

112-21 NORTHERN BOULEVARD

QUEENS, NEW YORK

Remedial Action Work Plan

NYSDEC BCP Number: C241157

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CERTIFICATION

I, Brian P. Morrissey, 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).

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

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NYS Professional Engineer #062617

November 25, 2014
Date



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.

DISCLOSURE STATEMENT

The professional engineering services rendered in preparation of this document have been performed for Roux Associates, Inc. by Remedial Engineering, P.C., a professional corporation certified to perform such services in the State of New York.

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LIST OF ACRONYMS

Acronym	Definition
40 CFR	Title 40 of the Code of Federal Regulations
1,2-DCE	cis-1,2-dichloroethene
trans-1,2-DCE	trans-1,2-dichloroethene
4,4'-DDE	4,4'-dichlorodiphenyldichloroethylene
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane
4,4'-DDT	4,4'-dichlorodiphenyltrichloroethane
1,1,1-TCA	1,1,1 trichloroethane
AAR	Alternatives Analysis Report
AOCs	Areas of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
ASP	Analytical Services Protocol
AWQSGVs	Ambient Water Quality Standards and Guidance Values
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bls	Below land surface
BSA	New York City Board of Standards and Appeals
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Certificate of Completion
COCs	Contaminants of Concern
CP-51	Commissioner Policy-51
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CRZ	Contamination Reduction Zone
CVOCs	Chlorinated Volatile Organic Compounds
CY	Cubic Yards

Acronym	Definition
DER	Division of Environmental Remediation
DER-10	NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation
DO	Dissolved Oxygen
DRO	Diesel Range Organics
DSHM	Division of Solid and Hazardous Materials
DSNY	New York City Department of Sanitation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
EDD	Electronic data deliverable
ELAP	Environmental Laboratory Approval Program
EZ	Exclusion Zone
FDNY	New York City Fire Department
FER	Final Engineering Report
FS	Feasibility Study
FSI	Focused Subsurface Investigation
GCI	GCI Environmental Advisory, Inc.
GRA	General Response Action
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operation Worker
HDPE	High Density Polyethylene
HRO	Heavy Range Organics
IHWDS	Inactive Hazardous Waste Disposal Site
IC	Institutional Control
IRM	Interim remedial measures
L/min	Liters per minute
mg/kg	Milligrams per kilogram, equal to 1,000 µg/kg
mg/L	Milligrams per liter
µg/kg	Micrograms per kilogram, equal to 0.001 mg/kg

Acronym	Definition
µg/L	Micrograms per liter
µg/m ³	Micrograms per cubic meter
MS	Matrix Spike
MSDs	Matrix Spike Duplicates
MTBE	Methyl tertiary butyl-ether
MW	Monitoring well
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OM&M	Operation, Maintenance and Monitoring
ORP	Oxidation Reduction Potential
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethene
PID	Photoionization detector
PPE	Personal Protection Equipment
ppm	Parts per million, equivalent to mg/kg
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RRSCOs	Restricted Residential Soil Cleanup Objectives
SCGs	Standards, Criteria and Guidance
SCOs	Soil Cleanup Objective

Acronym	Definition
SF	Square feet
SMP	Site Management Plan
SoMP	Soil Management Plan
SOP	Site Operations Plan
SPH	Separate-Phase Petroleum Hydrocarbon
STARS	Spill Technology and Remediation Series
SVE	Soil Vapor Extraction
SVOCs	Semivolatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
SZ	Support Zone
TAL	Target Analyte List
TAGM	Technical and Administrative Guidance Memorandum
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substance Control Act
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UUSCOs	Unrestricted Use Soil Cleanup Objectives
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

Eastern Emerald Group, LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) dated April 2014, to investigate, remediate, and develop a 1.62-acre property located at 112-21 Northern Boulevard in the Borough of Queens, New York City, New York. The Applicants have been accepted into the Brownfield Cleanup Program (BCP) as a “Volunteer” for the Site (BCP site number C241157).

The proposed use for the redevelopment of the Site is as a hotel with conference hall capabilities and onsite underground parking.

Site Description/Physical Setting/Site History

The property is approximately 1.62 acres (70,613 square feet) in size, roughly triangular in shape, and lies along the north side of Northern Boulevard between 112th Place and Astoria Blvd. (114th Street). Beyond Astoria Blvd., which forms the northeast border of the Site, the Site is bounded by exit and entrance ramps for the Whitestone Expressway and the Grand Central Parkway. Flushing Bay lies approximately 600 feet northeast of the Site.

The Site is located in a mixed-use commercial and residential area of Corona, Queens, New York. Neighboring properties include vacant land and highway to the Northeast, residential apartment buildings, and a commercial property to the South, and residential properties to the West. The Site lies within the R6 Zoning District in Corona, Queens. The R6 district is a medium-density residential district with no fixed height limits.¹

The property is currently vacant and was most recently used as an auto dealership and repair facility. The entire lot is either paved for parking areas or covered by buildings associated with auto repair and the dealership. Historical storage, transfer, and usage of petroleum products and chlorinated solvents on Site have resulted in impacts to soil, soil vapor, and groundwater.

¹ http://www.nyc.gov/html/dcp/html/north_corona_2/north_corona2.shtml

Summary of the Remedial Investigation

Soil Vapor Investigation Results

Eight soil vapor samples, one duplicate, and one ambient air sample were collected at the Site.

Petroleum-related VOCs were detected in all soil vapor samples. The maximum detections (and locations) are summarized below:

- 1,2,4-Trimethylbenzene – 3.58 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) (RXSV-01);
- 1,3,5-Trimethylbenzene – 1.13 $\mu\text{g}/\text{m}^3$ (RXSV-01);
- Benzene – 11 $\mu\text{g}/\text{m}^3$ (RXSV-04);
- Ethylbenzene – 3.7 $\mu\text{g}/\text{m}^3$ (RXSV-07);
- Toluene – 42.2 $\mu\text{g}/\text{m}^3$ (RXSV-01); and
- Total Xylenes – 19.9 $\mu\text{g}/\text{m}^3$ (RXSB-07).

Tetrachloroethene was detected in six of the eight soil vapor samples, with the highest detection in the duplicate sample for RXSV-02 (208 $\mu\text{g}/\text{m}^3$).

Based on the OSWER Draft Guidance, benzene in soil vapor at RXSB-04 and tetrachloroethene at RXSV-02 represent potential VOCs of concern to indoor air via soil vapor intrusion².

Soil Investigation Results

Nineteen soil samples including one duplicate sample were collected during the RI.

Volatile Organic Compounds

Discounting trace detections of acetone, methylene chloride and 2-butanone (MEK) as probable laboratory-induced artifacts, VOCs were detected at concentrations above the Unrestricted SCOs in soil above the water table at location RXSB-4 at a depth of 30-32 ft bls, as summarized below:

- 3.8 milligrams per kilogram (mg/kg) 1,2,4-Trimethylbenzene (no exceedances in the duplicate sample); and

² Assuming a 1×10^{-6} risk level and the Target Shallow Gas Concentration Corresponding to Target Indoor Air Concentration Where the Soil Gas to Indoor Air Attenuation Factor=0.1 (EPA, November 2002).

- 1.4 mg/kg total Xylenes (1.2 mg/kg in the duplicate sample).

Semivolatile Organic Compounds

No SVOCs were detected at concentrations above the Unrestricted SCOs in soil samples collected beneath the Site.

Metals

Six metals (cadmium, chromium, copper, lead, nickel, and zinc) were detected at concentrations above SCOs in the soil samples collected beneath the Site. There were no TCLP exceedances for metals in any of the soil samples obtained during the RI.

Metals detected in soil above only the Unrestricted Use SCOs beneath the Site included:

- Chromium
 - 43 mg/kg in RXSB-6 (35-37 ft bls)
 - 38 mg/kg in RXSB-9 (34-36 ft bls)
- Copper
 - 220 mg/kg in Drywell Sample DW-1
- Lead
 - 130 mg/kg in Drywell Sample DW-1
- Nickel
 - 45 mg/kg in Drywell Sample DW-1
 - 31 mg/kg in RXSB-6 (35-37 ft bls)
- Zinc
 - 1,700 mg/kg in Drywell Sample DW-1

Metals detected in soil above the Restricted-Restricted Use SCOs beneath the Undeveloped Lot included:

- Cadmium
 - 4.9 mg/kg in Drywell Sample DW-1

PCBs

There were no PCBs detected above SCOs in Site soil.

Pesticides

There were no pesticides detected above SCOs in Site soil.

Groundwater Sampling Results

The general direction of groundwater flow across the Site is towards the northeast; ranging in elevation from 5.2 feet relative to mean sea level (ft rmsl) at the southwest corner of the Site, to 4.7 ft rmsl along the northeast border of the Site. On June 11, the depth to the water table ranged from 27.93 feet at MW-1 (at the northwest corner of the Site) to 45.18 feet at MW-9 (at the southwest corner of the Site).

Twelve groundwater samples including one duplicate sample were collected from the 12 onsite wells installed during this RI. Groundwater samples were collected on June 11 and 12, 2014.

Volatile Organic Compounds

Chlorinated volatile organic compounds (CVOCs), petroleum-related VOCs, and methyl-tertiary butyl ether (MTBE) were detected in exceedance of AWQSGVs in RXMW-4, RXMW-8, RXMW-11 and RXMW-12. The maximum concentrations observed in groundwater above AWQSGVs are summarized below:

- 1,2,4,5-Tetramethylbenzene – 5.1 µg/L (RXMW-12)
- 1,2,4-Trimethylbenzene – 68 µg/L (RXMW-12)
- 1,2-Dichloroethene (total) – 200 µg/L (RXMW-12)
- 1,3,5- Trimethylbenzene – 18 µg/L (RXMW-11)
- Benzene – 54 µg/L (RXMW-11)
- Chloroform – 13 µg/L (RXMW-11)
- cis-1,2-Dichloroethene – 200 µg/L (RXMW-12)
- Ethylbenzene – 31 µg/L (RXMW-12)
- MTBE – 11 µg/L (RXMW-11)

- Napthalene – 23 µg/L (RXMW-11)
- n-Propylbenzene – 5.4 µg/L (RXMW-12)
- Tetrachloroethene – 28 µg/L (RXMW-11)
- Toluene – 88 µg/L (RXMW-11)
- Total Xylenes – 280 µg/L (RXMW-11)

Semivolatile Organic Compounds

Napthalene (11 µg/L in RXMW-11) was the only SVOC detected in groundwater at a concentration above AWQSGVs.

Metals

Each groundwater sample was analyzed for unfiltered and filtered metals. Ten metals (barium, beryllium, chromium, iron, lead, manganese, nickel, selenium, sodium, thallium) were detected above their respective AWQSGVs in unfiltered samples. Only iron, manganese and sodium were detected above AWQSGVs in filtered samples. Iron, manganese and sodium occur in regional groundwater and not considered Site-specific contaminants.

PCBs

No PCBs were detected in any of the groundwater samples collected during this RI.

Pesticides

Chlordane (0.506 µg/L in RXMW-9) was the only pesticide detected at concentrations above AWQSGVs during this RI.

Qualitative Human Health Exposure Assessment

As described in Appendix 3B of DER-10, “The overall purpose of the Qualitative Human Health Exposure Assessment (QHHEA) is to evaluate and document how people might be exposed to site-related contaminants, and to identify and characterize the potentially exposed population(s) now and under the reasonably anticipated future use of the site.” The following section details the exposure assessment based on data collected during the RI.

Soil Exposure

As described in Section 5.2, soil samples collected during the RI indicate the presence of VOCs, and metals at concentrations above the NYSDEC Sub-Part 375-6 Unrestricted Use SCOs. An individual could be exposed to these contaminants through direct contact with the soil during ground-intrusive work at the Site. Direct contact without the use of proper personal protective equipment (PPE) and personal hygiene measures could lead to dermal contact and incidental ingestion of these compounds. Since the entire Site is covered by either buildings or asphalt, the potential for contact with the soil is limited to remedial and construction contract workers at the Site performing ground intrusive activities. The Site will be fully fenced during demolition activities and access will be controlled. The general public will not be exposed to direct contact with Site soil. PPE will be required during any intrusive Site work. A community air monitoring program (CAMP) will be implemented during intrusive activities to minimize the potential for off-site exposures from soil/dust leaving the Site.

A review of RI soil data indicated that there is the potential for offsite soil beneath the sidewalk along 112th Place (immediately northwest of the one-story auto repair building) to be impacted with VOCs at concentrations above Unrestricted Use SCOs.

The proposed use for the redevelopment of the Site is a hotel with conference hall capabilities and onsite underground parking. The redevelopment construction plans include excavation down to the water table and the construction of a multi-story hotel/banquet center with an onsite parking garage. Because the Site will be completely capped by the proposed complex, the potential for exposure by direct contact with contaminated soil will be minimized for both the public and any future construction workers performing ground intrusive activities at the Site.

Groundwater Exposure

As described above in Section 5.3, groundwater samples collected during the RI indicated the presence of VOCs above the AWQSGVs. Groundwater is not used for drinking (the area is connected to the public water supply), and there is no direct contact with or ingestion of groundwater by the general public. Individuals who perform ground intrusive work (i.e., utility repair), perform groundwater sampling or remedial activities may come into contact with

contaminated groundwater. Proper PPE and personal hygiene measures will be required to prevent dermal contact and the potential for incidental ingestion of these compounds.

The building will be serviced by the public water supply. The proposed remedy to address the VOCs in the Site groundwater will be described in the RAWP. Based on this, the potential for public exposure by direct contact with contaminated groundwater will be reduced or eliminated.

Groundwater flows to the northeast across the Site. A review of groundwater quality data obtained during the RI for wells along the entire northeast portion of the Site indicated that the groundwater is not impacted by VOCs, SVOCs or metals. Therefore, there is little potential for offsite migration of impacted groundwater.

Soil Vapor Exposure

As described above in Section 5.1, soil vapor samples collected during the RI indicated the presence of VOCs in soil vapor beneath the Site. The excavation of the majority of the onsite soil, treatment of VOCs in groundwater, installation of a vapor barrier below the building slab and the construction of the building over the entire Site footprint will mitigate the potential for soil vapor intrusion. Additional details on the proposed remedy to address on Site soil vapor will be described in the RAWP.

A review of soil vapor data obtained during the RI indicated relatively low concentrations of VOCs in onsite soil vapor. Therefore, there is little potential for offsite soil vapor migration and offsite soil vapor intrusion. The only area where there may be a slightly elevated risk of offsite migration of impacted soil vapor would be along 112th Place immediately north of the one-story auto repair building where elevated concentrations of tetrachloroethene (PCE) were detected in soil vapor. There was no indication from the RI that there is an onsite source of PCE. However, the PCE could have been due to the onsite auto repair facility, or due to an offsite source of PCE.

Exposure Assessment Summary

The following table summarizes the exposure assessment.

Environmental Media and Exposure Route	Human Exposure Assessment
Direct contact with subsurface soils (and incidental ingestion)	<ul style="list-style-type: none"> • Demolition, construction and remedial contractors can come into contact with soil if they complete ground intrusive work at the Site. • During remediation, remedial workers, trespassers, passersby, and utility workers could come into contact with contaminated soil contained in dust through inhalation, incidental ingestion and dermal contact. • Future exposure will be eliminated through addressing contaminated soil in the RAWP and full capping of the Site by the newly constructed building. • Negligible potential for exposure to offsite impacted soil.
Ingestion of groundwater	<ul style="list-style-type: none"> • Contaminated groundwater is not used for drinking water, as the Site is connected to the public water supply.
Direct contact with groundwater (and incidental ingestion)	<ul style="list-style-type: none"> • Remedial workers, trespassers, and utility workers could come into contact with contaminated groundwater through dermal contact and incidental ingestion during ground intrusive work, and groundwater remediation and sampling activities. • Future exposure will be reduced or eliminated by addressing contaminated soil that is acting as a source of contamination to groundwater, and addressing groundwater contamination in the RAWP. • No evidence of offsite migration of impacted groundwater. Negligible potential for exposure to offsite impacted groundwater.
Inhalation of air (exposures related to soil vapor intrusion)	<ul style="list-style-type: none"> • Remedial workers, trespassers, and utility workers may be exposed to contaminated soil vapor inside the building or within open excavations. • Future exposure will be reduced or eliminated by addressing soil vapor contamination in the RAWP and through passive and mechanical means proposed as part of the building design. • Negligible potential for offsite exposure to impacted soil vapor via soil vapor intrusion.

Summary of the Remedy

A Track 1 cleanup is proposed consisting of the following remedial components:

1. Groundwater remediation consisting of *in situ* chemical oxidation injections;
2. Removal and closure of USTs;
3. Excavation and off-site disposal of soil to elevation 7.0 ft amsl for the majority of the Site and to elevation 0.0 ft amsl for the hot spot as shown in Drawing 5. The excavation should remove all soil that is impacted above NYSDEC Subpart 375-6 Unrestricted Use Soil Cleanup Objectives (UUSCOs) ;
4. Site monitoring of airborne VOCs and particulates in accordance with a NYSDEC approved Community Air Monitoring Plan (CAMP) during all ground intrusive and soil handling activities;
5. Implementation of proper dust and odor suppression techniques during all ground intrusive and soil handling activities;
6. Import of materials to be used for backfill and cover in compliance with : (1) Subpart 375-6.7 (d) regulations; and, (2) all Federal, State and local rules and regulations for handling and transport of material;
7. Implementation of erosion and sediment controls;
8. Screening for indications of contamination (by visual means, odor, and monitoring with PID) in all excavated soil during all ground intrusive Site work;
9. Collection and analysis of end-point soil samples to evaluate the performance of the remedy with respect to attainment of UUSCOs;
10. Appropriate offsite disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal of waste materials;
11. All responsibilities associated with the Remedial Action, including permitting and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

REMEDIATION ACTION WORK PLAN

1.0 INTRODUCTION

Eastern Emerald Group LLC entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) in April 2014, to investigate and remediate a 1.62 acre property located at 112-21 Northern Boulevard in Corona, Queens New York. Eastern Emerald Group LLC is a Volunteer in the Brownfield Cleanup Program. Commercial and residential use is proposed for the property. When completed, the Site will contain a hotel with conference hall capabilities and onsite underground parking. Refer to the Brownfield Cleanup Program (BCP) application for additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between May 2014 and June 2014. 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.

Based upon the level of detail provided in this RAWP, a formal Remedial Design document will not be prepared.

1.1 Site Location and Description

The Site is located in the Corona, Queens, New York and is identified as Block 1707 and Lot 8 on the Queens Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (Figure 1) shows the Site location. The Site is situated on an approximately 1.62-acre area bounded by 114th Street to the northeast, Northern Boulevard to the south, and 112th Place to the west (see Figure 1). A boundary map is attached to the BCA as required by Environmental

Conservation Law (ECL) Title 14 Section 27-1419. The 1.62-acre property is fully described in Appendix B – Site Location Maps. A global positioning system coordinate for the starting point is included.

1.2 Contemplated Redevelopment Plan

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

1.3 Description of Surrounding Property

A review of neighboring properties from the Site and from public thoroughfares, and research of available information regarding the neighboring properties, was performed to identify evidence of environmental concerns that could adversely impact the Site. The Site is located in a mixed-use commercial and residential area of the Corona, Queens, New York.

Direction	Operations
Northeast	Roadway (Astoria Blvd.), with strips of vacant land, highway, and highway access ramps beyond.
South	Northern Boulevard (four-lane roadway) and residential apartment buildings and a commercial property.
West	Roadway (112 th Street)

The Site is zoned as an R6 district and is governed by height factor and (optional) quality housing regulations. A typical build height in R6 districts is 13-stories. There are no height limits for height factor buildings although they must be set within a sky exposure plane which begins at a height of 60 feet above the street line and then slopes inward over the zoning lot. The Site also has a C2-4 zoning overlay, which allows for commercial uses such as grocery stores and restaurants below the residential portion of the building. The commercial uses are subject to floor area ratio restrictions and are general restricted to the first and second floors of the building.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan dated May 23, 2014. The investigation was conducted between May 2014 and June 2014. The RI Report was submitted to NYSDEC on June 27, 2014.

2.1 Summary Remedial Investigations Performed

This section should include a summary of all Remedial Investigation elements. It should be concise but complete and include quantities of each element. Tabular presentations are preferred.

2.1.1 Borings and Wells

The RI field activities performed by Roux Associates were completed in accordance with the revised RIWP dated May 23, 2014, the associated project plans including the Site-specific Health and Safety Plan (HASP), the Field Sampling Plan (FSP), the Quality Assurance Project Plan (QAPP), and the email correspondence with NYSDEC for the modification of the RI Scope of Work. The RI field activities included:

- Installation of eight soil vapor points (RXSV-1 through RXSV-8) ;
- The installation of 18 soil borings (RXSB-01 through RXSB-12, and RXSB-12A through RXSB-17); and
- The installation of 12 groundwater monitoring wells, which included three product-recovery wells.

2.1.2 Samples Collected

The samples collected during the RI field activities included:

- Sampling of eight soil vapor points;
- The collection of 18 soil samples including one duplicate sample;
- The collection of a sample of sediment from the onsite drywell (DW-1); and
- The collection of 12 groundwater samples including one duplicate sample, and the completion of one round of groundwater level measurement, and three rounds of separate-phase product gauging in wells with product.

2.1.3 Chemical Analytical Work Performed

Table 1 summarized samples obtained during the RI.

2.1.4 Documentation

Eight soil vapor samples, one duplicate, and one ambient air sample were collected at the Site. The analytical results are summarized on Table 2 and Plate 1. The soil vapor samples were co-located with soil and groundwater samples as follows:

Soil Vapor Sample	Soil and Groundwater Sampling Location
RXSV-01	RXSB-1 / RXMW-1
RXSV-02	RXMW-11 / RXMW-12
RXSV-03	RXSB-6 / RXMW-5
RXSV-04	RXSB-7 / RXMW-6
RXSV-05	RXSB-11 / RXMW-8
RXSV-06	RXSB-15 (no associated well)
RXSV-07	RXSB-16 / RXMW-10
RXSV-08	RXSB-17 / RXMW-9

Nineteen soil samples including one duplicate sample were collected during the RI. A summary of the analytical results are provided in Tables 3 through 8. Soil samples exceeding their respective NYSDEC Subpart 375-6 SCOs (SCOs) are presented on Plate 2. Additionally, *in situ* waste characterization soils samples were collected in five foot intervals from each soil boring installed during the RI.

