifications:

All type is Ariel.

Format is: Center each line of copy with initial caps and small Letters.

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:

Next page.

8'

2"	 NEW YORK STATE OF OPPORTUNITY.	Department of Environmental Conservation	Logo (Use eps or .jpg file) Green Text (See Key) White Background
6"			
2"			
4"	Program Name		
2"			
4"	Site Name		
2"			
2"	Site No.		
2"			
2"	Remedial Party or New York State Department of Environmental Conservation		
2"			
2"	Governor		
2"			
2"	Commissioner		
2"			
2"	Municipal Executive		
2"			
4"	Transform the Past.... Build for the Future		
2"			

Green Text (See Key)

Blue Text (See Key)

Blue Text (See Key)

Green Text (See Key)

Black Text

Black Text

Black Text

Blue Text (See Key)

4'

Color Key for Text

Green Text = Pantone 350C or CMYK 80/43/63/42

Blue Text = Pantone 288C or CMYK 100/87/27/19

Project Sign Format

ATTACHMENT H
Estimated Remedial Costs

FORMER BRONX FREIGHT TERMINAL
101 Lincoln Avenue
Bronx, NY

Summary of Project Costs

NYS Brownfields Cleanup Program
Costs by Task

TASK - ENVIRONMENTAL REMEDIATION	Alternative 1 - Track 1	Alternative 2 - Track 4
BCP Entry Documents	Completed	Completed
Supplemental Investigation And RI Report	Completed	Completed
Remedial Work Plan, Remedy Scoping & Coordination	\$ 18,450.00	\$ 18,450.00
Remedial Program Implementation	\$ 7,507,934.50	\$ 2,425,810.00
Final Engineering Report, Site Management Plan & IC/ECs	\$ 18,200.00	\$ 50,450.00
<i>Subtotal</i>	\$ 7,544,584.50	\$ 2,494,710.00
<i>15% Contingency</i>	\$ 1,131,687.68	\$ 374,206.50
<i>Total</i>	\$ 8,676,272.18	\$ 2,868,916.50