Two rounds of water-level data were obtained during the RI (Table 9). The water-level data from a June 18, 2014 round were used to create a water-table contour map (Plate 3).

Twelve groundwater samples including one duplicate sample were collected from the 12 onsite wells installed during this RI. Groundwater samples were collected on June 11 and 12, 2014. The analytical data are summarized in Tables 10 through 14. Exceedances of the AWQSGVs are presented on Plate 4.

Below is a summary of RI findings.

Soil Vapor

Petroleum-related VOCs were detected in all soil vapor samples. The maximum detections (and locations) are summarized below:

- 1,2,4-Trimethylbenzene – 3.58 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) (RXSV-01);
- 1,3,5-Trimethylbenzene – 1.13 $\mu\text{g}/\text{m}^3$ (RXSV-01);
- Benzene – 11 $\mu\text{g}/\text{m}^3$ (RXSV-04);
- Ethylbenzene – 3.7 $\mu\text{g}/\text{m}^3$ (RXSV-07);
- Toluene – 42.2 $\mu\text{g}/\text{m}^3$ (RXSV-01); and
- Total Xylenes – 19.9 $\mu\text{g}/\text{m}^3$ (RXSB-07).

Tetrachloroethene was detected in six of the eight soil vapor samples, with the highest detection in the duplicate sample for RXSV-02 (208 $\mu\text{g}/\text{m}^3$).

Soil

Discounting trace detections of acetone, methylene chloride and 2-butanone (MEK) as probable laboratory-induced artefacts, VOCs were detected at concentrations above SCOs in soil above the water table at location RXSB-4 at a depth of 30-32 ft bls, as summarized below (Table 15):

- 3.8 milligrams per kilogram (mg/kg) 1,2,4-Trimethylbenzene (no exceedances in the duplicate sample); and
- 1.4 mg/kg total Xylenes (1.2 mg/kg in the duplicate sample).

No SVOCs were detected at concentrations above SCOs in soil samples collected beneath the Site.

Six metals (cadmium, chromium, copper, lead, nickel and zinc) were detected at concentrations above SCOs in the soil samples collected beneath the Site. There were no TCLP exceedances for metals in any of the soil samples obtained during the RI.

Metals detected in soil above only the Unrestricted Use SCOs beneath the Site included:

- Chromium
 - 43 mg/kg in RXSB-6 (35-37 ft bls); and
 - 38 mg/kg in RXSB-9 (34-36 ft bls).
- Copper
 - 220 mg/kg in Drywell Sample DW-1;
- Lead
 - 130 mg/kg in Drywell Sample DW-1;
- Nickel
 - 45 mg/kg in Drywell Sample DW-1; and
 - 31 mg/kg in RXSB-6 (35-37 ft bls).
- Zinc
 - 1,700 mg/kg in Drywell Sample DW-1.

Metals detected in soil above the Restricted-Restricted Use SCOs beneath the Undeveloped Lot included:

- Cadmium
 - 4.9 mg/kg in Drywell Sample DW-1.

There were no PCBs detected above SCOs in Site soil.

There were no pesticides detected above SCOs in Site soil.

Groundwater

Chlorinated volatile organic compounds (CVOCs), petroleum-related VOCs, and methyl-tertiary butyl ether (MTBE) were detected in exceedance of AWQSGVs in RXMW-4, RXMW-8, RXMW-11 and RXMW-12. The maximum concentrations observed in groundwater above AWQSGVs are summarized below:

- 1,2,4,5-Tetramethylbenzene – 5.1 µg/L (RXMW-12);
- 1,2,4-Trimethylbenzene – 68 µg/L (RXMW-12);

- 1,2-Dichloroethene (total) – 200 µg/L (RXMW-12);
- 1,3,5- Trimethylbenzene – 18 µg/L (RXMW-11);
- Benzene – 54 µg/L (RXMW-11);
- Chloroform – 13 µg/L (RXMW-11);
- cis-1,2-Dichloroethene – 200 µg/L (RXMW-12);
- Ethylbenzene – 31 µg/L (RXMW-12);
- MTBE – 11 µg/L (RXMW-11);
- Napthalene – 23 µg/L (RXMW-11);
- n-Propylbenzene – 5.4 µg/L (RXMW-12);
- Tetrachloroethene – 28 µg/L (RXMW-11);
- Toluene – 88 µg/L (RXMW-11); and
- Total Xylenes – 280 µg/L (RXMW-11).

Naphthalene (11 µg/L in RXMW-11) was the only SVOC detected in groundwater at a concentration above AWQSGVs.

Each groundwater sample was analyzed for unfiltered and filtered metals. Ten metals (barium, beryllium, chromium, iron, lead, manganese, nickel, selenium, sodium, thallium) were detected above their respective AWQSGVs in unfiltered samples. Only iron, manganese and sodium were detected above AWQSGVs in filtered samples. Iron, manganese, and sodium occur in regional groundwater and not considered Site-specific contaminants.

No PCBs were detected in any of the groundwater samples collected during this RI.

Chlordane (0.506 µg/L in RXMW-9) was the only pesticide detected a concentrations above AWQSGVs during this RI.

2.2 Significant Threat

The NYSDEC and NYSDOH will determine if the Site poses a significant threat to human health and the environment based on the results of the RI Report.

2.3 Site History

The following summary of Site history was based on a Phase I Environmental Site Assessment performed by Vertex Environmental Services, Inc. in June 2013).

2.3.1 Past Uses and Ownership

Based on a review of historical Sanborn maps, the 112-21 Northern Boulevard portion of the Site was utilized for automobile sales from 1950 to 2006. According to city directories, this address has also been used for automobile repair/service from at least 1939. A glass company also operated at this address in 1950. Based on historical resources, additional automobile repair facilities have been located on the southeastern and northwestern portions of the Site at various times from 1931 until at least 2006.

The southeastern portion of the Site (112-47 Northern Boulevard) operated as a filling station with multiple generations of gasoline underground storage tanks (USTs) from at least 1931 until 1981. The filling station was no longer depicted on this portion of the site on the 1982 Sanborn map. Ten USTs were located on this portion of the Site in 1931, and five USTs were located on this portion of the Site in 1950. No listings associated with this former filling station were identified during a preliminary review of the regulatory database report. According to New York City Fire Department (FDNY) documentation and an affidavit from Martin Pump and Tank Corporation, it appears that a total of 13 550-gallon USTs (12 gasoline and one waste oil UST) were decommissioned, cleaned, and filled with concrete circa 1980.

At least five residences were formerly located on-Site at varying times from at least 1914 until the 1980s. Two of these were located along 114th Street, north of the maintenance garage building located near the southeast corner of the Site. One residence was located in the center of the Site, and the remaining two were located in the northwestern corner of the Site. It is not

known if these former residences had USTs to fuel on-site heating systems when they were occupied.

2.3.2 Phase I and Phase II Reports

This section provides an overview of the results of previous environmental investigations at the Site. The following environmental reports were reviewed by Roux Associates:

- VERTEX Environmental Services, Inc. Phase I Environmental Site Assessment (ESA) and Phase II Limited Subsurface Investigation (LSI), June 3, 2013; and
- AEI Consultants, Supplemental Phase II Subsurface Investigation, July 31, 2013.

Results of these reports are discussed in the subsections below. A map showing sampling locations by VERTEX and AEI referred to below is provided as Figure 2.

Vertex Environmental Services, Inc. Phase I ESA

Vertex Environmental Services, Inc. (Vertex) prepared a combined Phase I ESA/ Phase II LSI Report on June 3, 2013 for the subject property. The following recognized environmental conditions (RECs) were identified by Vertex as a result of the Phase I ESA:

- According to the regulatory database report, one 3,000-gallon No. 2 fuel oil underground storage tank (UST) was operated at 112-21 Northern Boulevard (automobile showroom/office) from 1964 until 2008, when the tank was closed in place. This address was also identified on the Leaking Storage Tanks (LTANKS) database for a failed tank tightness test of this UST on April 10, 2008. According to information provided, the tank was closed in place, impacted soil was removed, and post-closure samples did not reveal evidence of residual impacts. The spill case was closed by the NYSDEC on June 2, 2009. No additional details were provided in the regulatory database report.
- According to Sanborn maps reviewed, the 112-21 Northern Boulevard portion of the site was utilized for auto sales from 1950 to 2006. According to city directories, this address has also been used for auto service from at least 1939 to 2012. Additional automobile repair facilities have been located on the southeastern and northwestern portions of the site at various times from 1931 until at least 2006.
- Based on Sanborn maps, the southeastern portion of the site (112-47 Northern Boulevard) operated as a filling station with multiple generations of gasoline tanks from at least 1931 until 1981. The filling station was no longer depicted on this portion of the site on the 1982 Sanborn map. Ten tanks were located on this portion of the site in 1931, and five tanks were located on this portion of the site in 1950. No listings associated with this former filling station were identified during a preliminary review of the regulatory

database report. According to FDNY documentation and an affidavit from Martin Pump and Tank Corporation, it appears that a total of 13 550-gallon USTs (12 gasoline and one waste oil UST) were decommissioned, cleaned, and filled with concrete circa 1980.

- Based on Sanborn maps reviewed, two gasoline tanks were depicted along the sidewalk to the south of the site in 1931. It is possible that these tanks were part of the 13 tanks decommissioned circa 1980.
- Two active No. 2 fuel oil USTs of unknown size are present to the east of the Northern Boulevard automobile repair facility and to the west of the 112th Place automobile repair facility.
- A former gasoline UST and dispenser and a former waste oil UST, both of unknown size, formerly were present in the sidewalk on the western side of the maintenance garage building fronting 112th Place. The gasoline UST was depicted along the sidewalk to the northwest of the site on the 1931 through 2006 Sanborn maps. No additional details regarding the gasoline tank were obtained by Vertex. It appears that the waste oil tank was decommissioned and filled with sand in 2009.
- Several drywells were observed in the northern portion of the site. Staining was observed on the pavement that extended from the east garage bay of the 112th Place automobile repair facility to one of the drywells.
- The former gas station located on the adjacent property to the northwest, at 112-12 Astoria Boulevard, is identified on the UST, Historical UST (HIST UST) and NY SPILLS databases.
- Vertex identified evidence of at least four former in-ground hydraulic lifts in the 112th Place automobile repair facility and two former in-ground lifts in the Northern Boulevard automobile repair facility. Based on the size of the former cylinder penetrations (approximately 6" diameter) and the age of the hardware, it is likely that these lifts utilized underground storage reservoirs. Vertex was unable to determine the size of the potential hydraulic fluid reservoirs, and it is currently unknown if the reservoirs, if present, were removed.
- Vertex observed significant staining on the concrete in the vicinity of the waste oil above-ground storage tank (AST) and the parts washing station in the garage at 112th Place.
- A Phase II Limited Site Investigation was also conducted by Vertex based on their Phase I ESA findings. The investigation included the advancement of 18 soil borings (SB-01 through SB-18), the collection of one sediment sample (SED-01) and the installation/sampling of seven temporary groundwater monitoring wells in the vicinity of eight identified areas of concern (AOC), described below. The soil, groundwater and sediment samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals.

2.3.3 Sanborn Maps

All Sanborn Maps available for this Site were reviewed prior to preparation of the RAWP.

2.4 Geological Conditions

The property location is shown on the 2013 USGS Topographic Map of Flushing, New York. The surface elevation of the property ranges from approximately 34 feet above mean sea level (amsl) at the northern tip (corner of 112th Place and 114th Street) to 41 feet amsl at the southeastern tip (corner of 114th street and Northern Boulevard) to 50 feet amsl along the southwestern tip (corner of 112th Place and Northern Boulevard) of the property. Topography of the property slopes slightly to the north-northeast towards Flushing Bay, which is approximately 600 feet northeast of the eastern border of the Site at its closest point to the Bay.

Based on United States Geological Survey data (2006) local surface topography and the location of surface water bodies in the area, groundwater is expected to flow to the east-northeast towards Flushing Bay.

There are no identified wetlands on or adjacent to the Site. There are no surface water bodies on or adjacent to the Site. Flushing Bay is approximately 600 feet northeast of the property.

According to the USGS, soils in the area of the Site are classified as Urban Land (Ug). Ug consists of areas where at least 80-85 percent of the surface is covered by asphalt, concrete, or other impervious building materials.

Queens County subsurface consists of sequences of unconsolidated sediments of Late Cretaceous age that are underlain by crystalline bedrock of Precambrian age and overlain mostly by glacial upper Pleistocene deposits of Wisconsin age. Erosion of the subsurface units developed a valley system, which traverses Queens County from north to south. The valleys are filled with Pleistocene age deposits.

A groundwater flow map is shown in Plate 3. A review of Plate 3 indicates that the general direction of groundwater flow across the Site is towards the northeast; ranging in elevation from 5.2 feet relative to mean sea level (ft rmsl) at the southwest corner of the Site, to 4.7 ft rmsl along the northeast border of the Site. On June 11, 2014, the depth to the water table ranged from 27.93 feet at MW-1 (at the northwest corner of the Site) to 45.18 feet at MW-9 (at the southwest corner of the Site [Table 9]).

2.5 Contamination Conditions

The Site is underlain by unconsolidated soil and fill of undocumented origin that is impacted by VOCs, SVOCs and metals. Underlying groundwater is impacted by VOCs and separate-phase product due to releases from USTs beneath the western portion of the Site. There are records of USTs beneath the southeastern portion of the site. However, there was no evidence of releases from these USTs based on a review of observations made during the RI.

2.5.1 Conceptual Model of Site Contamination

Based on the historical investigations and the recent RI, the primary COCs at the Site are petroleum-related VOCs including benzene, ethylbenzene, toluene and xylene (BTEX), CVOCs including tetrachloroethene (PCE) and its degradation products (i.e., cis-1,2-dichloroethene), and constituents of historical urban fill of undocumented origin including metals. The entire Site is covered by an asphalt parking lot or three one-story buildings. Two of the buildings are used for auto repair, and one is an auto dealership. The Site is underlain by historical fill and/or unconsolidated overburden. Petroleum-related soil and groundwater contamination is primarily present in the western portion of the Site, near a one-story auto repair building, and is probably related to underground storage tanks (USTs) that were present in the vicinity.

According to the Sanborn Fire Insurance Maps, the earliest noted use of the Site for automotive activities was 1931, when there were two dwellings with detached automobile garages on the northwest corner of the site. A larger structure labeled as ‘Garage,’ two automobile garages, and three dwellings are depicted in the center of the site. A structure labeled as ‘Automobile repairing’ and two smaller store structures are depicted on the south east corner of the site. Ten gas tanks are depicted on the southeast corner of the site.

The 1950 Sanborn shows a filling station with five USTs on the southeast corner of the site, which continues to be shown through 1981, and is absent by 1982.

The historical surrounding property usage has been a mix of residential and commercial. Based on the available data, impacts to soil, soil vapor, and groundwater resulting from previous Site operations are present in several portions of the Site. The impacts may have resulted from

releases from former USTs and improper storage and/or disposal of parts washing solvents associated with automotive repair.

2.5.2 Description of Areas of Concern

Identify original locations and all available information on:

- Historic fill
- Vaults
- Drains
- Pipes, transformers

Other potential sources of contamination:

- Contaminated Media
 - Soil
 - Soil vapor
 - Groundwater

Note: More detail should be provided in breakout sections below

There are two areas of the site where USTs were reported based on Sanborn maps: The southeast corner of the Site, where USTs associated with a former filling station are depicted on historical Sanborn maps, and the former gasoline UST and dispenser and a former waste oil UST beneath the northwestern portion of the Site. Based on a review of the Phase I Environmental Site Assessment, these USTs were present in the sidewalk on the western side of the maintenance garage building located at 32-11 112th Place. The gasoline UST was depicted beneath the sidewalk to the west of the Site on the 1931 through 2006 Sanborn maps. No additional details regarding the gasoline tank were available. According to the Phase I Environmental Site Assessment and Phase II Limited Subsurface Investigation Report prepared by Vertex Environmental Services, Inc. and dated June 3, 2013, the waste oil tank was decommissioned and filled with sand in 2009.

The results of the AEI investigations indicated the presence of separate-phase product at the Site in the area of the former gasoline UST and dispenser and former waste oil UST. Based on a review of the Vertex and AEI reports, on November 26, 2013, Roux Associates contacted the NYSDEC to report Spill No. 1308653.

Three monitoring/product recovery wells were installed in the vicinity of the reported spill during the RI; RXMW-4, RXMW-11 and RXMW-12. Four product gauging events were performed in the three wells during the RI: on June 11, June 18, June 25 and July 2, 2014. There was no measurable product in any of the wells on June 11 and June 18. Product was only measureable in RXMW-11 on June 25 and July 2 as summarized below:

Well Designation	Date	Depth to Product (ft bmp)	Depth to Water (ft bmp)	Product Thickness (feet)
RXMW-11	June 25, 2014	31.28	31.44	0.16
RXMW-11	July 2, 2014	31.52	31.68	0.16

ft bmp – feet below measuring point

2.5.3 Identification of Standards, Criteria and Guidance

Standards, criteria and guidance (SCGs) are promulgated requirements (“standards” and “criteria”) and non-promulgated guidance (“guidance”) that govern activities that may affect the environment and are used by the DER at various stages in the investigation and remediation of a site. SCGs incorporate both the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA), concept of “applicable or relevant and appropriate requirements” (ARARs) and the United States Environmental Protection Agency’s (USEPA) “to be considered” (TBCs) category of non-enforceable criteria or guidance. SCGs applicable to the Site are summarized below.

SCGs for Soil

Soil cleanup objectives (SCOs) for soil at BCP sites are the numerical soil cleanup objectives presented in 6NYCRR Part 375-6.

The proposed remedy will achieve a Track 1 Unrestricted Use cleanup as set forth in 6 NYCRR Part 375-6 based on the intended future use at the Site. Based upon the evaluation of the current soil data discussed in the RI and the proposed future use of the Site, the SCOs for soil are the Unrestricted Use SCOs. If a Track 4 Restricted-Residential cleanup is determined to be the only practicable option for the Site, the Restricted-Residential SCOs will be the SCOs. For compounds detected in groundwater above the AWQSGVs in the RI the PoGSCOs will be the SCOs for a Track 4 Restricted-Residential Cleanup.

SCOs for the Protection of Ecological Resources were considered, but were determined not to be applicable based on Site-specific conditions. In accordance with the Part 375-6 Regulations, Protection of Ecological Resources SCOs do not and/or will not apply to sites or portions of sites where the condition of the land (e.g., paved, covered by impervious surfaces, buildings and other structures) precludes the existence of an ecological resource that constitutes an important component of the environment. The entire Site has been and will be paved or covered by buildings as part of the proposed future development; therefore, use of SCOs for Protection of Ecological Resources is not applicable.

SCGs for Groundwater

Although the groundwater beneath the Site is not used as a drinking water source, based upon the evaluation of the current groundwater data discussed in the RI, the following SCGs for the groundwater will be considered:

- New York State Groundwater Quality Standards – 6 NYCRR Part 703; and
- NYSDEC AWQSGVs – TOGS 1.1.1.

2.5.4 Soil/Fill Contamination

Soil beneath the Site is impacted by VOCs and metals at concentrations above SCOs.

2.5.4.1 Summary of Soil/Fill Data

VOCs were detected at concentrations above SCO in soil above the water table at location RXSB-4 at a depth of 30-32 ft bls, as summarized below (Table 15):

- 3.8 milligrams per kilogram (mg/kg) 1,2,4-Trimethylbenzene (no exceedances in the duplicate sample)
- 1.4 mg/kg total Xylenes (1.2 mg/kg in the duplicate sample)

Metals detected in soil above only the Unrestricted Use SCO beneath the Site included:

- Chromium
 - 43 mg/kg in RXSB-6 (35-37 ft bls)
 - 38 mg/kg in RXSB-9 (34-36 ft bls)
- Copper
 - 220 mg/kg in Drywell Sample DW-1
- Lead
 - 130 mg/kg in Drywell Sample DW-1
- Nickel
 - 45 mg/kg in Drywell Sample DW-1
 - 31 mg/kg in RXSB-6 (35-37 ft bls)
- Zinc
 - 1,700 mg/kg in Drywell Sample DW-1

Metals detected in soil above the Restricted-Restricted Use SCO beneath the Undeveloped Lot included:

- Cadmium
 - 4.9 mg/kg in Drywell Sample DW-1

2.5.4.2 Comparison of Soil/Fill with SCGs

Tables 15 and 16 show exceedances from Track 1 Unrestricted SCO for all soil/fill at the Site. Plate 2 is a spider map that shows the location and summarizes exceedances from Track 1 Unrestricted SCO for all soil/fill. Only VOCs and metals in soil exceeded Track 1 SCO.

2.5.5 Summary of Groundwater Data

VOCs were detected in groundwater beneath the Site. The maximum concentrations of VOCs observed in groundwater above AWQSGVs are summarized below (Table 17):

- 1,2,4,5-Tetramethylbenzene – 5.1 µg/L (RXMW-12)
- 1,2,4-Trimethylbenzene – 68 µg/L (RXMW-12)
- 1,2-Dichloroethene (total) – 200 µg/L (RXMW-12)
- 1,3,5- Trimethylbenzene – 18 µg/L (RXMW-11)
- Benzene – 54 µg/L (RXMW-11)
- Chloroform – 13 µg/L (RXMW-11)
- cis-1,2-Dichloroethene – 200 µg/L (RXMW-12)
- Ethylbenzene – 31 µg/L (RXMW-12)
- MTBE – 11 µg/L (RXMW-11)
- Napthalene – 23 µg/L (RXMW-11)
- n-Propylbenzene – 5.4 µg/L (RXMW-12)
- Tetrachloroethene – 28 µg/L (RXMW-11)
- Toluene – 88 µg/L (RXMW-11)
- Total Xylenes – 280 µg/L (RXMW-11)

Napthalene (11 µg/L in RXMW-11) was the only SVOC detected in groundwater at a concentration above AWQSGVs (Table 18).

Metals were detected in groundwater at concentrations above AWQSGVs (Table 19). The maximum detections of metals in groundwater at concentrations above AWQSGVs in unfiltered samples are summarized below:

- Barium – 1,061 µg/L (RXMW-3)
- Beryllium – 3.46 µg/L (RXMW-11)
- Chromium – 114 µg/L (RXMW-8)

- Iron – 38,800 µg/L (RXMW-8)
- Lead – 58.57 µg/L (RXMW-3)
- Manganese – 4,310 µg/L (RXMW-3)
- Nickel – 138.7 µg/L (RXMW-3)
- Selenium – 10.6 µg/L (RXMW-3)
- Sodium – 343,000 µg/L (RXMW-9)
- Thallium – 0.56 µg/L (RXMW-8)

The maximum detections of metals in groundwater at concentrations above AWQSGVs in filtered samples are summarized below:

- Manganese – 1,709 µg/L (RXMW-4)
- Sodium – 368,000 µg/L (RXMW-9)

Chlordane (0.506 µg/L in RXMW-9 [Table 20]) was the only pesticide detected a concentrations above AWQSGVs during this RI.

2.5.5.1 Comparison of Groundwater with SCGs

Exceedances from GA groundwater standards in monitor wells prior to the remedy are summarized in Tables 17 through 20. A spider map that indicates the location(s) of and summarizes exceedances from GA groundwater standards prior to the remedy is shown in Plate 3.

2.5.6 Soil Vapor

A table of soil vapor data collected prior to the remedy is shown in Table 2. A spider map that indicates the location(s) of and summarizes soil vapor data prior to the remedy is shown in Plate 1.

2.6 Environmental and Public Health Assessments

2.6.1 Qualitative Human Health Exposure Assessment

This section should include a description of the Qualitative Human Health Exposure Assessment.

- Existence and potential sources of soil, groundwater and soil vapor contamination on the Site;
- Vertical and horizontal nature and extent of contamination in on-Site soils, on- and off-Site groundwater and vapor plumes;
- Fate and transport of contaminants;
- Exposure pathways: Potential routes of exposure by receptors;
- Existence of human exposure to Site-related contaminants under current or reasonably foreseeable conditions;
- Receptor populations; and
- Human health exposure assessment.

2.6.2 Fish and Wildlife Remedial Impact Analysis

If required by Site conditions and surrounding natural resources. See Section 3.10 of DER-10 for guidance.

2.7 Remedial Action Objectives

As described in Section 3.8 of Part 375, the goal of the remedy selection process in the BCP is to select a remedy for a site that is fully protective of public health and the environment, taking into account the current, intended, and reasonably anticipated future land use of the site.

The remedial goals for soil at the Site are to meet the unrestricted residential SCOs for on-site areas (Track 1). The remedial goals for the groundwater are to obtain mass reductions of VOCs in on-site groundwater. Consistent with 6NYCRR Part 375, the proposed remedies for the Site will be fully protective of public health and the environment, taking into account the current, intended, and potential future land use. In the event that Track 1 cleanup cannot be achieved throughout the Site, areas that do not meet Track 1 cleanup goals will be remediated to Track 4 cleanup goals.

According to Section 3.8 of 6 NYCRR Part 375, for Track 1 cleanup:

- the remedial program shall achieve a cleanup level that will allow the site to be used for any purpose without any restrictions on the use of the site as described in subparagraph 375-1.8(g)(1)(i);

- (ii) the soil component of the remedial program shall achieve the unrestricted soil cleanup objectives as set forth in Table 375-6.8(a) for all soils above bedrock.
- (iii) the remedial program shall not include the use of long-term institutional or engineering controls; provided, however, that a restriction on groundwater use may be included as a component of the remedial program if the applicant:
 - (a) is a volunteer; and
 - (b) has demonstrated to the Department's satisfaction that there has been a bulk reduction in groundwater contamination to asymptotic levels;
- (iv) the remedial program may include the use of short-term employment of institutional or engineering controls provided:
 - (a) the remedial program includes an active treatment system, either *ex situ* or *in situ*, which will operate for, or require, no more than 5 years to meet the applicable contaminant-specific soil cleanup objectives or remedial goals established for other contaminated media;
 - (b) the remedial program requires the institutional control to assure the operation and integrity of the remedy, as well as to address potential human health exposures during this period; and
 - (c) the remedial program includes a provision for the applicant to implement an alternative remedy to meet the soil cleanup objectives in the event that the short-term institutional period is exceeded; and
- (v) the Department may require the Applicant, or the Applicant may request, to develop a soil cleanup objective for a contaminant not included in Table 375-6.8(a) as set forth in section 375-6.9.

According to Section 3.8 of 6 NYCRR Part 375, for Track 4 (Restricted use with site-specific soil cleanup objectives) cleanup:

- (i) in developing the site-specific soil cleanup objectives, the Applicant may, solely or in combination:
 - (a) use the soil cleanup objectives, as set forth in subpart 375-6;
 - (b) develop or modify site specific soil cleanup objectives, as set forth at section 375-6.9; or
 - (c) propose site-specific soil cleanup objectives which are protective of public health and the environment;

- (ii) the remedial program may include the use of long-term institutional or engineering controls to address all media; and
- (iii) exposed surface soils in a Track 4 remedy will be addressed as follows:
 - (a) for residential use:
 - (1) the top two feet of all exposed surface soils which exceed the site background values for contaminants of concern and are not otherwise covered by the components of the development of the site (e.g., buildings, pavement), shall not exceed the applicable contaminant-specific soil cleanup objectives as set forth in subparagraph (2)(ii) above, and protection of groundwater SCO's are applicable below 2 feet for compounds detected above groundwater standards in the remedial investigation, to the extent feasible;
 - (2) where it is necessary to utilize off-site soil to achieve this requirement, the soil brought to the site will satisfy the requirements of subdivision 375-6.7(d);
 - (b) for commercial use:
 - (1) the top one foot of all exposed surface soils which exceed the site background values for contaminants of concern and are not otherwise covered by the components of the development of the site (e.g., buildings, pavement), shall not exceed the applicable contaminant-specific soil cleanup objectives as set forth in subparagraph (2)(ii) above; and
 - (2) where it is necessary to utilize off-site soil to achieve this requirement, the soil brought to the site will satisfy the requirements of subdivision 375-6.7(d);
 - (c) for industrial use:
 - (1) the top one foot of all exposed surface soils which exceed the site background values for contaminants of concern and are not otherwise covered by the components of the development of the site (e.g., buildings, pavement), shall not exceed the applicable contaminant-specific soil cleanup objectives as set forth in subparagraph (2)(ii) above; and
 - (2) where it is necessary to utilize off-site soil to achieve this requirement, the soil brought to the site will satisfy the requirements of subdivision 375-6.7(d);

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; and
- 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; and
- Remove the source of ground or surface water contamination.

2.7.2 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with contaminated soil; and
- 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

RAOs for Public Health Protection

- 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

The following is a detailed description of the alternatives analysis and remedy selection process to address impacted media from historic releases. As free-product was only identified in one, offsite monitoring well (RXMW-11), free-product recovery is not included in the Alternatives Analysis. Free product recovery from RXMW-11 will be implemented as part of the ongoing weekly groundwater gauging events as detailed in the RIWP. Free-product is not anticipated to be present onsite during implementation of this Remedial Action.

This section of the RAWP was prepared in accordance with Part 375 - 3.8(f), Part 375 - 1.8(f), and Section 4.3 of DER-10. As required, a minimum of two remedial alternatives (one being an unrestricted use scenario) are evaluated, as follows:

- One alternative that will achieve unrestricted use relative to on-site soil without the use of institutional or engineering controls; and
- One alternative assuming a restricted residential cleanup scenario for on-site areas (which is more protective than the current commercially zoned use and reasonably anticipated future use), coupled with the use of institutional and engineering controls.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. As required, a minimum of two remedial alternatives (Alternative 1 and Alternative 2) are considered for alternatives analysis for this site:

Remedial Alternative 1: Track 1 Unrestricted cleanup (Plate 5):

- Excavation and off-site disposal of soil to meet the Unrestricted Use SCOs for the entire Site.
- Hot spot excavation on the west side of the site to 5 feet below the water table to remove petroleum-impacted soil (Drawing 5).
- UST closure and removal.
- Backfill of excavated areas as necessary for the construction of the proposed building foundation with soil meeting UUSCOs. Soil generated from the excavation may be used for backfill if it meets UUSCOs.
- Groundwater remediation consisting of *in situ* chemical oxidation groundwater injections (Drawing 5). Klorur CR (as manufactured by Peroxychem) will be injected 10 feet

below the water table at 37 injection points. Injections will take place prior to excavation.

Remedial Alternative 2: Track 4 Restricted Residential cleanup (Plate 6):

- Excavation and off-site disposal of soil to meet the Restricted Residential SCOs for the entire Site, and the Protection of Groundwater SCOs for compounds detected above groundwater standards in the RI per Part 375-6.5, regardless of depth, to the extent feasible.
- UST closure and removal.
- Groundwater remediation consisting of dual-phase product recovery and *in situ* chemical oxidation groundwater injections (Drawing 5). Klozur CR (as manufactured by Peroxychem) will be injected 10 feet below the water table at 37 injection points prior to excavation. Following Site redevelopment, groundwater remediation will continue via upgradient *in situ* chemical oxidation groundwater injections and downgradient monitoring to ensure no offsite migration is occurring.
- A Site cover system consisting of a vapor barrier and building slab to prevent soil vapor exposure.

3.1 Evaluation of Remedial Alternatives

The goal of the remedy selection process under 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. Each remedial alternative is evaluated based on the factors listed below:

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

Applicable Remedial Action standards, criteria, and guidance are listed below:

- 6 NYCRR Part 375-6 Soil Cleanup Objectives – The unrestricted use and restricted residential criteria listed in the guidance were used to evaluate soils, delineate areas with impacts, and specify cleanup objectives.
- New York State Groundwater Quality Standards – 6 NYCRR Part 703; the standards listed in the guidance were used to evaluate groundwater quality, delineate areas with impacts, and specify cleanup objects.
- NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1; the standards listed in the guidance were used to evaluate groundwater quality, delineate areas with impacts, and specify cleanup objects.
- NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation – May 2010; the proposed remedial alternatives were developed in accordance with the abovementioned document.
- NYSDEC Draft Brownfield Cleanup Program Guide – May 2004; the project is part of the BCP, and as such, the abovementioned guidance document was used to prepare this report.
- New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) will be required for all ground intrusive activities, and the abovementioned document was used to prepare the CAMP.
- NYS Waste Transporter Permits – 6 NYCRR Part 364; as the proposed remedies include excavation and disposal of soil, the abovementioned guidance document applies.
- NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364; as the proposed remedies include excavation and disposal of soil, the abovementioned guidance document applies.

3.1.1 Overall Protection of Human Health and the Environment

Alternative 1 would be protective of human health and the environment by removing all soil above the USCOs at the Site, thus eliminating the potential for human and environmental exposure to contaminated soil/fill once construction is complete and eliminating the risk of contamination leaching into groundwater. Though there is minimal potential for contact with contaminated groundwater as it is not used for potable purposes, the proposed groundwater *in situ* treatment will remove all concentrations of contaminants above the GA AWQSGVs. Potential soil vapors would be addressed through source removal of contaminated soil and groundwater,

Alternative 2 will be protective of human health and the environment by excavating and removing soil above the Track 4 RRSCOs and the Protection of Groundwater SCOs for compounds detected above groundwater standards in the RI per Part 375-6.5, as well as by employing institutional and engineering controls and dual-phase product recovery for groundwater, a composite cover system and a vapor barrier. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing institutional controls including a deed notice and a Site Management Plan would ensure that the composite cover system remains intact and protective. Excavating soil above RRSCOs would minimize the risk of contamination leaching into groundwater.

During site remediation (e.g., excavation of soil, groundwater injection well installation, etc.) and other construction purposes, workers may be exposed to impacted soil and groundwater. Potential worker exposure to soil and groundwater during remediation activities will be mitigated through the required OSHA training and appropriate HASP(s). Any potential environmental exposure will be mitigated by engineering controls implemented during construction.

3.1.2 Standards, Criteria, and Guidance

Alternative 1 will achieve compliance with the remedial goals, SCGs and RAOs for soil through establishment of Track 1 Unrestricted Use SCOs. Compliance with SCGs for groundwater will be achieved through *in situ* treatment. Compliance with the SCGs for soil vapor will be achieved through source removal.

Alternative 2 would achieve compliance with remedial goals, SCGs, and RAOs for soil through the removal of soil to Track 4 RRSCOs and Protection of Groundwater GSCOs for compounds detected above groundwater standards in the RI per Part 375-6.5, groundwater treatment through dual-phase product recovery and *in situ* treatment to reach GA AWQSGVs, and capping the Site with a composite cover and vapor barrier to reach soil vapor standards. A site management plan would ensure that these engineering controls remain protective for the long term.

For both alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with the applicable SCGs.

3.1.3 Long-term Effectiveness and Permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of ECs/ICs that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of Engineering Controls.

Alternative 1 removes all soil that was impacted by the historic releases. Therefore, incremental risk from soil impacts is eliminated, and Alternative 1 will continue to meet RAOs in the future, thus providing a permanent long-term solution for the Site.

Alternative 2 would provide long-term effectiveness by removing most on-site contamination and attaining Track 4 RRSCOs, establishing engineering controls including a vapor barrier, dual-phase product recovery and in situ groundwater treatment, and a composite cover system across the entire site, establishing institutional controls to ensure long-term management including use restrictions, a Site Management Plan, and placement of a deed restriction to memorialize these controls for the long term. The Site Management Plan will ensure long-term effectiveness of all engineering controls and institutional controls by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended to and assuring that protections designed in the remedy will provide continued high levels of protection, in perpetuity.

3.1.4 Reduction in Toxicity, Mobility or Volume of Contamination through Treatment

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their

principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

By removing all soil with concentrations that exceeded the UUSCOs criteria, Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil, groundwater and soil vapor. In addition, *in situ* groundwater treatment will reduce the toxicity, mobility and volume of impacted groundwater on Site.

Alternative 2 would permanently eliminate most of the toxicity, mobility, and volume of contaminants from on-site soil by removing soil in excess of Track 4 RRSCOs and Protection of Groundwater SCOs for compounds detected above groundwater standards in the RI per Part 375-6.5, and remaining soil/fill would meet Track 4 RRSCOs. Dual-phase product recovery and in situ groundwater treatment will reduce the mobility, toxicity and volume of contaminants in groundwater at the Site. The remainder of the site will be capped to permanently eliminate exposures and associated toxicity.

3.1.5 Short-Term Impacts and Effectiveness

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their effects on public health and the environment during implementation of the remedial action, including protection of the community, environmental impacts, time until remedial response objectives are achieved, and protection of workers during remedial actions.

Alternative 1 and 2 have similar-short term effectiveness during their respective implementations, as each requires excavation of impacted material. Alternative 1 and 2 would both employ appropriate measures to prevent short term impacts, including a CAMP and a

SoMP, during all on-Site soil disturbance activities and would effectively prevent the release of significant contaminants into the environment. Both alternatives provide short term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Health and Safety Plan (HASP) will be protected from on-Site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones).

3.1.6 Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g., obtaining permits for remedial activities), and availability of services and materials.

Both Alternatives are feasible and implementable. The techniques, materials and equipment to implement Alternative 1 and 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. They use standard materials, services, and well-established technology. The reliability of these remedies is also high. There are no specific difficulties associated with any of the activities proposed, which utilize standard/industry methods.

3.1.7 Cost

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

The maximum cost estimates for each alternative are shown in Tables 21 and 22. The total cost for Alternative 1 is 13.99 million dollars and the total cost for Alternative 2 is 14.66 million

dollars. Initial costs associated with Alternative 1 are higher than Alternative 2 because additional excavation (including sheeting and shoring) and off-Site disposal would be required. Long-term costs for Alternative 2 include the costs for operation of dual-phase product recovery system and long term implementation of a Site Management Plan, thus making Alternative 2 more expensive.

3.1.8 Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

Based on the overall goals of the remedial program and initial observations by the project team, both of the alternatives are expected to be acceptable to the community. This RAWP will be subject to a public review per the requirements of the BCP, and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedial action. The Citizen Participation Plan for the project is provided in Appendix D.

3.1.9 Land Use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

Both alternatives provide protection of public health and the environment. Remedial action for both alternatives is beneficial to the surrounding community and is consistent with the goals of New York City for remediating and redeveloping brownfield sites.

3.2 Selection of the Preferred Remedy

Remedial Alternative 1 was selected for implementation in on-site areas since it adequately meets each of the evaluation criteria, and will result in unrestricted use of the Site. In summary, Alternative 1:

- is protective of public health and the environment;
- complies with the appropriate Track 1 unrestricted criteria for soil;
- provides long-term effectiveness and permanence through source removal and *in situ* treatment of groundwater;
- reduces the toxicity, mobility, or volume of impacted material through source removal;
- provides short-term effectiveness, including minimal impacts to workers or the surrounding neighborhood through the implementation of engineering controls during construction;
- can be readily implemented;
- can be implemented for less cost than Alternative 2; and
- is compatible with land use.

Alternative 1 is consistent with the approach for an unrestricted use scenario described in the Part 375 Regulations.

As described in Section 3.1, the preferred Remedial Alternative 1 proposes source removal for the excavation and off-site disposal of soil to meet Unrestricted Use SCOs and hot spot removal to five feet into the groundwater table (elevation 0.0 feet amsl). Groundwater treatment will begin prior to excavation, and will consist of *in situ* groundwater injections. A land use factor evaluation of the preferred Remedial Alternative 1 is provided below based on the following criteria as required by Article 27, Title 14 of the Environmental Conservation Law 27-1415.

3.2.1 Zoning

The current zoning for the Site is R6, however, the Site is in the process of being re-zoned. The RAWP assumes that the changes to zoning will occur to allow the redevelopment to proceed. No action will occur until zoning changes are finalized.

3.2.2 Surrounding Property Uses

Land use surrounding the western and southern borders of the Site is a combination of commercial and residential buildings/dwellings. Highways, vacant land, and a surface water body (Flushing Bay) lie to the northeast of the Site. The proposed end use of this redevelopment includes a hotel with conference hall capabilities, onsite underground parking and street level retail, consistent with the current land use. Zoning variances will be acquired from the New York City Department of City Planning, as required to accommodate the new development.

3.2.3 Citizen Participation

Citizen participation will be pursued throughout the remedial process in accordance with the BCP guide. A Citizen Participation Plan is included as Appendix D.

3.2.4 Environmental Justice Concerns

The property is located in a potential environmental justice area (PEJA) according to the maps issued by NYSDEC. The proposed remedy will be consistent with the goals of the PEJA by remediating the Site to Track 1 standards and implementing new property uses that will provide employment opportunities for members of the surrounding community.

3.2.5 Land Use Designations

The property has been assigned an E-Designation (E-121) according to the New York City Environmental Quality Review (CEQR # 03DCP058Q) for Hazardous Materials (i.e., Underground Storage Tank Testing Protocol). Prior to any improvement at this property, including the construction of a new structure or certain remodeling of an existing structure, property owners are required to demonstrate that the improvement will satisfy the environmental requirements and will occur without potential hazardous material, air quality or noise impacts

that could negatively affect construction workers, future users of the lot or those in close proximity to the lot.

The New York City Office of Environmental Remediation (NYC OER) has been informed of the status of the site in the NYSDEC BCP and has been provided copies of all NYSDEC approved documents and work plans for the Site. NYC OER will issue a Notice to Proceed once this RAWP has been approved by NYSDEC.

3.2.6 Population Growth Patterns

Population growth patterns and land development patterns in the area are consistent with the proposed use for the Site. Furthermore, the proposed use will support the existing local business trends and promote increased business and investment in the area.

3.2.7 Accessibility to Existing Infrastructure

The Site's location in Corona, Queens is immediately accessible to existing infrastructure. The Site is within close proximity to the Grand Central Parkway and other main highways.

3.2.8 Proximity to Cultural Resources

There are no cultural resources identified near the Site.

3.2.9 Proximity to Natural Resources

The Flushing Bay is approximately 600 feet northeast of the subject property. The current use of the Site is a commercial property. Natural resources will not be endangered by the Remedial Alternative.

3.2.10 Off-Site Impacts

By removing soil in excess of the unrestricted criteria and *in situ* groundwater treatment, onsite sources of impacts to groundwater, soil and soil vapor will be remediated. Therefore, Remedial Alternative 1 will reduce the toxicity, mobility, and volume of contaminants, and thereby prevent any potential offsite impacts.

3.2.11 Proximity to Floodplains

Based on a review of the floodplain maps provided by FEMA, the subject property is within a ½ mile of both 100 and 500 year floodplains (Figure 6 of BCP Application). The proposed remedial alternative will not have an effect on the floodplain.

3.2.12 Geography and Geology of the Site

The Site is shown on the 1995 USGS Topographic Quadrangle Map of Flushing, New York. The surface elevation of the Site is 50 feet above mean sea level (amsl) in the southwest corner of the property and 30 feet above mean seal level in the northwest portion of the property. Regional topography slopes to the north toward Flushing Bay, which is located approximately 600 feet northeast of the Site. According to the USGS, soils on this property are mapped as Urban Land. Historic environmental reports indicated that the Site is underlain with historic fill and fine to coarse grained sand with gravel until at least 50 feet below grade. USGS classifies the bedrock underlying this area as a stratified sequence from the Cretaceous System, Upper Cretaceous System of the Mesozoic Era.

3.2.13 Current Institutional Controls

There are no current institutional controls at the Site.

3.3 Summary of Selected Remedial Actions

The Remedial Action will consist of the following remedial elements:

1. Excavation and off-site disposal of soil above the UUSCOs criteria presented in the Part 375 Regulations;
2. Groundwater remediation during construction activities consisting of *in situ* treatment using injections;
3. Removal and closure of former USTs;
4. Site Monitoring of airborne VOCs and particulates in accordance with a NYSDEC approved Community Air Monitoring Plan (CAMP) during all ground intrusive and soil handling activities;
5. Implementation of proper dust and odor suppression techniques during all ground intrusive and soil handling activities;

6. Import of materials to be used for backfill and cover in compliance with : (1) the Subpart 375-6.7 (d), (2) all Federal, State and local rules and regulations for handling and transport of material;
7. Implementation of a erosion and sediment controls;
8. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during all ground intrusive Site work;
9. Collection and analysis of end-point soil samples to evaluate the performance of the remedy with respect to attainment of UUSCOs;
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. Installation of a vapor barrier below the building slab;
12. An evaluation of the potential for onsite and offsite soil vapor intrusion post-remedy; and
13. 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 and the Department-issued Decision Document. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

4.1 Governing Documents

4.1.1 Site Specific Health and Safety Plan (HASP)

The HASP for the site is included in Appendix B. The HASP also includes the CAMP. 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 ground intrusive work performed at the Site until the issuance of a Certificate of Completion.

The Site Safety Coordinator will be identified in the SOP. A resume will be provided to NYSDEC prior to the start of remedial construction.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.2 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) provides a detailed description of site specific sampling and analytical methods and sample handling procedures for end-point soil sampling. The elements are provided in Section 5.2. A copy of the Site-specific QAPP is presented as Appendix C.

4.1.3 Construction Quality Assurance Plan (CQAP)

The Construction Quality Assurance Plan (CQAP) for all construction activities provides a detailed description of the observation and testing activities that will be used to monitor

construction quality and confirm that the remedial construction is in conformance with the remediation objectives and specifications. The CQAP will be prepared by the selected Excavation/Remedial Contractor and will include the following.

- Responsibilities and authorities of the organizations and key personnel involved in the design and construction of the remedy.
- Qualifications of the quality assurance personnel that demonstrate that they possess the proper training and experience necessary to fulfill project-specific responsibilities.
- The observations and tests that will be used to monitor construction and the frequency of performance of such activities.
- The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for implementing corrective measures as addressed in the plans and specifications.
- Requirements for project coordination meetings between the Volunteer and its representatives, the Construction Manager, Excavation Contractor, remedial or environmental subcontractors, and other involved parties.
- Description of the reporting requirements for quality assurance activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation.
- Description of the final documentation retention provisions.

4.1.4 Soil/Materials Management Plan (SoMP)

4.1.4.1 Soil Screening Methods

Visual, olfactory and instrument-based soil screening will be performed by a the Remedial Engineer or person under their supervision during all remedial construction and portions of the redevelopment construction activities at the Site during which earth disturbance activities are occurring and/or the potential for exposure to environmental contaminants in onsite and/or immediately adjacent offsite soil, groundwater and soil vapor exists. Soil screening will be performed regardless of when the ground intrusive work is done and will include all excavation and ground intrusive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing.

4.1.4.2 Stockpile Methods

All impacted materials will be directly loaded into trucks for disposal based on *in situ* waste characterization. If for any reason, stockpiling is required, the methods described in this section will be followed.

If stockpiling is required, materials known to be hazardous waste will be staged separately from non-hazardous waste and stockpiles will be labeled accordingly. Based on the results of the RI, no hazardous waste is expected to be encountered. Material suspected to be hazardous (if any is encountered outside of the existing areas identified) will be stockpiled separately for waste characterization and stockpiles will be labeled as “results pending.” The Remedial Engineer or his designee will be responsible for overseeing the waste segregation process and confirming that waste is segregated and stockpiled in the appropriate locations onsite. The Contractor will be responsible for installation, operation, and maintenance of the staging area and Roux Associates/Remedial Engineering onsite personnel will be responsible for inspection and monitoring of the staging area and for recommending any corrective actions should issues be identified. In general, stockpiles will be constructed by the Contractor to provide a 12-mil polyethylene base liner below the excavated soil. Stockpiles will be kept covered at all times with appropriately anchored tarps of 12 mil thickness or greater. Stockpiles will be routinely inspected by Roux Associates/Remedial Engineering onsite personnel and damaged tarp covers will be promptly replaced by the Contractor.

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

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

Stockpiles will be inspected daily (during the work 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.

4.1.4.3 Materials Excavation and Load Out

The Remedial Engineer or person under their supervision will oversee all ground intrusive work and the excavation and load-out of all excavated material.

The owner of the property and its contractors are solely responsible for safe execution of all ground intrusive and other work performed under this RAWP.

The presence of utilities and easements on the site will be investigated by the Remedial Engineer or person under their supervision. It will be determined whether a risk or impediment to the planned work under this RAWP is posed by utilities or easements on the site.

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

The Remedial Engineer or person under their supervision will be responsible for ensuring that all outbound trucks will be cleaned and decontaminated before leaving the site until the activities performed under this section are complete.

A stabilized construction entrance will be located on Ste. Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The Remedial Engineer or person under their supervision will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during ground intrusive activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

4.1.4.4 Materials Transport Off-Site

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

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

All trucks will be cleaned and decontaminated, as necessary prior to leaving the site. Truck wash water will be treated to the New York City Department of Environmental Protection (NYCDEP) sewer discharge limits and discharged to the NYCDEP sewer system under permit or containerized pending proper offsite disposal.

Truck transport routes to/from the nearest main artery are as follows and as shown on Figure 3:

- Inbound Truck Route (shown in green on Figure 3)
 1. I-278 (Brooklyn Queens Expressway) toward Exit 42
 2. Take Exit 42 toward Astoria Boulevard
 3. Merge onto Astoria Boulevard (destination will be on the right)
- Outbound Truck Route (shown in red on Figure 3)
 1. Head south on Astoria Boulevard
 2. Turn right onto Northern Boulevard west toward I-287
 3. Merge onto I-278 west via the ramp on the left to Brooklyn Queens Expressway

All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility, to the extent practicable; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site. Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development. Queuing of trucks will be performed on-site, to the extent practicable, in order to minimize off-site disturbance. Off-site queuing will be prohibited to the extent practicable.

4.1.4.5 Materials Disposal Off-Site

All soil/fill excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations.

If disposal of soil/fill from this site is proposed for unregulated off-site disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified based upon the *in situ* waste characterization sampling previously performed. NYSDEC will be provided with a pre-excavation notification, including estimated quantities and a breakdown by class of disposal facility if appropriate, i.e., hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, Beneficial Use Facility, permitted recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report and in the FER. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading, and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, in accordance with 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCO's is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

4.1.4.6 Materials Reuse On-Site

Criteria for on-site reuse of material will be in accordance with DER-10 5.4(e)4, Reuse of Soil From the Site. The Remedial Engineer or person under their supervision will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material does not remain on-site.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval.

4.1.4.7 Fluids Management

All liquids to be removed from the site, including excavation dewatering, truck wash water and run-off/run-on from stockpile and excavation areas, will be treated onsite or handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, but will either be containerized and disposed of in accordance with all applicable regulations or treated to the NYCDEP sewer discharge limits by an onsite water treatment system with discharge to the New York City sewer system.

4.1.4.8 Confirmation Samples

Compliance with soil cleanup objectives for the site will be through the collection and analysis of confirmation samples during the implementation of the remedy. Due to the potential large extent of excavation, in accordance with DER-10 5.4(b)iii(2), a confirmation sampling frequency proposal will be submitted separately to the NYSDEC, with supporting rationale. The proposal will include both sidewall and bottom confirmation samples, with increased sample collection frequency in areas of hot-spot removal, and removal of petroleum-impacted soil.

4.1.4.9 Backfill from Off-Site Sources

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 environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

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

4.1.4.10 Odor Control Plan

This odor control plan will be capable of controlling emissions of nuisance odors offsite and onsite. Specific odor control methods to be used on a routine basis will include backfilling excavations within the hot spot area in a timely manner to the extent practicable, and maintaining covers over stockpiled impacted soils. If nuisance odors are identified, work in the particular affected work area will be halted and the source of odors will be identified and corrected. Work will not resume in this area until nuisance odors have been abated (work may continue in other, unrelated areas.). NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. The Volunteer's onsite representative, Roux Associates/Remedial Engineering, will be present during ground intrusive work and will monitor for nuisance odors and recommend measures for odor control, including but not limited to halting the work temporarily, as necessary to evaluate options. Implementation of all odor controls, including halting the work, will be the responsibility of the Remedial Engineer.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. Tarps will be employed to suppress vapor and odors from stockpiled soil in the staging area. Foam will also be used to suppress vapors and odors, if necessary. The foam

unit, such as a Rusmar PFU-400, includes a self-contained 400-gallon tank for mixing foam concentrate. If needed, foam will be applied to stockpiled soil and excavation sidewalls. All necessary means will be employed to prevent onsite and offsite nuisances. If odors develop and cannot be otherwise controlled, additional means to eliminate nuisance odors 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.

In summary, if an odor complaint is received, the following procedure will be implemented:

1. Work in the affected area will be halted, and the source of odors will be identified.
2. NYSDEC, NYSDOH, and the Volunteer will be notified of the odor complaint.
3. Nuisance odors will be abated through the use of tarps to cover stockpiles, backfilling open excavations within the hot spot area in a timely manner, to the extent practicable; and/or use of a foam unit or other appropriate measures.
4. Work will resume in the affected area when the nuisance odors have been abated, as determined by the Roux Associates/Remedial Engineering onsite personnel.

4.1.4.11 Dust Control Plan

All ground intrusive work will be completed in accordance with the CAMP that is included within the HASP in Appendix B. A dust suppression plan that addresses dust management during ground intrusive onsite work will include, as needed, any or all of the items listed below:

- Dust suppression may be achieved through the use of a dedicated onsite water hoses for road wetting. The hoses will be capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Gravel may be used on roadways to provide a clean and dust-free road surface.
- Onsite truck routes may be limited to minimize the area required for water hose spraying.

4.1.5 Stormwater Pollution Prevention Plan (SWPPP)

Implementation of erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control. As necessary, hay bales will be placed at locations upgradient of excavation areas to control stormwater runoff and surface water from entering or exiting the excavation. Catch basin inlets

immediately adjacent to the work area will be protected to prevent disturbed soil from entering. Construction water will be managed in accordance with the SoMP described in section 4.1.4.

The Site is exempt from the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-02-01) requirement as it is solely serviced by combined sewers.

4.1.6 Community Air Monitoring Plan (CAMP)

Site monitoring of VOCs and particulates will be conducted during all ground intrusive and soil handling activities. The CAMP is included as Attachment 5 of the HASP (Appendix B).

4.1.7 Contractors Site Operations Plan (SOP)

A Contractors Site Operations Plan (SOP) will be developed with the selected Excavation/Remedial Contractor. The SOP will compile all of the required project plans into one document.

The Remedial Engineer or person under their supervision will review 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

A Citizen Participation Plan (CPP) was prepared and submitted in May, 2014.

A certification of mailing will be sent by the Volunteer to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of

recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

The approved Citizen Participation Plan for this project is attached in Appendix D.

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

Queens Public Library – Corona Branch
38-24 104th Street
Corona, New York 11368
718-426-2844

Monday, Thursday, Friday 11:00 am – 7:00 pm
Tuesday 2:00 pm – 7:00 pm
Wednesday 1:00 pm – 7:00 pm
Saturday and Sunday Closed

4.2 General Remedial Construction Information

4.2.1 Project Organization

The excavation/remediation general contractor is Racanelli Construction Company Inc. An organization chart of key people involved in the Remedial Action will be included in the SOP. A copy of professional profiles for the Remedial Engineer and the data validator are presented in Appendix E.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Brian P. Morrissey. 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 112-21 Northern Boulevard Site (NYSDEC BCA Index No. C241157-04-14 Site No. C241157). The Remedial Engineer will certify in the Final Engineering Report that the remedial activities

were observed by persons 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 or person under his supervision will oversee the work of other 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. The Remedial Engineer will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer or person under his supervision will review all pre-remedial plans submitted by contractors for compliance with this Remedial Action Work Plan and will certify compliance in the Final Remediation Report.

The Remedial Engineer will provide the certifications listed in Section 11.1 in the Final Engineering Report.

4.2.3 Remedial Action Construction Schedule

A proposed schedule for the major elements of the remedial construction and portions of the redevelopment construction are presented on Table 23.

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 Volunteer of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

Security for the work, equipment, materials, supplies, facilities, personnel, and incidentals will be provided throughout the performance of the work at the Site. The Site will be surrounded by

perimeter fencing in accordance with the New York City construction and building code requirements. The fences and gates will be closed and locked when there is no activity on the Site and any breaks or gaps will be repaired immediately. Temporary fencing will supplement the perimeter fencing to delineate and secure the area of ongoing remediation activities within the Site such as soil stockpiles, and health and safety exclusion zones.

All personnel and visitors will be required to sign-in upon entering the Site and sign-out upon leaving. A sign-in/sign-out sheet will be maintained at the Site. To restrict access during remediation activities, warning signs and barrier tape will be installed at certain locations, such as open excavations.

The Site security, control, and access measures will be described in more detail in the SOP.

4.2.6 Traffic Control

The Remediation Contractor/General Contractor will be responsible for providing all necessary personnel and materials (i.e., traffic lanes, safety cones) to control traffic entering and exiting the Site and for coordinating traffic control measures, as necessary. Detailed traffic control procedures will be developed when preparing the SOP.

The truck route for ingress and egress is presented in Figure 3. The route will be selected based on the existing access roads and an effort to limit transportation of work vehicles through neighboring residential and commercial areas and may be modified based on input from the community prior to the start of construction. Any changes in the truck route will be submitted to NYSDEC for review and approval prior to implementation.

4.2.7 Contingency Plan

A contingency plan describes procedures to be conducted in the event of an emergency, or the remedial work fails to meet any of its objectives or otherwise fails to protect human health or the environment. This plan shall address the recommended procedures after encountering an unknown UST.

The preferred remedial alternative is a Track 1 Cleanup. Based on the data generated during the RI, Remedial Alternative 1 should remove all soil above the USCOs and treat groundwater contamination. If the remedial work fails to meet any of its objectives, a Track 4 Cleanup will serve as the contingency plan.

If soil impacts exceeding the USCOs remain below the hot spot depth of excavation (0.0 ft amsl), a Track 4 Restricted Residential cleanup will be completed to address any impacts above the RRSCOs and the Protection of Groundwater SCOs for compounds detected above groundwater standards in the RI per Part 375-6.5.

As some soil contamination may remain in place, a Site Cover System including the vapor barrier and building slab, and a SMP will be instituted.

If *in situ* groundwater injections fail to remove VOCs to the GA AWQSGVs, injections will continue during the excavation (when feasible) and following the redevelopment, as necessary, and a Site Cover System and a SMP will be put in place. Additionally, quarterly groundwater monitoring will be performed until concentrations of VOCs are below the GA AWQSGVs or as otherwise approved by NYSDEC.

4.2.8 Worker Training and Monitoring

As discussed in Section 4.1.1, all Site workers conducting ground intrusive activities in the exclusion zone will be required to have 40-hour HAZWOPER training in accordance with the referenced regulations.

4.2.9 Agency Approvals

The Volunteer has addressed all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, 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 NYC DCP. Variances for specific aspects (e.g., height, FAR and setback

restrictions) of the proposed development will be obtained prior to the start of building construction. A Certificate of Completion will not be issued for the project unless conformance with zoning designation is demonstrated.

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

4.2.10 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.

4.2.11 Pre-Construction Meeting with NYSDEC

A project kick-off meeting will be conducted with the Volunteer, Roux Associates/Remedial Engineering, and the selected Contractor prior to the commencement of any ground intrusive remedial activities.

4.2.12 Emergency Contact Information

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

4.2.13 Remedial Action Costs

The total estimated cost of the Remedial Action is 13.99 million dollars, which was based on the assumption that most of the Site soil will have to be removed to achieve SCOs. The actual volume of soil to be removed will be based on the requirement to meet Site SCOs, as documented by confirmation sampling. An itemized and detailed summary of estimated costs

for all remedial activity is provided in Tables 21 and 22. This estimate will be revised based on the actual quantity of soil necessary to be removed to achieve the SCOs. The revised cost estimate will be submitted as an Appendix to the Final Engineering Report.

4.3 Site Preparation

Site preparation activities will include: identification of unmapped utilities, utility relocation (if required); Site survey for pre-existing conditions, establishment of temporary construction facilities, security and perimeter fencing inspection and installation (as necessary). The preparatory tasks are described in more detail below.

4.3.1 Mobilization

Prior to commencing the remediation construction activities, the Remediation and General Contractor will perform the following mobilization and Site preparation activities:

- Identification and markout of all aboveground and underground utilities;
- De-energizing, turning off and disconnecting existing subsurface utility services known to be present in the work area (e.g., water, gas, electric and sewer);
- Mobilization of remediation equipment and materials;
- Traffic control measures;
- Work zone demarcation;
- Installation of erosion control devices in accordance with the Soil Erosion and Sediment Control Plan;
- Asphalt pavement removal;
- Installation of perimeter air monitoring system;
- Installation of temporary facilities;
- Installation of dewatering and water treatment system or containers for storage and disposal; and
- Installation of decontamination facilities.

The detailed description of the mobilization and site preparation activities and responsibilities will be presented in the SOP.

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. Hay bales and/or silt fence will be placed by the remedial contractor at locations surrounding excavation areas, within the perimeter fencing, to control storm water runoff and surface water from entering or exiting the excavation. These control measures will be installed prior to initiating the soil excavation.

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 decontamination pad (see Section 4.3.7) and the stone-based egress path will be continuous so that trucks do not get recontaminated prior to departure from the Site.

4.3.4 Utility Marker and Easements Layout

The Volunteer 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 Volunteer and its contractors are solely responsible for safe execution of all ground intrusive 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 Sheet piling and Shoring

The contractor will use soil nailing/shotcrete to stabilize the sidewalls of the excavation. Localize sheet piling and/or timber shoring may be used in areas of elevator pits, hot-spot excavations, etc. The excavation support plans are included in Appendix A.

Appropriate management of structural stability of on-Site or off-Site structures during on-Site activities include excavation is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for safe execution of all ground intrusive and other work performed under this Plan. The Volunteer 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 Volunteer 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

All equipment and work materials will be staged in a location noted in the SOP.

4.3.7 Decontamination Area

A temporary decontamination pad will be constructed to decontaminate trucks and other vehicles/equipment leaving the Site. The decontamination pad will be constructed using 60-mil high density polyethylene (HDPE) liner with perimeter berms, sloped to a low-lying sump to contain any liquids. The decontamination pad will be sized to accommodate the largest construction vehicle used and located prior to the stabilized construction egress. All decontamination material will be collected and properly disposed of offsite.

4.3.8 Site Fencing

An eight-foot high plywood construction fence will be erected around the entire Site perimeter per NYC DOB requirements. Temporary silt fencing will be installed around the perimeter of soil stockpiles, staging areas, and around the excavation limit of disturbance. Hay bales will be used as needed near catch basins, surface waters and other discharge points

4.3.9 Demobilization

In conjunction with the remedial activities, the Site will be prepared for the construction activities required for the development project. All temporary structures not required for the subsequent construction work will be removed. Materials used in constructing the waste staging area (e.g., plastic sheeting, haybales) will be removed and disposed properly. Soil underlying

the plastic sheeting in the waste staging area will be inspected for any visual staining or evidence of waste materials. Any impacts to the soil in this area will be removed and disposed as well. All equipment will be decontaminated prior to leaving the Site.

4.4 Reporting

All daily and monthly Reports will be prepared and maintained on Site and included in the Final Engineering Report. The following sections provide a summary of reports that will be prepared and maintained throughout the remedial action.

4.4.1 Daily Reports

Daily activity reports will be prepared and maintained on site for compilation and record management.

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day following the reporting period and will include:

- An update of progress made during the reporting day;
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP monitoring, including any exceedances of the CAMP action limits;
- 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.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

A Site map that shows a predefined alpha-numeric grid for use in identifying locations described in reports submitted to NYSDEC is attached in Plate 5.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers by the 10th day of the month following the end 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) format. Photos will illustrate all remedial program elements. Representative photos of the Site prior to any Remedial Actions will also be provided. Copies of the photos will be provided in the Monthly Progress Reports submitted to NYSDEC and NYSDOH in accordance with the BCA for the Site.

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

Any complaints received from the public regarding nuisances or other site conditions will be communicated within 24-hours to NYSDEC and NYSDOH, investigated and remedied, if required.

4.4.5 Deviations from the Remedial Action Work Plan

Any required deviations from this RAWP will be discussed by Volunteer's representatives with the NYSDEC. At that time, the reasons for necessary deviations from the approved RAWP will be explained and the effect of the required deviations on the overall remedy will be evaluated. If the deviation is deemed to be a significant change to the RAWP by the NYSDEC, a description and reasons for the proposed change will be emailed to the NYSDEC Project Manager for review and written approval. All deviations from the RAWP will be fully documented in the FER.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Soil Excavation

The Site will be excavated to remove all soil above UUSCOs (Drawing 5). This work will be conducted after the New York City Department of Buildings has issued a building permit and foundation permit for the Site.

The excavation will be performed by the Foundation Contractor retained for the new building construction. The excavation and shoring installation will be conducted in a manner that protects the integrity of the adjacent structures. Soil excavation will generally be conducted using traditional excavation equipment. If any underground utilities or other subsurface piping are encountered, the excavation will be performed by hand as required to safely expose and support the utilities.

Because the excavation of the site soils in the hot spot area will involve removing soil from below the groundwater table, hydraulic control measures (i.e., excavation dewatering system) will be required to manage groundwater. Wastewater resulting from site dewatering will be containerized onsite pending proper offsite disposal or treated and discharged to the NYCDEP sewer system in accordance with NYCDEP permitting procedures.

All trucks removing material from the Site will be loaded on-Site and properly decontaminated before leaving the Site.

During the excavation activities, any existing subsurface structures will be demolished and removed when encountered to the extent required to remove impacted soil. The debris will be managed as discussed in the Section 5.4.5. Subsurface obstructions/conditions that may be encountered include former piles, and large pieces of demolition debris. This material, if encountered, will be managed as described below and disposed of in accordance with all federal, state, and local regulations. If encountered within the excavation area, these materials will be cut or broken into lengths or pieces suitable for offsite disposal in accordance with approved disposal facility requirements. If this type of debris is not visually impacted, it will be disposed of as construction and demolition debris (C&D) at an approved licensed C&D disposal facility.

If the debris is visually impacted, it will be either decontaminated (if possible) and managed as non-impacted C&D, or sampled for waste characterization purposes and disposed of at an appropriate approved facility.

Excavated material slated for off-site disposal will be temporarily staged on site and disposed in accordance with the Soil and Materials Management Plan discussed in Section 5.4.

Following excavation, end-point soil samples will be collected in accordance with the remedial performance evaluation described in Section 5.2.

Groundwater

Dewatering will be required during excavation activities to facilitate work below the groundwater table. Extracted groundwater will either be containerized for offsite disposal or be treated as necessary to meet NYCDEP requirements, and discharged to the NYCDEP sewer system. The groundwater will be extracted through the use of drainage sumps and/or perimeter well points to maintain dry conditions within the excavation. Drainage sumps will be installed within the excavation, as necessary, to dewater the excavation area. The water from the drainage sumps will be pumped to either an onsite wastewater storage tank or an onsite treatment system. The Remediation Contractor will identify, in the Contractor's SOP, the means and methods for dewatering and treatment.

If required, the treatment system may entail a settling tank, oil/water separator, bag filters, and carbon filter vessels, respectively. The effluent from the treatment system will be discharged to the NYCDEP sewer system under a sewer discharge permit that will be obtained from the NYCDEP following the submission of information regarding the proposed treatment system. The effluent from the treatment system will be sampled as required by NYCDEP. If wastewater is to be disposed of offsite, it will be stored onsite in an approved water storage tank pending characterization and transport for proper offsite disposal.

The quantity of groundwater to be extracted and treated will be determined based upon the following factors:

- Duration of excavation work below the water table;
- Depth of excavation beneath the water table; and
- Hydrogeologic factors including hydraulic permeability, hydraulic gradient, and rate of recharge into the excavation.

The extracted and treated groundwater will serve a beneficial role in reducing the toxicity, mobility, and volume of contaminated groundwater beneath the Site.

In addition to the extraction and treatment through dewatering, *in situ* groundwater treatment will be conducted. The means and methods for *in situ* groundwater treatment will be included in the SOP.

Provided below is a more detailed description of the remedial action, including the soil cleanup objectives, remedial performance evaluation, estimated material removal quantities, and Soil and Materials Management Plan.

5.1 Soil Cleanup Objectives

The proposed alternative is pursuing a Track 1 cleanup to the extent feasible up to the Site property line. A contingency Track 4 Restricted-Residential cleanup will be implemented if Track 1 cleanup objectives cannot be feasibly achieved to the property line on the Site. Additionally, a portion of the Site may potentially be managed separately as a Track 4 Restricted-Residential if all other portions of the Site achieve Track 1. In this case the Track 4 portion of the Site would be specifically detailed using metes and bounds and detailed in the Final Engineering Report.

Soil and materials management on-Site and off-Site will be conducted in accordance with the Soil Management Plan as described below.

Tables 3 and 8 summarize all soil samples that exceed the SCOs proposed for this Remedial Action. A data box map that shows all soil samples that exceed the SCOs proposed for this Remedial Action is shown in Plate 2.

UST closures will, at a minimum, conform to criteria defined in DER-10.

5.2 Remedial Performance Evaluation (Post-Excavation End-Point Sampling)

End-point sampling and reporting will be conducted in accordance with the DER-10 and the QAPP and is discussed in the sections below.

5.2.1 End-Point Sampling Frequency

Preliminarily, end-point excavation bottom samples will be collected at a frequency of one sample per 900 square feet of excavation bottom in accordance with NYSDEC DER-10 Section 5.4. However, an alternative sampling frequency may be proposed for approval by the NYSDEC in the event that the final excavation extent would require the collection of an excessive numbers of confirmation samples. The end-point samples will be analyzed for VOCs, SVOCs, metals PCBs and pesticides. Areas that appear more heavily impacted, if any, may be sampled at a higher frequency for confirmation.

No excavation sidewall samples will be collected as the excavation will extend to or slightly beyond the property line on all sides of the Site. Also, the presence of the excavation support system will prevent access to the soils on the excavation sidewalls. If the excavation does not extend to the property boundary, sidewall samples will be collected using GeoProbe or drill rig on the outside of the SOE per DER-10 Section 5.4. The default frequency of sidewall sample collection will be every 30 feet of excavation perimeter. However, an alternative sampling frequency may be proposed for approval by the NYSDEC in the event that the final excavation extent would require the collection of an excessive numbers of sidewall confirmation samples.

If the end-point sidewall soil sample results indicate that concentrations of target constituents are detected below the UUSCOs, the remedial excavation activities will be considered complete. However, if concentrations of target constituents are detected at a level above the UUSCOs, the

excavation activities, including additional end-point sidewall soil sampling, will continue until these conditions are met or to the extent feasible due to excavation shoring limitations and the risk of undermining adjacent roadways and structures.

5.2.2 Methodology

Each sample will be inspected for visual evidence of contamination (i.e., staining, presence of petroleum or odors) and field screened for VOCs using a portable photoionization detector (PID). Soil samples to be submitted for analysis will be placed in a laboratory sample jar, and transported to the laboratory in an iced container. Samples will be submitted for analysis for VOCs, SVOCs, and metals, PCBs and pesticides. Laboratory analysis will be performed by a NYSDEC-approved laboratory using USEPA SW846 Method 8260 for VOCs, USEPA SW846 Method 8270 for SVOCs, USEPA SW846 Method 6010 for metals, USEPA SW846 Method 8082 for PCBs and USEPA SW846 Method 8081 for pesticides.

5.2.3 Reporting of Results

The laboratory will report analytical results in Analytical Services Protocol (ASP) Category B deliverable packages. An electronic data deliverable (EDD) will also be provided by the laboratory.

All end-point sample data generated for the Remedial Action will be logged in a database and organized to facilitate data review and evaluation. The electronic dataset will include the data flags provided in accordance with USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organic Analysis and Inorganic Analyses, as well as additional comments of the data review for ASP/CLP analyses. The data flags include such items as: 1) concentration below required detection limit, 2) estimated concentration due to poor recovery below required detection limit, 3) estimated concentration due to poor spike recovery, and 4) concentration of chemical also found in laboratory blank.

5.2.4 QA/QC

Quality control (QC) samples serve as checks on both the sampling and measurements systems and assist in determining the overall data quality with regard to representation, accuracy, and

precision. Field duplicates and matrix spike samples are analyzed to assess the quality of the data resulting from the field sampling. Field duplicate samples are individual portions of the same field sample. These samples can be used to estimate the overall precision of the data collection activity. Sampling error can be estimated by the comparison of field sample result and duplicated sample result. During end-point sampling, one field duplicate sample will be collected for each 20 samples collected. Matrix spike and matrix spike duplicates are used to evaluate analytical accuracy and precision, respectively. MS/MSDs will be analyzed by the laboratory at a frequency of one per preparation batch.

5.2.5 DUSR

A Data Usability Summary Report (DUSR) will be prepared to evaluate the end-point samples by a party independent from the laboratory performing the analysis in accordance with Appendix 2B of DER-10.

5.2.6 Reporting of End-Point Data in FER

Chemical labs used for all end-point sample results and contingency sampling will be NYSDOH ELAP certified.

The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs.

5.3 Estimated Material Removal Quantities

The estimated quantity of material removed from the Site will be governed by the minimum quantity of soil to:

1. Achieve Track 1 SCOs. In the event that this is not feasible, a contingency of removing the quantity of soil as required to achieve Track 4 Restricted-Residential SCOs or PoGSCOs for compounds detected above the AWQSGVs in groundwater during the RI will be implemented.
2. Remove soil in hot spot to 5 feet below the groundwater table (to elevation 0.0 ft amsl).

The depth of soil to be excavated and disposed off-site to meet the UUSCOs varies by location. Maps showing the estimated extent of materials to be removed are provided in Drawing 5.

Additional plans for soil sampling to determine how much soil will be removed as part of the remedy will be prepared prior to beginning excavation of the Site.

This section describes the media to be removed and the following:

- Criteria to govern material removal
- Volume/mass of material to be removed
- Locations from which materials were removed:
 - Scaled maps of excavation areas and types of materials removed
 - Vertical and horizontal extent

No soil is anticipated to be imported into the Site for use as for backfill or cover. The estimated quantity of soil/fill expected to be reused/relocated on Site is 2,230 cubic yards.

5.4 Soil/Materials Management Plan

The following sections provide the Soil Management Plan to be implemented during the Remedial Action.

5.4.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed by the Remedial Engineer or person under their supervision during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be performed regardless of when the ground intrusive work is done and will include all excavation and ground intrusive 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 the Remedial Engineer or person under their supervision.

5.4.2 Stockpile Methods

As pre-characterization soil sampling was performed prior to excavation, soils will be loaded directly into trucks for transport offsite for disposal. In the unlikely event that stockpiling of soils is necessary, Stockpiles will be constructed on 12 mil poly sheeting and will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

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

5.4.3 Materials Excavation and Load Out

The Remedial Engineer, or individual under his supervision will oversee all ground intrusive work and the excavation and load-out of all excavated material.

The Volunteer and its contractors are solely responsible for safe execution of all ground intrusive and other work performed under this Plan.

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.

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).

The Remedial Engineer or person under their supervision will be responsible for ensuring that all outbound trucks will be cleaned and decontaminated 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 Remedial Engineer or person under their supervision 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 ground intrusive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

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

Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

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

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a

surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Final Engineering Report.

5.4.4 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.

Trucks will transport Site materials for disposal using the routes detailed in Section 4.1.4.4. All trucks loaded with Site materials will exit the vicinity of the Site using only those approved truck routes.

Proposed in-bound and out-bound truck routes to the Site are shown in Figure 3. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off- Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport; [(g) community input [where necessary]]

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

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

Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be limited to the extent practicable.

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

All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

5.4.5 Materials Disposal Off-Site

The total quantity of soil expected to be disposed off-Site is approximately 213,200 cubic yards of non-hazardous waste. The potential disposal facilities will be provided in the SOP.

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

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 completed disposal facility application for each receiving facility describing the material to be disposed. The application will state the contaminants present in the material, the source of the material and that the material was generated at an environmental remediation Site in New York State. The letter will include as an attachment a summary of all chemical data for the material being transported; 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.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) 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 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, 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 attached summary of all chemical data for the material being transported.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Final Engineering Report.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results, and QA/QC will be reported in the FER. All data

available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

5.4.6 Materials Reuse On-Site

Chemical criteria for on-Site reuse of material will in accordance with DER-10 5.4(e)4. 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.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

5.4.7 Fluids Management

Construction wastewater will be generated from personnel/equipment decontamination and run-off/run-on in bermed soil stockpile and excavation areas. Construction wastewater will be collected and stored on-site in leak-tight drums, vacuum trucks, or temporary storage tanks or treated by an onsite wastewater treatment system and discharged to the adjacent NYCDEP sewer system in accordance with NYCDEP permits. If containerized, the wastewater will be sampled and submitted for analysis for disposal/discharge characterization. Based on the laboratory analytical results, the construction wastewater will be disposed off-site at a permitted disposal/recycling facility or discharged to the public sewer system, if approved in writing by the NYCDEP. The remedial contractor will acquire any required permits.

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Liquids discharged into the NYCDEP sewer system will be addressed through approval by NYCDEP.

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

5.4.8 Demarcation

No demarcation layer will be required as Track 1 remediation is proposed for the Site. In the event that a Track 1 cleanup is not feasible and the Site or portion(s) of the Site is remediated to Track 4 SCOs, a demarcation layer and soil cover system will be emplaced per DER-10 4.1(f).

5.4.9 Backfill from Off-Site Sources

Clean fill meeting the requirements of 6 NYCRR Part 375-6. 7(d) will be brought in to replace the excavated soil. This material will meet the specifications of the geotechnical engineer, Remedial Engineer, and Redevelopment Construction Documents. The source approval process will require a review of the following information:

- Sources of backfill material
 - Past usage of backfill material source site origin
 - Source area background check
- Chemical sampling data
 - Source analytical data to confirm that material meets the UUSCOs.
 - Frequency to be determined by Remedial Engineer and will comply with guidance provided in DER-10.

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this RAWP prior to receipt at the Site.

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

The Final Engineering Report will include the following certification by the Remedial Engineer:

“I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.”

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. These NYSDEC approved backfill or cover soil quality objectives are the lower of the protection of groundwater or the protection of public health soil cleanup objectives for the Site as set forth in Table 375-6.8(b) of 6 NYCRR Part 375. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

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. Nothing in this Remedial Action Work Plan should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

5.4.10 Stormwater Pollution Prevention

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by 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 stockpile areas, around sewer inlets, where applicable, and around the entire perimeter of the remedial construction area.

5.4.11 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 semivolatiles, TCL pesticides and PCBs). These analyses will not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during ground intrusive 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.

5.4.12 Community Air Monitoring Plan

Each of the components of the Remedial Action will require air monitoring. These activities include excavation of soil with VOCs. The air monitoring program will be implemented during all ground intrusive remedial actions to provide a measure of protection for the downwind

community from potential airborne contaminant releases as a direct result of investigative or remedial work activities.

A CAMP is provided in accordance with the NYSDOH Generic Community Air Monitoring Plan (Appendix B). The CAMP includes real-time continuous air monitoring at the Site's downwind perimeter for VOCs and particulates. Implementation and management procedures are specified within the CAMP. During all phases of work, the remedial contractor will be responsible for mitigating any vapor and particulate issues, via suppression techniques defined in the CAMP.

Three CAMP stations will be deployed prior to the start of all ground intrusive activities. Once establishing the predominant wind direction, the location of the CAMP stations will be placed to provide a measure of protection for the downwind community (i.e., off-site residences) from potential airborne contaminant releases. A PID with a 10.6 eV lamp, such as the MiniRae 3000, will be used to monitor VOCs. A particulate monitor capable of measuring PM-10 such as the DustTrak 2 will be used to monitor dust. Each monitor will record 15-minute time weighted averages. The action level for VOCs is 5 ppm above background. At this level, odor suppression techniques will be implemented. If the VOC level does not drop, work will be stopped. The exceedance level is 25 ppm above the background. The action level for particulates is 100 mcg/m³ above the upwind or baseline level. If 100 mcg/m³ is reached, dust suppression techniques will be implemented. Work must be stopped at 150 mcg/m³ above the upwind level.

The CAMP monitoring locations will be moved depending on wind directions. The location of the stations will be recorded.

Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

5.4.13 Odor, Dust, and Nuisance Control Plan

Dust will be controlled by spraying a water mist over the work area if perimeter action levels established in the CAMP are exceeded. The water mist will be generated by connecting a misting device to a hose, which will be connected to any potable water source. The degree to which these measures will be used will depend on particulate levels in ambient air at the Site perimeter as determined through implementation of the CAMP.

As necessary, a foam unit to suppress vapors and odors that are generated during the soil excavations will be employed. The foam unit, such as a Rusmar PFU-400, includes a self-contained 400-gallon tank for mixing foam concentrate. Foam will be applied, if warranted, to stockpiled soil and excavation sidewalls in an effort to maintain work zone and perimeter air monitoring criteria established in the HASP and CAMP. Alternately an odor suppressant misting system may be used both within the excavation and stockpiling areas and at the perimeter to control odors and airborne VOC concentrations. Tarps will also be employed to suppress vapor and odors from stockpiled soil in the staging area.

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

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include assigning a dedicated air monitoring technician to monitor odors, backfilling excavations in a timely manner, and maintaining covers over any stockpiled impacted soils. 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 Remedial Engineer.

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 odor suppressants to treat 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.

5.4.13.2 Dust Control Plan

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

- Dust suppression will be achieved through the use of a dedicated on-Site dust suppression hoses capable of 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 spraying.

5.4.13.3 Other Nuisances

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

A noise control plan will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

6.0 ENGINEERING CONTROLS: TREATMENT SYSTEMS

6.1 In Situ Chemical Oxidation Injections

An aggressive approach is proposed to address groundwater contamination in the western area of the Site. This work will be timed so that it is initiated prior to the start of excavation activities at the Site. The proposed action is to use chemical oxidant injections to address the VOCs in the groundwater. The following sections present the detailed injection plan.

6.1.1 Kloxur CR Injections

As discussed above, an *in situ* chemical oxidation injection program will be performed to address contaminated groundwater beneath hot spot area of the Site (Drawing 5). As a result of the concentrations of BTEX, MTBE, and chlorinated solvents, either Kloxur CR as manufactured by PeroxyChem or RegenOx as manufactured by Regenesis is proposed since either will be a strong oxidant, and will enhance aerobic and anaerobic biodegradation. A product brochure of Kloxur CR and RegenOx is provided in Appendix F.

Volume and density application rates for the chemical oxidant will be based on the manufacturer's recommendations.

The chemical oxidant will be injected using approximately 37 temporary points installed by a Geoprobe™, or depending on subsurface conditions, an alternative drilling method. The oxidant will be distributed evenly among the injection points using a 20% to 30% solution. Based on expected subsurface conditions, the injection points will be spaced approximately 30 feet on center to inject the slurry into the subsurface. The injections will occur at a depth of approximately -5 ft amsl, approximately 10 feet into the water table. The approximate locations of the proposed injection points are shown on Drawing 5. Additional oxidant will be applied to the base of excavation areas to address potential recontamination from groundwater migration following completion of dewatering.

6.1.2 Groundwater Monitoring

To assess the performance of the oxidant injections, a groundwater monitoring program will be established. This will include two components: baseline sampling and performance monitoring.

Groundwater Monitoring will include the installation of on-site groundwater monitoring wells to ensure all Non-Aqueous Phase Liquid (NAPL) has been removed and dissolved-phase contamination meets the "bulk reduction" requirement per 6 NYCRR Part 375-3.8(e) for Track 1. Performance monitoring wells will be installed in the area that contained NAPL, and will be sampled on a quarterly basis for 2 years following completion of groundwater remediation activities. In addition, performance monitoring wells will be installed at the downgradient (i.e., northeast) Site boundary to ensure that contaminated groundwater is not migrating off-site. The exact number and locations of performance monitoring wells will be determined following building construction and a determine of access constraints.

The sampling, sample handling, decontamination, and field instrument calibration procedures will be performed in accordance with established procedures for the Site.

Baseline Sampling

The results of the groundwater sampling performed during the Remedial Investigation will be utilized as the baseline sampling. The amount of oxidant proposed is based on those sampling results.

Performance Monitoring

Approximately two weeks after the oxidant injection event, performance monitoring samples will be collected from the existing Site monitoring wells. The monitoring wells will be sampled for the Target Compound List (TCL) of VOCs using USEPA SW846 Method 8260.

Schedule

Design details for the oxidant injections and reinjections (as necessary), as well as work schedule will be included in the SOP. If necessary, additional rounds of injection may be scheduled upon review of post-injection monitoring data. The construction schedule may limit the opportunity to assess the performance of the initial round of injections and complete additional rounds of injections.

6.1.3 Data Evaluation and Reporting

After the injection and the performance monitoring have been completed, Remedial Engineering, P.C. and Roux Associates will evaluate the results each injection round to determine the effectiveness of the oxidant at reducing the residual BTEX, MTBE and chlorinated solvent concentrations in the groundwater. The evaluation and recommended course of action will be summarized in a report to NYSDEC.

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment components will be presented in the FER.

7.0 CRITERIA FOR COMPLETION OF REMEDIATION/ TERMINATION OF REMEDIAL SYSTEMS

The remediation is considered complete when all soil is excavated as described in Section 5 and groundwater chemical injections are complete as described in and Section 6. If the remediation is not successful, the contingency plan described below in Sections 8 through 10 will be implemented.

8.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE CONTINGENCY PLAN

The selected remedial alternative is designed to reduce the concentrations of Site contaminants to below the USCOs and AWQSGVs. If the remedial action is unsuccessful (i.e., soil above the USCOs or groundwater above the AWQSGVs remains on Site, then Engineering and Institutional Controls (ECs and ICs) would be required to protect human health and the environment. These ECs and ICs are described hereafter as a contingency. Long-term management of EC/ICs and of residual contamination will be executed under a Site specific Site Management Plan (SMP) that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have one primary EC system. The EC system will include a composite site cover system.

The FER will report any residual contamination on the Site in tabular and map form. This will include presentation of exceedances of both Track 1 and Track 4 sites.

9.0 CONTINGENCY PLAN ENGINEERING CONTROLS: COMPOSITE COVER SYSTEM

If the remediation of impacted soil is unsuccessful, exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be constructed across the Site. This composite cover system will be comprised of the concrete building slab and a vapor barrier system around the entire building foundation including the slab and foundation walls.

A site plan detailing the specific layout of the building foundation and vapor barrier components will be provided in the FER. A Soil and Underground Structure Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the FER.

10.0 CONTINGENCY PLAN INSTITUTIONAL CONTROLS

As the preferred remedial alternative consists of Track 1 remedy, institutional controls are not required. If the remediation is not successful, the contingency plan described in Section 9 will be implemented, and institutional controls will be required.

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

The specific requirements of the environmental easement and SMP are detailed below.

10.1 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 contains residual contamination after completion of all Remedial Actions than an Environmental Easement is required. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Queens County Office of the City Resister. The Environmental Easement 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 Queens County Office of the City Register before the Certificate of Completion can be issued by NYSDEC. A series of Institutional Controls are required under this remedy to implement, maintain and monitor these Engineering Control systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to restricted residential and commercial uses only. 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, which provides all of the methods and procedures to be followed to comply with this remedy.

The Institutional Controls that support Engineering Controls include the following:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of asphalt covered roads, concrete covered sidewalks, and concrete building slabs must be inspected, certified and maintained as required in the SMP;
- All Engineering Controls on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- On-Site environmental monitoring devices, including but not limited to, groundwater monitor wells and soil vapor probes, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Note: Institutional Controls may be modified, added or deleted from this list as warranted by Site conditions and deemed necessary by NYSDEC.

Adherence to these Institutional Controls for the Site is mandated by the Environmental Easement and will be implemented under the Site Management Plan (discussed in the next section). The Controlled Property (Site) will also have a series of Institutional Controls in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited.

- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose.
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in the Site Management Plan.
- The Controlled Property may be used for restricted residential use only, provided the long-term Engineering and Institutional Controls included in the Site Management Plan are employed.
- The Controlled Property may not be used for a higher level of use, such as unrestricted residential use without an amendment or extinguishment of this Environmental Easement.
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This [time period] statement must be certified by an expert that the NYSDEC finds acceptable.

10.2 Site Management Plan

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

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to

operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP will include: (1) an Institutional and Engineering Control Plan for implementation and management of EC/ICs; (2) Institutional Control and Engineering Control (IC/EC) Certification; (3) a Site Monitoring Plan for implementation of Site Monitoring; (4) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; (5) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC; and (6) a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010 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, unless otherwise approved by NYSDEC. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

The Site Management Plan in the Final Remediation Report may include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site-wide performance of the remedy.

All handling of residual contaminated material will be subject to provisions contained in the SMP.

11.0 FINAL ENGINEERING REPORT

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

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

The Final Remediation Report will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that

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

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

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

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

11.1 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, Brian P. Morrissey, 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 Brian P. Morrissey, 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 must 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 must 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 must include: Any financial assurance mechanisms required by DEC pursuant to Environmental Conservation Law have been executed.

It is a violation of Article 130 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 130, New York State Education Law.

12.0 SCHEDULE

A schedule of Remedial Actions provided as Table 23.

TABLES

1. Summary of Remedial Investigation Samples
2. Summary of Volatile Organic Compounds in Soil Vapor
3. Summary of Volatile Organic Compounds in Soil
4. Summary of Semivolatile Organic Compounds in Soil
5. Summary of Metals in Soil
6. Summary of TCLP Metals in Soil
7. Summary of Polychlorinated Biphenyls in Soil
8. Summary of Pesticides in Soil
9. Summary of Water-Level Measurements
10. Summary of Volatile Organic Compounds in Groundwater
11. Summary of Semivolatile Organic Compounds in Groundwater
12. Summary of Metals in Groundwater
13. Summary of Polychlorinated Biphenyls in Groundwater
14. Summary of Pesticides in Groundwater
15. Summary of Volatile Organic Compounds in Soil
16. Summary of Metals in Soil
17. Summary of Volatile Organic Compounds in Groundwater
18. Summary of Semivolatile Organic Compounds in Groundwater
19. Summary of Metals in Groundwater
20. Summary of Pesticides in Groundwater
21. Remedial Alternative 1 Cost Estimate
22. Remedial Alternative 2 Cost Estimate
23. Proposed Remediation Schedule

Table 1. Summary of Remedial Investigation Samples, 112-21 Northern Boulevard, Corona, New York

Sample Location	Depth (ft bls)	Matrix	Analyses
DW-1	-	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-01	13 - 15	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-2	28 - 30	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-3	27 - 29	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-4	30 - 32	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-4 DUP	30 - 32	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-5	32 - 34	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-6	35 - 37	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-7	35 - 37	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-8	35 - 37	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-9	34 - 36	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-10	24 - 26	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-11	28 - 30	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-12A	16 - 18	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-12	34 - 36	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-13	37 - 39	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-14	37 - 39	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-15	30 - 32	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-16	40 - 42.5	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXSB-17	42 - 44	Soil	VOCs, SVOCs, Metals, PCBs, Pesticides
RXMW-1	25-35	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-1 DUP	25-35	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-2	27-37	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-3	27-37	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-4	22-37	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-5	34-44	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-6	34-44	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-7	33-43	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-8	32-42	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-9	41-51	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-10	40-50	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-11	26-41	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides
RXMW-12	26-41	Groundwater	VOCs, SVOCs, Metals (filtered and unfiltered), PCBs, Pesticides

Table 1. Summary of Remedial Investigation Samples, 112-21 Northern Boulevard, Corona, New York

Sample Location	Depth (ft bls)	Matrix	Analyses
AMBIENT AIR	0	Air	VOCs
RX-SV-01	8	Soil Vapor	VOCs
RX-SV-02	8	Soil Vapor	VOCs
RX-SV-02 DUP	8	Soil Vapor	VOCs
RX-SV-03	8	Soil Vapor	VOCs
RX-SV-04	8	Soil Vapor	VOCs
RX-SV-05	8	Soil Vapor	VOCs
RX-SV-06	8	Soil Vapor	VOCs
RX-SV-07	8	Soil Vapor	VOCs
RX-SV-08	8	Soil Vapor	VOCs

DUP - duplicate sample

Sample depth for groundwater samples is the screened interval

Table 2. Summary of Volatile Organic Compounds in Soil Vapor, 112-21 Northern Boulevard, Queens, New York

Parameter	Sample Designation: Sample Date:	AMBIENT AIR 6/6/2014	RX-SV-01 6/6/2014	RX-SV-02 6/6/2014	RX-SV-02 DUP 6/6/2014	RX-SV-03 6/6/2014	RX-SV-04 6/11/2014	RX-SV-05 6/6/2014
(Concentrations in ug/m ³)								
1,1,1-Trichloroethane		1.09 U	1.09 U	7.53	8.57	1.09 U	1.09 U	1.09 U
1,1,2,2-Tetrachloroethane		1.37 U	1.37 U	1.37 U	1.37 U	1.37 U	1.37 U	1.37 U
1,1,2-Trichloroethane		1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U
1,1-Dichloroethane		0.809 U	0.809 U	0.809 U	0.809 U	0.809 U	0.809 U	0.809 U
1,1-Dichloroethene		0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U
1,2,4-Trichlorobenzene		1.48 U	1.48 U	1.48 U	1.48 U	1.48 U	1.48 U	1.48 U
1,2,4-Trimethylbenzene		0.983 U	3.58	0.983 U	3.29	1.92	1.76	3.22
1,2-Dibromoethane		1.54 U	1.54 U	1.54 U	1.54 U	1.54 U	1.54 U	1.54 U
1,2-Dichlorobenzene		1.20 U	1.20 U	1.20 U	1.20 U	1.20 U	1.2 U	1.20 U
1,2-Dichloroethane		0.809 U	0.809 U	0.923	0.809 U	0.809 U	0.809 U	0.809 U
1,2-Dichloropropane		0.924 U	0.924 U	0.924 U	0.924 U	0.924 U	0.924 U	0.924 U
1,3,5-Trimethylbenzene		0.983 U	1.13	0.983 U	0.983 U	0.983 U	0.983 U	1.02
1,3-Butadiene		0.442 U	0.442 U	0.442 U	0.442 U	1.19	0.442 U	1.5
1,3-Dichlorobenzene		1.20 U	1.20 U	1.20 U	1.20 U	1.20 U	1.2 U	1.20 U
1,4-Dichlorobenzene		1.20 U	1.20 U	1.20 U	1.20 U	1.20 U	1.2 U	1.20 U
1,4-Dioxane		0.721 U	0.721 U	0.721 U	0.721 U	0.721 U	0.721 U	0.721 U
2-Butanone (MEK)		0.590 U	15.5	8.46	8.08	3.69	16.4	16.5
2-Hexanone		0.820 U	1.55	0.820 U	1.04	0.820 U	0.82 U	1.82
3-Chloropropene		0.626 U	0.626 U	0.626 U	0.626 U	0.626 U	0.626 U	0.626 U
4-Ethyltoluene		0.983 U	0.983 U	0.983 U	0.983 U	0.983 U	0.983 U	0.983 U
4-Methyl-2-pentanone (MIBK)		0.820 U	4.05	1.02	1.81	1.49	2.69	3.51
Acetone		6.06	285	142	182	52.3	394	254
Benzene		0.639 U	2.73	2.14	1.12	0.92	11	2.11
Benzyl chloride		1.04 U	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U
Bromodichloromethane		1.34 U	1.34 U	1.34 U	1.34 U	1.34 U	1.34 U	1.34 U
Bromoethene		0.874 U	0.874 U	0.874 U	0.874 U	0.874 U	0.874 U	0.874 U
Bromoform		2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U
Bromomethane		0.777 U	0.777 U	0.777 U	0.777 U	0.777 U	0.777 U	0.777 U
Carbon disulfide		0.623 U	2.68	19.5	0.859	1.41	9.93	6.17
Carbon tetrachloride		1.26 U	1.26 U	1.26 U	1.26 U	1.26 U	1.26 U	1.26 U
Chlorobenzene		0.921 U	0.921 U	0.921 U	0.921 U	0.921 U	0.921 U	0.921 U
Chloroethane		0.528 U	0.528 U	0.528 U	0.528 U	0.528 U	0.528 U	0.528 U
Chloroform		0.977 U	1.48	0.977 U	0.977 U	1.35	1.09	1.55
Chloromethane		0.983	0.547	0.717	0.413 U	0.413 U	0.913	0.479
cis-1,2-Dichloroethene		0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U
cis-1,3-Dichloropropene		0.908 U	0.908 U	0.908 U	0.908 U	0.908 U	0.908 U	0.908 U

Table 2. Summary of Volatile Organic Compounds in Soil Vapor, 112-21 Northern Boulevard, Queens, New York

Parameter	Sample Designation:	AMBIENT AIR	RX-SV-01	RX-SV-02	RX-SV-02 DUP	RX-SV-03	RX-SV-04	RX-SV-05
	Sample Date:	6/6/2014	6/6/2014	6/6/2014	6/6/2014	6/6/2014	6/11/2014	6/6/2014
(Concentrations in ug/m ³)								
Cyclohexane		0.688 U	0.688 U	1.85	0.688 U	0.922	38.2	0.771
Dibromochloromethane		1.70 U	1.70 U	1.70 U	1.70 U	1.70 U	1.7 U	1.70 U
Dichlorodifluoromethane		1.24	1.03	1.17	1.21	1.73	2.39	1.55
Ethanol		4.71 U	15	10.6	14.9	4.71 U	32.6	14.2
Ethyl Acetate		1.80 U	1.80 U	1.80 U	1.80 U	1.80 U	4.11	1.80 U
Ethylbenzene		0.869 U	3.46	0.869 U	2.89	0.969	2.35	3.31
Freon 113		1.53 U	1.53 U	1.53 U	1.53 U	1.53 U	1.53 U	1.53 U
Freon 114		1.40 U	1.40 U	1.40 U	1.40 U	1.40 U	1.4 U	1.40 U
Heptane		0.820 U	5.82	2.35	1.68	0.820 U	17.1	1.81
Hexachlorobutadiene		2.13 U	2.13 U	2.13 U	2.13 U	2.13 U	2.13 U	2.13 U
Isooctane		0.934 U	1.78	0.934 U	0.934 U	1.55	28.1	14.8
Isopropanol		1.23 U	5.09	1.75	2.39	4.94	13.2	3.59
m+p-Xylene		1.74 U	13.3	1.74 U	11.5	3.86	6.08	12.7
Methylene chloride		3.47 U	3.47 U	3.47 U	3.47 U	3.47 U	3.47 U	3.47 U
MTBE		0.721 U	0.721 U	0.721 U	0.721 U	0.721 U	0.721 U	0.721 U
n-Hexane		0.705 U	1.49	0.955	0.712	1	12	2.13
o-Xylene		0.869 U	5.21	0.869 U	4.56	1.62	2.93	5.13
Styrene		0.852 U	0.852 U	0.975	0.852 U	0.852 U	0.852 U	0.852 U
t-Butyl Alcohol		1.52 U	112	115	34.3	19.5	158	88.8
Tetrachloroethene		1.36 U	1.36 U	61.6	208	2.39	1.36 U	1.54
Tetrahydrofuran		0.590 U	1.55	0.590 U	0.835	0.590 U	2.77	1.04
Toluene		1.46	42.2	10.6	20.4	13.3	47.5	28.1
trans-1,2-Dichloroethene		0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U	0.793 U
trans-1,3-Dichloropropene		0.908 U	0.908 U	0.908 U	0.908 U	0.908 U	0.908 U	0.908 U
Trichloroethene		1.07 U	1.07 U	1.07 U	1.07 U	1.07 U	1.07 U	1.07 U
Trichlorofluoromethane		1.12 U	1.63	1.33	1.38	1.58	2.49	2.17
Vinyl chloride		0.511 U	0.511 U	0.511 U	0.511 U	0.511 U	0.511 U	0.511 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

ug/m³ - Micrograms per cubic meter

Bold data indicates that parameter was detected

Table 2. Summary of Volatile Organic Compounds in Soil Vapor, 112-21 Northern Boulevard, Queens, New York

Parameter	Sample Designation:	RX-SV-06	RX-SV-07	RX-SV-08
(Concentrations in ug/m ³)	Sample Date:	6/6/2014	6/6/2014	6/6/2014
1,1,1-Trichloroethane		1.09 U	1.09 U	1.8
1,1,2,2-Tetrachloroethane		1.37 U	1.37 U	1.37 U
1,1,2-Trichloroethane		1.09 U	1.09 U	1.09 U
1,1-Dichloroethane		0.809 U	0.809 U	0.809 U
1,1-Dichloroethene		0.793 U	0.793 U	0.793 U
1,2,4-Trichlorobenzene		1.48 U	1.48 U	1.48 U
1,2,4-Trimethylbenzene		2.88	3.51	3.33
1,2-Dibromoethane		1.54 U	1.54 U	1.54 U
1,2-Dichlorobenzene		1.20 U	1.20 U	1.20 U
1,2-Dichloroethane		0.809 U	0.809 U	0.809 U
1,2-Dichloropropane		0.924 U	0.924 U	0.924 U
1,3,5-Trimethylbenzene		0.983 U	1.09	0.983 U
1,3-Butadiene		0.442 U	0.442 U	0.442 U
1,3-Dichlorobenzene		1.20 U	1.20 U	1.20 U
1,4-Dichlorobenzene		1.20 U	1.20 U	1.20 U
1,4-Dioxane		0.721 U	0.721 U	0.721 U
2-Butanone (MEK)		7.61	8.91	8.46
2-Hexanone		0.902	1.14	1.36
3-Chloropropene		0.626 U	0.626 U	0.626 U
4-Ethyltoluene		0.983 U	0.983 U	0.983 U
4-Methyl-2-pentanone (MIBK)		1.85	1.91	2.11
Acetone		136	198	139
Benzene		0.968	0.898	0.901
Benzyl chloride		1.04 U	1.04 U	1.04 U
Bromodichloromethane		1.34 U	1.34 U	1.34 U
Bromoethene		0.874 U	0.874 U	0.874 U
Bromoform		2.07 U	2.07 U	2.07 U
Bromomethane		0.777 U	0.777 U	0.777 U
Carbon disulfide		1.32	1.02	1.16
Carbon tetrachloride		1.26 U	1.26 U	1.26 U
Chlorobenzene		0.921 U	0.921 U	0.921 U
Chloroethane		0.528 U	0.528 U	0.528 U
Chloroform		0.977 U	1.9	1.87
Chloromethane		0.665	0.425	0.483
cis-1,2-Dichloroethene		0.793 U	0.793 U	0.793 U
cis-1,3-Dichloropropene		0.908 U	0.908 U	0.908 U

Table 2. Summary of Volatile Organic Compounds in Soil Vapor, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in ug/m ³)	Sample Designation:	RX-SV-06	RX-SV-07	RX-SV-08
	Sample Date:	6/6/2014	6/6/2014	6/6/2014
Cyclohexane		0.688 U	0.726	0.688 U
Dibromochloromethane		1.70 U	1.70 U	1.70 U
Dichlorodifluoromethane		1.3	1.09	0.989 U
Ethanol		6.97	13.8	8.22
Ethyl Acetate		1.80 U	1.80 U	1.80 U
Ethylbenzene		1.67	3.7	2.38
Freon 113		1.53 U	1.53 U	1.53 U
Freon 114		1.40 U	1.40 U	1.40 U
Heptane		0.947	1.11	1.11
Hexachlorobutadiene		2.13 U	2.13 U	2.13 U
Isooctane		0.934 U	1.26	4.11
Isopropanol		5.09	3.56	2.75
m+p-Xylene		6.99	14.2	9.69
Methylene chloride		3.47 U	3.47 U	3.47 U
MTBE		0.721 U	0.721 U	0.721 U
n-Hexane		1.34	0.902	0.705 U
o-Xylene		2.78	5.69	3.89
Styrene		0.852 U	0.852 U	0.852 U
t-Butyl Alcohol		32.7	24.7	41.5
Tetrachloroethene		4.67	4.43	3.17
Tetrahydrofuran		0.590 U	1.23	0.590 U
Toluene		17.4	14.5	19.5
trans-1,2-Dichloroethene		0.793 U	0.793 U	0.793 U
trans-1,3-Dichloropropene		0.908 U	0.908 U	0.908 U
Trichloroethene		1.07 U	1.07 U	1.07 U
Trichlorofluoromethane		1.39	1.48	1.57
Vinyl chloride		0.511 U	0.511 U	0.511 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

ug/m³ - Micrograms per cubic meter

Bold data indicates that parameter was detected

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32
1,1,1,2-Tetrachloroethane	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
1,1,1-Trichloroethane	0.68	0.68	100		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
1,1,2,2-Tetrachloroethane	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
1,1,2-Trichloroethane	--	--	--		0.2 U	0.0016 U	0.0016 U	0.0017 U	0.086 U
1,1-Dichloroethane	0.27	0.27	26		0.2 U	0.0016 U	0.0016 U	0.0017 U	0.086 U
1,1-Dichloroethene	0.33	0.33	100		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
1,1-Dichloropropene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
1,2,3-Trichlorobenzene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
1,2,3-Trichloropropane	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
1,2,4,5-Tetramethylbenzene	--	--	--		0.44 J	0.0042 U	0.0042 U	0.0044 U	1.2
1,2,4-Trichlorobenzene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
1,2,4-Trimethylbenzene	3.6	3.6	52		0.67 U	0.0052 U	0.0053 U	0.0056 U	3.8
1,2-Dibromoethane	--	--	--		0.53 U	0.0042 U	0.0042 U	0.0044 U	0.23 U
1,2-Dichlorobenzene	1.1	1.1	100		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
1,2-Dichloroethane	0.02	0.02	3.1		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
1,2-Dichloroethene (total)	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.045 J
1,2-Dichloropropane	--	--	--		0.47 U	0.0037 U	0.0037 U	0.0039 U	0.2 U
1,3,5-Trimethylbenzene	8.4	8.4	52		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.62
1,3-Dichlorobenzene	2.4	2.4	49		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
1,3-Dichloropropane	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
1,3-Dichloropropene	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
1,4-Dichlorobenzene	1.8	1.8	13		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
1,4-Dioxane	0.1	0.1	13		13 U	0.1 U	0.1 U	0.11 U	5.7 U
2,2-Dichloropropane	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
2-Butanone (MEK)	0.12	0.12	100		1.3 U	0.01 U	0.01 U	0.011 U	0.17 J
2-Hexanone	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
4-Ethyltoluene	--	--	--		0.53 U	0.0042 U	0.0042 U	0.0044 U	1.9
4-Methyl-2-pentanone (MIBK)	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
Acetone	0.05	0.05	100		0.59 J	0.01 UV	0.01 U	0.0077 J	0.57 U
Acrylonitrile	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
Benzene, 1,4-Diethyl	--	-	--		0.75	0.0042 U	0.0042 U	0.0044 U	2.4
Benzene	0.06	0.06	4.8		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32
Bromobenzene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Bromochloromethane	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Bromodichloromethane	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
Bromoform	--	--	--		0.53 U	0.0042 U	0.0042 U	0.0044 U	0.23 U
Bromomethane	--	--	--		0.27 U	0.0021 U	0.0021 U	0.0022 U	0.11 U
Carbon disulfide	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
Carbon tetrachloride	0.76	0.76	2.4		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
Chlorobenzene	1.1	1.1	100		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
Chloroethane	--	--	--		0.27 U	0.0021 U	0.0021 U	0.0022 U	0.11 U
Chloroform	0.37	0.37	49		0.2 U	0.0016 U	0.0016 U	0.0017 U	0.086 U
Chloromethane	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
cis-1,2-Dichloroethene	0.25	0.25	100		0.13 U	0.001 U	0.001 U	0.0011 U	0.045 J
cis-1,3-Dichloropropene	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
Dibromochloromethane	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
Dibromochloropropane	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Dibromomethane	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
Dichlorodifluoromethane	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
Diethyl Ether	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Ethylbenzene	1	1	41		0.13 U	0.001 U	0.001 U	0.0011 U	0.3
Hexachlorobutadiene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Isopropylbenzene	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.18
m+p-Xylene	--	--	--		0.27 U	0.0021 U	0.0021 U	0.0022 U	0.81
Methylene chloride	0.05	0.05	100		0.59 J	0.01 U	0.01 U	0.011 U	0.57 U
MTBE	0.93	0.93	100		0.27 U	0.0021 U	0.0021 U	0.0022 U	0.11 U
Naphthalene	12	12	100		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.36
n-Butylbenzene	12	12	100		0.13	0.001 U	0.001 U	0.0011 U	0.34
n-Propylbenzene	3.9	3.9	100		0.13 U	0.001 U	0.001 U	0.0011 U	0.37
o-Chlorotoluene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
o-Xylene	--	--	--		0.27 U	0.0021 U	0.0021 U	0.0022 U	0.6
p-Chlorotoluene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
p-Isopropyltoluene	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.035 J
sec-Butylbenzene	11	11	100		0.13 U	0.001 U	0.001 U	0.0011 U	0.1

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32
Styrene	--	--	--		0.27 U	0.0021 U	0.0021 U	0.0022 U	0.11 U
tert-Butylbenzene	5.9	5.9	100		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Tetrachloroethene	1.3	1.3	19		0.13 U	0.001 U	0.001 U	0.0011 U	0.021 J
Toluene	0.7	0.7	100		0.2 U	0.0016 U	0.0016 U	0.0017 U	0.086 UV
trans-1,2-Dichloroethene	0.19	0.19	100		0.2 U	0.0016 U	0.0016 U	0.0017 U	0.086 U
trans-1,3-Dichloropropene	--	--	--		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
trans-1,4-Dichloro-2-butene	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Trichloroethene	0.47	0.47	21		0.13 U	0.001 U	0.001 U	0.0011 U	0.057 U
Trichlorofluoromethane	--	--	--		0.67 U	0.0052 U	0.0053 U	0.0056 U	0.29 U
Vinyl acetate	--	--	--		1.3 U	0.01 U	0.01 U	0.011 U	0.57 U
Vinyl chloride	0.02	0.02	0.9		0.27 U	0.0021 U	0.0021 U	0.0022 U	0.11 U
Xylenes (total)	0.26	1.6	100		0.27 U	0.0021 U	0.0021 U	0.0022 U	1.4

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks and Trip Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37	RXSB-8 6/5/2014 35 - 37
1,1,1,2-Tetrachloroethane	--	--	--		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
1,1,1-Trichloroethane	0.68	0.68	100		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
1,1,2,2-Tetrachloroethane	--	--	--		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
1,1,2-Trichloroethane	--	--	--		0.089 U	0.0019 U	0.0021 U	0.0018 U	0.0016 U
1,1-Dichloroethane	0.27	0.27	26		0.089 U	0.0019 U	0.0021 U	0.0018 U	0.0016 U
1,1-Dichloroethene	0.33	0.33	100		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
1,1-Dichloropropene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,2,3-Trichlorobenzene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,2,3-Trichloropropane	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
1,2,4,5-Tetramethylbenzene	--	--	--		1	0.005 U	0.0057 U	0.0049 U	0.0042 U
1,2,4-Trichlorobenzene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,2,4-Trimethylbenzene	3.6	3.6	52		3.3	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,2-Dibromoethane	--	--	--		0.24 U	0.005 U	0.0057 U	0.0049 U	0.0042 U
1,2-Dichlorobenzene	1.1	1.1	100		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,2-Dichloroethane	0.02	0.02	3.1		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
1,2-Dichloroethene (total)	--	--	--		0.041 J	0.0012 U	0.0014 U	0.0012 U	0.001 U
1,2-Dichloropropane	--	--	--		0.21 U	0.0043 U	0.005 U	0.0043 U	0.0036 U
1,3,5-Trimethylbenzene	8.4	8.4	52		0.51	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,3-Dichlorobenzene	2.4	2.4	49		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,3-Dichloropropane	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,3-Dichloropropene	--	--	--		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
1,4-Dichlorobenzene	1.8	1.8	13		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
1,4-Dioxane	0.1	0.1	13		5.9 U	0.12 U	0.14 U	0.12 U	0.1 U
2,2-Dichloropropane	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
2-Butanone (MEK)	0.12	0.12	100		0.59 U	0.012 U	0.0015 J	0.012 U	0.01 U
2-Hexanone	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
4-Ethyltoluene	--	--	--		1.6	0.005 U	0.0057 U	0.0049 U	0.0042 U
4-Methyl-2-pentanone (MIBK)	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
Acetone	0.05	0.05	100		0.59 U	0.012 U	0.014 U	0.012 U	0.01 UV
Acrylonitrile	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
Benzene, 1,4-Diethyl	--	-	--		2	0.005 U	0.0057 U	0.0049 U	0.0042 U
Benzene	0.06	0.06	4.8		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37	RXSB-8 6/5/2014 35 - 37
Bromobenzene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Bromochloromethane	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Bromodichloromethane	--	--	--		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
Bromoform	--	--	--		0.24 U	0.005 U	0.0057 U	0.0049 U	0.0042 U
Bromomethane	--	--	--		0.12 U	0.0025 U	0.0028 U	0.0024 U	0.0021 U
Carbon disulfide	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
Carbon tetrachloride	0.76	0.76	2.4		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
Chlorobenzene	1.1	1.1	100		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
Chloroethane	--	--	--		0.12 U	0.0025 U	0.0028 U	0.0024 U	0.0021 U
Chloroform	0.37	0.37	49		0.089 U	0.0019 U	0.0021 U	0.0018 U	0.0016 U
Chloromethane	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
cis-1,2-Dichloroethene	0.25	0.25	100		0.041 J	0.0012 U	0.0014 U	0.0012 U	0.001 U
cis-1,3-Dichloropropene	--	--	--		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
Dibromochloromethane	--	--	--		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
Dibromochloropropane	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Dibromomethane	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
Dichlorodifluoromethane	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
Diethyl Ether	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Ethylbenzene	1	1	41		0.28	0.0012 U	0.0014 U	0.0012 U	0.001 U
Hexachlorobutadiene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Isopropylbenzene	--	--	--		0.16	0.0012 U	0.0014 U	0.0012 U	0.001 U
m+p-Xylene	--	--	--		0.65	0.0025 U	0.0028 U	0.0024 U	0.0021 U
Methylene chloride	0.05	0.05	100		0.12 J	0.012 U	0.014 U	0.0046 J	0.01 U
MTBE	0.93	0.93	100		0.12 U	0.0025 U	0.0028 U	0.0024 U	0.0021 U
Naphthalene	12	12	100		0.29 J	0.0062 U	0.0071 U	0.0061 U	0.0052 U
n-Butylbenzene	12	12	100		0.43	0.0012 U	0.0014 U	0.0012 U	0.001 U
n-Propylbenzene	3.9	3.9	100		0.33	0.0012 U	0.0014 U	0.0012 U	0.001 U
o-Chlorotoluene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
o-Xylene	--	--	--		0.53	0.0025 U	0.0028 U	0.0024 U	0.0021 U
p-Chlorotoluene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
p-Isopropyltoluene	--	--	--		0.033 J	0.0012 U	0.0014 U	0.0012 U	0.001 U
sec-Butylbenzene	11	11	100		0.12	0.0012 U	0.0014 U	0.0012 U	0.001 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37	RXSB-8 6/5/2014 35 - 37
Styrene	--	--	--		0.12 U	0.0025 U	0.0028 U	0.0024 U	0.0021 U
tert-Butylbenzene	5.9	5.9	100		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Tetrachloroethene	1.3	1.3	19		0.035 J	0.0012 U	0.0014 U	0.0012 U	0.001 U
Toluene	0.7	0.7	100		0.089 UV	0.0019 U	0.0021 U	0.0018 U	0.0016 U
trans-1,2-Dichloroethene	0.19	0.19	100		0.089 U	0.0019 U	0.0021 U	0.0018 U	0.0016 U
trans-1,3-Dichloropropene	--	--	--		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
trans-1,4-Dichloro-2-butene	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Trichloroethene	0.47	0.47	21		0.059 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
Trichlorofluoromethane	--	--	--		0.3 U	0.0062 U	0.0071 U	0.0061 U	0.0052 U
Vinyl acetate	--	--	--		0.59 U	0.012 U	0.014 U	0.012 U	0.01 U
Vinyl chloride	0.02	0.02	0.9		0.12 U	0.0025 U	0.0028 U	0.0024 U	0.0021 U
Xylenes (total)	0.26	1.6	100		1.2	0.0025 U	0.0028 U	0.0024 U	0.0021 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks and Trip Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-9 5/29/2014 34 - 36	RXSB-10 5/30/2014 24 - 26	RXSB-11 6/3/2014 28 - 30	RXSB-12A 5/28/2014 16 - 18	RXSB-12 6/2/2014 34 - 36
1,1,1,2-Tetrachloroethane	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
1,1,1-Trichloroethane	0.68	0.68	100		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
1,1,2,2-Tetrachloroethane	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
1,1,2-Trichloroethane	--	--	--		0.0018 U	0.0018 U	0.0018 U	0.0017 U	0.0021 U
1,1-Dichloroethane	0.27	0.27	26		0.0018 U	0.0018 U	0.0018 U	0.0017 U	0.0021 U
1,1-Dichloroethene	0.33	0.33	100		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
1,1-Dichloropropene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,2,3-Trichlorobenzene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,2,3-Trichloropropane	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
1,2,4,5-Tetramethylbenzene	--	--	--		0.0049 U	0.0049 U	0.0047 U	0.0045 U	0.0055 U
1,2,4-Trichlorobenzene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,2,4-Trimethylbenzene	3.6	3.6	52		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,2-Dibromoethane	--	--	--		0.0049 U	0.0049 U	0.0047 U	0.0045 U	0.0055 U
1,2-Dichlorobenzene	1.1	1.1	100		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,2-Dichloroethane	0.02	0.02	3.1		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
1,2-Dichloroethene (total)	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
1,2-Dichloropropane	--	--	--		0.0042 U	0.0043 U	0.0041 U	0.0039 U	0.0048 U
1,3,5-Trimethylbenzene	8.4	8.4	52		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,3-Dichlorobenzene	2.4	2.4	49		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,3-Dichloropropane	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,3-Dichloropropene	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
1,4-Dichlorobenzene	1.8	1.8	13		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
1,4-Dioxane	0.1	0.1	13		0.12 U	0.12 U	0.12 U	0.11 U	0.14 U
2,2-Dichloropropane	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
2-Butanone (MEK)	0.12	0.12	100		0.012 U	0.012 U	0.012 U	0.011 U	0.0022 J
2-Hexanone	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
4-Ethyltoluene	--	--	--		0.0049 U	0.0049 U	0.0047 U	0.0045 U	0.0055 U
4-Methyl-2-pentanone (MIBK)	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
Acetone	0.05	0.05	100		0.012 UV	0.012 U	0.012 U	0.011 U	0.014 U
Acrylonitrile	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
Benzene, 1,4-Diethyl	--	-	--		0.0049 U	0.0049 U	0.0047 U	0.0045 U	0.0055 U
Benzene	0.06	0.06	4.8		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-9 5/29/2014 34 - 36	RXSB-10 5/30/2014 24 - 26	RXSB-11 6/3/2014 28 - 30	RXSB-12A 5/28/2014 16 - 18	RXSB-12 6/2/2014 34 - 36
Bromobenzene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Bromochloromethane	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Bromodichloromethane	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Bromoform	--	--	--		0.0049 U	0.0049 U	0.0047 U	0.0045 U	0.0055 U
Bromomethane	--	--	--		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U
Carbon disulfide	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
Carbon tetrachloride	0.76	0.76	2.4		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Chlorobenzene	1.1	1.1	100		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Chloroethane	--	--	--		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U
Chloroform	0.37	0.37	49		0.0018 U	0.0018 U	0.0018 U	0.0017 U	0.0021 U
Chloromethane	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
cis-1,2-Dichloroethene	0.25	0.25	100		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
cis-1,3-Dichloropropene	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Dibromochloromethane	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Dibromochloropropane	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Dibromomethane	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
Dichlorodifluoromethane	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
Diethyl Ether	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Ethylbenzene	1	1	41		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Hexachlorobutadiene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Isopropylbenzene	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
m+p-Xylene	--	--	--		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U
Methylene chloride	0.05	0.05	100		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
MTBE	0.93	0.93	100		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U
Naphthalene	12	12	100		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
n-Butylbenzene	12	12	100		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
n-Propylbenzene	3.9	3.9	100		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
o-Chlorotoluene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
o-Xylene	--	--	--		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U
p-Chlorotoluene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
p-Isopropyltoluene	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
sec-Butylbenzene	11	11	100		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-9 5/29/2014 34 - 36	RXSB-10 5/30/2014 24 - 26	RXSB-11 6/3/2014 28 - 30	RXSB-12A 5/28/2014 16 - 18	RXSB-12 6/2/2014 34 - 36
Styrene	--	--	--		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U
tert-Butylbenzene	5.9	5.9	100		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Tetrachloroethene	1.3	1.3	19		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Toluene	0.7	0.7	100		0.0018 U	0.0018 U	0.0018 U	0.0017 U	0.0021 U
trans-1,2-Dichloroethene	0.19	0.19	100		0.0018 U	0.0018 U	0.0018 U	0.0017 U	0.0021 U
trans-1,3-Dichloropropene	--	--	--		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
trans-1,4-Dichloro-2-butene	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Trichloroethene	0.47	0.47	21		0.0012 U	0.0012 U	0.0012 U	0.0011 U	0.0014 U
Trichlorofluoromethane	--	--	--		0.0061 U	0.0061 U	0.0058 U	0.0056 U	0.0069 U
Vinyl acetate	--	--	--		0.012 U	0.012 U	0.012 U	0.011 U	0.014 U
Vinyl chloride	0.02	0.02	0.9		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U
Xylenes (total)	0.26	1.6	100		0.0024 U	0.0024 U	0.0023 U	0.0022 U	0.0027 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks and Trip Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-13 5/28/2014 37 - 39	RXSB-14 5/28/2014 37 - 39	RXSB-15 5/29/2014 30 - 32	RXSB-16 5/27/2014 40 - 42.5	RXSB-17 5/28/2014 42 - 44
1,1,1,2-Tetrachloroethane	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
1,1,1-Trichloroethane	0.68	0.68	100		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
1,1,2,2-Tetrachloroethane	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
1,1,2-Trichloroethane	--	--	--		0.0016 U	0.002 U	0.0016 U	0.0017 U	0.0019 U
1,1-Dichloroethane	0.27	0.27	26		0.0016 U	0.002 U	0.0016 U	0.0017 U	0.0019 U
1,1-Dichloroethene	0.33	0.33	100		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
1,1-Dichloropropene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,2,3-Trichlorobenzene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,2,3-Trichloropropane	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
1,2,4,5-Tetramethylbenzene	--	--	--		0.0042 U	0.0053 U	0.0042 U	0.0046 U	0.0052 U
1,2,4-Trichlorobenzene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,2,4-Trimethylbenzene	3.6	3.6	52		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,2-Dibromoethane	--	--	--		0.0042 U	0.0053 U	0.0042 U	0.0046 U	0.0052 U
1,2-Dichlorobenzene	1.1	1.1	100		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,2-Dichloroethane	0.02	0.02	3.1		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
1,2-Dichloroethene (total)	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
1,2-Dichloropropane	--	--	--		0.0037 U	0.0046 U	0.0037 U	0.004 U	0.0045 U
1,3,5-Trimethylbenzene	8.4	8.4	52		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,3-Dichlorobenzene	2.4	2.4	49		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,3-Dichloropropane	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,3-Dichloropropene	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
1,4-Dichlorobenzene	1.8	1.8	13		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
1,4-Dioxane	0.1	0.1	13		0.11 U	0.13 U	0.1 U	0.12 U	0.13 U
2,2-Dichloropropane	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
2-Butanone (MEK)	0.12	0.12	100		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
2-Hexanone	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
4-Ethyltoluene	--	--	--		0.0042 U	0.0053 U	0.0042 U	0.0046 U	0.0052 U
4-Methyl-2-pentanone (MIBK)	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
Acetone	0.05	0.05	100		0.011 UV	0.013 UV	0.01 UV	0.012 U	0.013 U
Acrylonitrile	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
Benzene, 1,4-Diethyl	--	-	--		0.0042 U	0.0053 U	0.0042 U	0.0046 U	0.0052 U
Benzene	0.06	0.06	4.8		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-13 5/28/2014 37 - 39	RXSB-14 5/28/2014 37 - 39	RXSB-15 5/29/2014 30 - 32	RXSB-16 5/27/2014 40 - 42.5	RXSB-17 5/28/2014 42 - 44
Bromobenzene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Bromochloromethane	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Bromodichloromethane	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Bromoform	--	--	--		0.0042 U	0.0053 U	0.0042 U	0.0046 U	0.0052 U
Bromomethane	--	--	--		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U
Carbon disulfide	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
Carbon tetrachloride	0.76	0.76	2.4		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Chlorobenzene	1.1	1.1	100		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Chloroethane	--	--	--		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U
Chloroform	0.37	0.37	49		0.0016 U	0.002 U	0.0016 U	0.0017 U	0.0019 U
Chloromethane	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
cis-1,2-Dichloroethene	0.25	0.25	100		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
cis-1,3-Dichloropropene	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Dibromochloromethane	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Dibromochloropropane	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Dibromomethane	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
Dichlorodifluoromethane	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
Diethyl Ether	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Ethylbenzene	1	1	41		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Hexachlorobutadiene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Isopropylbenzene	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
m+p-Xylene	--	--	--		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U
Methylene chloride	0.05	0.05	100		0.0024 J	0.0031 J	0.01 U	0.012 U	0.0028 J
MTBE	0.93	0.93	100		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U
Naphthalene	12	12	100		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
n-Butylbenzene	12	12	100		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
n-Propylbenzene	3.9	3.9	100		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
o-Chlorotoluene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
o-Xylene	--	--	--		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U
p-Chlorotoluene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
p-Isopropyltoluene	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
sec-Butylbenzene	11	11	100		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation:	RXSB-13	RXSB-14	RXSB-15	RXSB-16	RXSB-17
				Sample Date:	5/28/2014	5/28/2014	5/29/2014	5/27/2014	5/28/2014
				Sample Depth (ft bls):	37 - 39	37 - 39	30 - 32	40 - 42.5	42 - 44
Styrene	--	--	--		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U
tert-Butylbenzene	5.9	5.9	100		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Tetrachloroethene	1.3	1.3	19		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Toluene	0.7	0.7	100		0.0016 U	0.002 U	0.0016 U	0.0017 U	0.0019 U
trans-1,2-Dichloroethene	0.19	0.19	100		0.0016 U	0.002 U	0.0016 U	0.0017 U	0.0019 U
trans-1,3-Dichloropropene	--	--	--		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
trans-1,4-Dichloro-2-butene	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Trichloroethene	0.47	0.47	21		0.0011 U	0.0013 U	0.001 U	0.0012 U	0.0013 U
Trichlorofluoromethane	--	--	--		0.0053 U	0.0066 U	0.0053 U	0.0058 U	0.0065 U
Vinyl acetate	--	--	--		0.011 U	0.013 U	0.01 U	0.012 U	0.013 U
Vinyl chloride	0.02	0.02	0.9		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U
Xylenes (total)	0.26	1.6	100		0.0021 U	0.0026 U	0.0021 U	0.0023 U	0.0026 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks and Trip Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/27/2014	FIELD BLANK 5/28/2014	FIELD BLANK 5/29/2014
1,1,1,2-Tetrachloroethane	--	--	--		2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	0.68	0.68	100		2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	--	--	--		0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	--	--	--		1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	0.27	0.27	26		2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	0.33	0.33	100		0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	--	--	--		2.0 U	2.0 U	2.0 U
1,2,4-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	3.6	3.6	52		2.5 U	2.5 U	2.5 U
1,2-Dibromoethane	--	--	--		2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.02	0.02	3.1		0.50 U	0.50 U	0.50 U
1,2-Dichloroethene (total)	--	--	--		2.5 U	2.5 U	2.5 U
1,2-Dichloropropane	--	--	--		1.0 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	8.4	8.4	52		2.5 U	2.5 U	2.5 U
1,3-Dichlorobenzene	2.4	2.4	49		2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	1.8	1.8	13		2.5 U	2.5 U	2.5 U
1,4-Dioxane	0.1	0.1	13		250 U	250 U	250 U
2,2-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	0.12	0.12	100		5.0 U	5.0 U	5.0 U
2-Hexanone	--	--	--		5.0 U	5.0 U	5.0 U
4-Ethyltoluene	--	--	--		2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	--	--	--		5.0 U	5.0 U	5.0 U
Acetone	0.05	0.05	100		5.0 U	4.7 J	1.0 J
Acrylonitrile	--	--	--		5.0 U	5.0 U	5.0 U
Benzene, 1,4-Diethyl	--	-	--		2.0 U	2.0 U	2.0 U
Benzene	0.06	0.06	4.8		0.50 U	0.50 U	0.50 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/27/2014	FIELD BLANK 5/28/2014	FIELD BLANK 5/29/2014
Bromobenzene	--	--	--		2.5 U	2.5 U	2.5 U
Bromochloromethane	--	--	--		2.5 U	2.5 U	2.5 U
Bromodichloromethane	--	--	--		0.50 U	0.50 U	0.50 U
Bromoform	--	--	--		2.0 U	2.0 U	2.0 U
Bromomethane	--	--	--		2.5 U	2.5 U	2.5 U
Carbon disulfide	--	--	--		5.0 U	5.0 U	5.0 U
Carbon tetrachloride	0.76	0.76	2.4		0.50 U	0.50 U	0.50 U
Chlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
Chloroethane	--	--	--		2.5 U	2.5 U	2.5 U
Chloroform	0.37	0.37	49		2.5 U	2.5 U	2.5 U
Chloromethane	--	--	--		2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	0.25	0.25	100		2.5 U	2.5 U	2.5 U
cis-1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
Dibromochloromethane	--	--	--		0.50 U	0.50 U	0.50 U
Dibromochloropropane	--	--	--		2.5 U	2.5 U	2.5 U
Dibromomethane	--	--	--		5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	--	--	--		5.0 U	5.0 U	5.0 U
Diethyl Ether	--	--	--		2.5 U	2.5 U	2.5 U
Ethylbenzene	1	1	41		2.5 U	2.5 U	2.5 U
Hexachlorobutadiene	--	--	--		2.5 U	2.5 U	2.5 U
Isopropylbenzene	--	--	--		2.5 U	2.5 U	2.5 U
m+p-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
Methylene chloride	0.05	0.05	100		2.5 U	2.5 U	2.5 U
MTBE	0.93	0.93	100		2.5 U	2.5 U	2.5 U
Naphthalene	12	12	100		2.5 U	2.5 U	2.5 U
n-Butylbenzene	12	12	100		2.5 U	2.5 U	2.5 U
n-Propylbenzene	3.9	3.9	100		2.5 U	2.5 U	2.5 U
o-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
o-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
p-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	--	--	--		2.5 U	2.5 U	2.5 U
sec-Butylbenzene	11	11	100		2.5 U	2.5 U	2.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/27/2014	FIELD BLANK 5/28/2014	FIELD BLANK 5/29/2014
Styrene	--	--	--		2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5.9	5.9	100		2.5 U	2.5 U	2.5 U
Tetrachloroethene	1.3	1.3	19		0.50 U	0.50 U	0.50 U
Toluene	0.7	0.7	100		2.5 U	2.5 U	2.5 U
trans-1,2-Dichloroethene	0.19	0.19	100		2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	--	--	--		2.5 U	2.5 U	2.5 U
Trichloroethene	0.47	0.47	21		0.50 U	0.50 U	0.50 U
Trichlorofluoromethane	--	--	--		2.5 U	2.5 U	2.5 U
Vinyl acetate	--	--	--		5.0 U	5.0 U	5.0 U
Vinyl chloride	0.02	0.02	0.9		1.0 U	1.0 U	1.0 U
Xylenes (total)	0.26	1.6	100		2.5 U	2.5 U	2.5 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

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µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/30/2014	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014
1,1,1,2-Tetrachloroethane	--	--	--		2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	0.68	0.68	100		2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	--	--	--		0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	--	--	--		1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	0.27	0.27	26		2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	0.33	0.33	100		0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	--	--	--		2.0 U	2.0 U	2.0 U
1,2,4-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	3.6	3.6	52		2.5 U	2.5 U	2.5 U
1,2-Dibromoethane	--	--	--		2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.02	0.02	3.1		0.50 U	0.50 U	0.50 U
1,2-Dichloroethene (total)	--	--	--		2.5 U	2.5 U	2.5 U
1,2-Dichloropropane	--	--	--		1.0 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	8.4	8.4	52		2.5 U	2.5 U	2.5 U
1,3-Dichlorobenzene	2.4	2.4	49		2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	1.8	1.8	13		2.5 U	2.5 U	2.5 U
1,4-Dioxane	0.1	0.1	13		250 U	250 U	250 U
2,2-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	0.12	0.12	100		5.0 U	5.0 U	5.0 U
2-Hexanone	--	--	--		5.0 U	5.0 U	5.0 U
4-Ethyltoluene	--	--	--		2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	--	--	--		5.0 U	5.0 U	5.0 U
Acetone	0.05	0.05	100		5.0 U	1.2 J	5.0 U
Acrylonitrile	--	--	--		5.0 U	5.0 U	5.0 U
Benzene, 1,4-Diethyl	--	-	--		2.0 U	2.0 U	2.0 U
Benzene	0.06	0.06	4.8		0.50 U	0.50 U	0.50 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/30/2014	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014
Bromobenzene	--	--	--		2.5 U	2.5 U	2.5 U
Bromochloromethane	--	--	--		2.5 U	2.5 U	2.5 U
Bromodichloromethane	--	--	--		0.50 U	0.50 U	0.50 U
Bromoform	--	--	--		2.0 U	2.0 U	2.0 U
Bromomethane	--	--	--		2.5 U	2.5 U	2.5 U
Carbon disulfide	--	--	--		5.0 U	5.0 U	5.0 U
Carbon tetrachloride	0.76	0.76	2.4		0.50 U	0.50 U	0.50 U
Chlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
Chloroethane	--	--	--		2.5 U	2.5 U	2.5 U
Chloroform	0.37	0.37	49		2.5 U	2.5 U	2.5 U
Chloromethane	--	--	--		2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	0.25	0.25	100		2.5 U	2.5 U	2.5 U
cis-1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
Dibromochloromethane	--	--	--		0.50 U	0.50 U	0.50 U
Dibromochloropropane	--	--	--		2.5 U	2.5 U	2.5 U
Dibromomethane	--	--	--		5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	--	--	--		5.0 U	5.0 U	5.0 U
Diethyl Ether	--	--	--		2.5 U	2.5 U	2.5 U
Ethylbenzene	1	1	41		2.5 U	2.5 U	2.5 U
Hexachlorobutadiene	--	--	--		2.5 U	2.5 U	2.5 U
Isopropylbenzene	--	--	--		2.5 U	2.5 U	2.5 U
m+p-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
Methylene chloride	0.05	0.05	100		2.5 U	2.5 U	2.5 U
MTBE	0.93	0.93	100		2.5 U	2.5 U	2.5 U
Naphthalene	12	12	100		2.5 U	2.5 U	2.5 U
n-Butylbenzene	12	12	100		2.5 U	2.5 U	2.5 U
n-Propylbenzene	3.9	3.9	100		2.5 U	2.5 U	2.5 U
o-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
o-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
p-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	--	--	--		2.5 U	2.5 U	2.5 U
sec-Butylbenzene	11	11	100		2.5 U	2.5 U	2.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/30/2014	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014
Styrene	--	--	--		2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5.9	5.9	100		2.5 U	2.5 U	2.5 U
Tetrachloroethene	1.3	1.3	19		0.50 U	0.50 U	0.50 U
Toluene	0.7	0.7	100		2.5 U	2.5 U	2.5 U
trans-1,2-Dichloroethene	0.19	0.19	100		2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	--	--	--		2.5 U	2.5 U	2.5 U
Trichloroethene	0.47	0.47	21		0.50 U	0.50 U	0.50 U
Trichlorofluoromethane	--	--	--		2.5 U	2.5 U	2.5 U
Vinyl acetate	--	--	--		5.0 U	5.0 U	5.0 U
Vinyl chloride	0.02	0.02	0.9		1.0 U	1.0 U	1.0 U
Xylenes (total)	0.26	1.6	100		2.5 U	2.5 U	2.5 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

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Field Blanks and Trip Blanks are expressed in µg/L

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Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
1,1,1,2-Tetrachloroethane	--	--	--		2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	0.68	0.68	100		2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	--	--	--		0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	--	--	--		1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	0.27	0.27	26		2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	0.33	0.33	100		0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	--	--	--		2.0 U	2.0 U	2.0 U
1,2,4-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	3.6	3.6	52		2.5 U	2.5 U	2.5 U
1,2-Dibromoethane	--	--	--		2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.02	0.02	3.1		0.50 U	0.50 U	0.50 U
1,2-Dichloroethene (total)	--	--	--		2.5 U	2.5 U	2.5 U
1,2-Dichloropropane	--	--	--		1.0 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	8.4	8.4	52		2.5 U	2.5 U	2.5 U
1,3-Dichlorobenzene	2.4	2.4	49		2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	1.8	1.8	13		2.5 U	2.5 U	2.5 U
1,4-Dioxane	0.1	0.1	13		250 U	250 U	250 U
2,2-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	0.12	0.12	100		5.0 U	5.0 U	5.0 U
2-Hexanone	--	--	--		5.0 U	5.0 U	5.0 U
4-Ethyltoluene	--	--	--		2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	--	--	--		5.0 U	5.0 U	5.0 U
Acetone	0.05	0.05	100		5.0 U	5.0 U	5.0 U
Acrylonitrile	--	--	--		5.0 U	5.0 U	5.0 U
Benzene, 1,4-Diethyl	--	-	--		2.0 U	2.0 U	2.0 U
Benzene	0.06	0.06	4.8		0.50 U	0.50 U	0.50 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
Bromobenzene	--	--	--		2.5 U	2.5 U	2.5 U
Bromochloromethane	--	--	--		2.5 U	2.5 U	2.5 U
Bromodichloromethane	--	--	--		0.50 U	0.50 U	0.50 U
Bromoform	--	--	--		2.0 U	2.0 U	2.0 U
Bromomethane	--	--	--		2.5 U	2.5 U	2.5 U
Carbon disulfide	--	--	--		5.0 U	5.0 U	5.0 U
Carbon tetrachloride	0.76	0.76	2.4		0.50 U	0.50 U	0.50 U
Chlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
Chloroethane	--	--	--		2.5 U	2.5 U	2.5 U
Chloroform	0.37	0.37	49		2.5 U	2.5 U	2.5 U
Chloromethane	--	--	--		2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	0.25	0.25	100		2.5 U	2.5 U	2.5 U
cis-1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
Dibromochloromethane	--	--	--		0.50 U	0.50 U	0.50 U
Dibromochloropropane	--	--	--		2.5 U	2.5 U	2.5 U
Dibromomethane	--	--	--		5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	--	--	--		5.0 U	5.0 U	5.0 U
Diethyl Ether	--	--	--		2.5 U	2.5 U	2.5 U
Ethylbenzene	1	1	41		2.5 U	2.5 U	2.5 U
Hexachlorobutadiene	--	--	--		2.5 U	2.5 U	2.5 U
Isopropylbenzene	--	--	--		2.5 U	2.5 U	2.5 U
m+p-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
Methylene chloride	0.05	0.05	100		2.5 U	2.5 U	2.5 U
MTBE	0.93	0.93	100		2.5 U	2.5 U	2.5 U
Naphthalene	12	12	100		2.5 U	2.5 U	2.5 U
n-Butylbenzene	12	12	100		2.5 U	2.5 U	2.5 U
n-Propylbenzene	3.9	3.9	100		2.5 U	2.5 U	2.5 U
o-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
o-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
p-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	--	--	--		2.5 U	2.5 U	2.5 U
sec-Butylbenzene	11	11	100		2.5 U	2.5 U	2.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
Styrene	--	--	--		2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5.9	5.9	100		2.5 U	2.5 U	2.5 U
Tetrachloroethene	1.3	1.3	19		0.50 U	0.50 U	0.50 U
Toluene	0.7	0.7	100		2.5 U	2.5 U	2.5 U
trans-1,2-Dichloroethene	0.19	0.19	100		2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--	--	--		0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	--	--	--		2.5 U	2.5 U	2.5 U
Trichloroethene	0.47	0.47	21		0.50 U	0.50 U	0.50 U
Trichlorofluoromethane	--	--	--		2.5 U	2.5 U	2.5 U
Vinyl acetate	--	--	--		5.0 U	5.0 U	5.0 U
Vinyl chloride	0.02	0.02	0.9		1.0 U	1.0 U	1.0 U
Xylenes (total)	0.26	1.6	100		2.5 U	2.5 U	2.5 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks and Trip Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 5/27/2014	TRIP BLANK 5/28/2014	TRIP BLANK 5/29/2014
1,1,1,2-Tetrachloroethane	--	--	--		2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	0.68	0.68	100		2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	--	--	--		0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	--	--	--		1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	0.27	0.27	26		2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	0.33	0.33	100		0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	--	--	--		2 U	2 U	2 U
1,2,4-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	3.6	3.6	52		2.5 U	2.5 U	2.5 U
1,2-Dibromoethane	--	--	--		2 U	2 U	2 U
1,2-Dichlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.02	0.02	3.1		0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	--	--	--		2.5 U	2.5 U	2.5 U
1,2-Dichloropropane	--	--	--		1 U	1 U	1 U
1,3,5-Trimethylbenzene	8.4	8.4	52		2.5 U	2.5 U	2.5 U
1,3-Dichlorobenzene	2.4	2.4	49		2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	--	--	--		0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	1.8	1.8	13		2.5 U	2.5 U	2.5 U
1,4-Dioxane	0.1	0.1	13		250 U	250 U	250 U
2,2-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	0.12	0.12	100		5 U	5 U	5 U
2-Hexanone	--	--	--		5 U	5 U	5 U
4-Ethyltoluene	--	--	--		2 U	2 U	2 U
4-Methyl-2-pentanone (MIBK)	--	--	--		5 U	5 U	5 U
Acetone	0.05	0.05	100		5 U	5 U	5 U
Acrylonitrile	--	--	--		5 U	5 U	5 U
Benzene, 1,4-Diethyl	--	-	--		2 U	2 U	2 U
Benzene	0.06	0.06	4.8		0.5 U	0.5 U	0.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 5/27/2014	TRIP BLANK 5/28/2014	TRIP BLANK 5/29/2014
Bromobenzene	--	--	--		2.5 U	2.5 U	2.5 U
Bromochloromethane	--	--	--		2.5 U	2.5 U	2.5 U
Bromodichloromethane	--	--	--		0.5 U	0.5 U	0.5 U
Bromoform	--	--	--		2 U	2 U	2 U
Bromomethane	--	--	--		2.5 U	2.5 U	2.5 U
Carbon disulfide	--	--	--		5 U	5 U	5 U
Carbon tetrachloride	0.76	0.76	2.4		0.5 U	0.5 U	0.5 U
Chlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
Chloroethane	--	--	--		2.5 U	2.5 U	2.5 U
Chloroform	0.37	0.37	49		2.5 U	2.5 U	2.5 U
Chloromethane	--	--	--		2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	0.25	0.25	100		2.5 U	2.5 U	2.5 U
cis-1,3-Dichloropropene	--	--	--		0.5 U	0.5 U	0.5 U
Dibromochloromethane	--	--	--		0.5 U	0.5 U	0.5 U
Dibromochloropropane	--	--	--		2.5 U	2.5 U	2.5 U
Dibromomethane	--	--	--		5 U	5 U	5 U
Dichlorodifluoromethane	--	--	--		5 U	5 U	5 U
Diethyl Ether	--	--	--		2.5 U	2.5 U	2.5 U
Ethylbenzene	1	1	41		2.5 U	2.5 U	2.5 U
Hexachlorobutadiene	--	--	--		2.5 U	2.5 U	2.5 U
Isopropylbenzene	--	--	--		2.5 U	2.5 U	2.5 U
m+p-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
Methylene chloride	0.05	0.05	100		2.5 U	2.5 U	2.5 U
MTBE	0.93	0.93	100		2.5 U	2.5 U	2.5 U
Naphthalene	12	12	100		2.5 U	2.5 U	2.5 U
n-Butylbenzene	12	12	100		2.5 U	2.5 U	2.5 U
n-Propylbenzene	3.9	3.9	100		2.5 U	2.5 U	2.5 U
o-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
o-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
p-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	--	--	--		2.5 U	2.5 U	2.5 U
sec-Butylbenzene	11	11	100		2.5 U	2.5 U	2.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 5/27/2014	TRIP BLANK 5/28/2014	TRIP BLANK 5/29/2014
Styrene	--	--	--		2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5.9	5.9	100		2.5 U	2.5 U	2.5 U
Tetrachloroethene	1.3	1.3	19		0.5 U	0.5 U	0.5 U
Toluene	0.7	0.7	100		2.5 U	2.5 U	2.5 U
trans-1,2-Dichloroethene	0.19	0.19	100		2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--	--	--		0.5 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	--	--	--		2.5 U	2.5 U	2.5 U
Trichloroethene	0.47	0.47	21		0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	--	--	--		2.5 U	2.5 U	2.5 U
Vinyl acetate	--	--	--		5 U	5 U	5 U
Vinyl chloride	0.02	0.02	0.9		1 U	1 U	1 U
Xylenes (total)	0.26	1.6	100		2.5 U	2.5 U	2.5 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks and Trip Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 5/30/2014	TRIP BLANK 6/2/2014	TRIP BLANK 6/3/2014
1,1,1,2-Tetrachloroethane	--	--	--		2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	0.68	0.68	100		2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	--	--	--		0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	--	--	--		1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	0.27	0.27	26		2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	0.33	0.33	100		0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	--	--	--		2 U	2 U	2 U
1,2,4-Trichlorobenzene	--	--	--		2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	3.6	3.6	52		2.5 U	2.5 U	2.5 U
1,2-Dibromoethane	--	--	--		2 U	2 U	2 U
1,2-Dichlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.02	0.02	3.1		0.5 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	--	--	--		2.5 U	2.5 U	2.5 U
1,2-Dichloropropane	--	--	--		1 U	1 U	1 U
1,3,5-Trimethylbenzene	8.4	8.4	52		2.5 U	2.5 U	2.5 U
1,3-Dichlorobenzene	2.4	2.4	49		2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	--	--	--		0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	1.8	1.8	13		2.5 U	2.5 U	2.5 U
1,4-Dioxane	0.1	0.1	13		250 U	250 U	250 U
2,2-Dichloropropane	--	--	--		2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	0.12	0.12	100		5 U	5 U	5 U
2-Hexanone	--	--	--		5 U	5 U	5 U
4-Ethyltoluene	--	--	--		2 U	2 U	2 U
4-Methyl-2-pentanone (MIBK)	--	--	--		5 U	5 U	5 U
Acetone	0.05	0.05	100		5 U	5 U	5 U
Acrylonitrile	--	--	--		5 U	5 U	5 U
Benzene, 1,4-Diethyl	--	-	--		2 U	2 U	2 U
Benzene	0.06	0.06	4.8		0.5 U	0.5 U	0.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 5/30/2014	TRIP BLANK 6/2/2014	TRIP BLANK 6/3/2014
Bromobenzene	--	--	--		2.5 U	2.5 U	2.5 U
Bromochloromethane	--	--	--		2.5 U	2.5 U	2.5 U
Bromodichloromethane	--	--	--		0.5 U	0.5 U	0.5 U
Bromoform	--	--	--		2 U	2 U	2 U
Bromomethane	--	--	--		2.5 U	2.5 U	2.5 U
Carbon disulfide	--	--	--		5 U	5 U	5 U
Carbon tetrachloride	0.76	0.76	2.4		0.5 U	0.5 U	0.5 U
Chlorobenzene	1.1	1.1	100		2.5 U	2.5 U	2.5 U
Chloroethane	--	--	--		2.5 U	2.5 U	2.5 U
Chloroform	0.37	0.37	49		2.5 U	2.5 U	2.5 U
Chloromethane	--	--	--		2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	0.25	0.25	100		2.5 U	2.5 U	2.5 U
cis-1,3-Dichloropropene	--	--	--		0.5 U	0.5 U	0.5 U
Dibromochloromethane	--	--	--		0.5 U	0.5 U	0.5 U
Dibromochloropropane	--	--	--		2.5 U	2.5 U	2.5 U
Dibromomethane	--	--	--		5 U	5 U	5 U
Dichlorodifluoromethane	--	--	--		5 U	5 U	5 U
Diethyl Ether	--	--	--		2.5 U	2.5 U	2.5 U
Ethylbenzene	1	1	41		2.5 U	2.5 U	2.5 U
Hexachlorobutadiene	--	--	--		2.5 U	2.5 U	2.5 U
Isopropylbenzene	--	--	--		2.5 U	2.5 U	2.5 U
m+p-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
Methylene chloride	0.05	0.05	100		2.5 U	2.5 U	2.5 U
MTBE	0.93	0.93	100		2.5 U	2.5 U	2.5 U
Naphthalene	12	12	100		2.5 U	2.5 U	2.5 U
n-Butylbenzene	12	12	100		2.5 U	2.5 U	2.5 U
n-Propylbenzene	3.9	3.9	100		2.5 U	2.5 U	2.5 U
o-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
o-Xylene	--	--	--		2.5 U	2.5 U	2.5 U
p-Chlorotoluene	--	--	--		2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	--	--	--		2.5 U	2.5 U	2.5 U
sec-Butylbenzene	11	11	100		2.5 U	2.5 U	2.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 5/30/2014	TRIP BLANK 6/2/2014	TRIP BLANK 6/3/2014
Styrene	--	--	--		2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5.9	5.9	100		2.5 U	2.5 U	2.5 U
Tetrachloroethene	1.3	1.3	19		0.5 U	0.5 U	0.5 U
Toluene	0.7	0.7	100		2.5 U	2.5 U	2.5 U
trans-1,2-Dichloroethene	0.19	0.19	100		2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--	--	--		0.5 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	--	--	--		2.5 U	2.5 U	2.5 U
Trichloroethene	0.47	0.47	21		0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	--	--	--		2.5 U	2.5 U	2.5 U
Vinyl acetate	--	--	--		5 U	5 U	5 U
Vinyl chloride	0.02	0.02	0.9		1 U	1 U	1 U
Xylenes (total)	0.26	1.6	100		2.5 U	2.5 U	2.5 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks and Trip Blanks are expressed in µg/L

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Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 6/4/2014	TRIP BLANK 6/6/2014
1,1,1,2-Tetrachloroethane	--	--	--		2.5 U	2.5 U
1,1,1-Trichloroethane	0.68	0.68	100		2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	--	--	--		0.5 U	0.5 U
1,1,2-Trichloroethane	--	--	--		1.5 U	1.5 U
1,1-Dichloroethane	0.27	0.27	26		2.5 U	2.5 U
1,1-Dichloroethene	0.33	0.33	100		0.5 U	0.5 U
1,1-Dichloropropene	--	--	--		2.5 U	2.5 U
1,2,3-Trichlorobenzene	--	--	--		2.5 U	2.5 U
1,2,3-Trichloropropane	--	--	--		2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	--	--	--		2 U	2 U
1,2,4-Trichlorobenzene	--	--	--		2.5 U	2.5 U
1,2,4-Trimethylbenzene	3.6	3.6	52		2.5 U	2.5 U
1,2-Dibromoethane	--	--	--		2 U	2 U
1,2-Dichlorobenzene	1.1	1.1	100		2.5 U	2.5 U
1,2-Dichloroethane	0.02	0.02	3.1		0.5 U	0.5 U
1,2-Dichloroethene (total)	--	--	--		2.5 U	2.5 U
1,2-Dichloropropane	--	--	--		1 U	1 U
1,3,5-Trimethylbenzene	8.4	8.4	52		2.5 U	2.5 U
1,3-Dichlorobenzene	2.4	2.4	49		2.5 U	2.5 U
1,3-Dichloropropane	--	--	--		2.5 U	2.5 U
1,3-Dichloropropene	--	--	--		0.5 U	0.5 U
1,4-Dichlorobenzene	1.8	1.8	13		2.5 U	2.5 U
1,4-Dioxane	0.1	0.1	13		250 U	250 U
2,2-Dichloropropane	--	--	--		2.5 U	2.5 U
2-Butanone (MEK)	0.12	0.12	100		5 U	5 U
2-Hexanone	--	--	--		5 U	5 U
4-Ethyltoluene	--	--	--		2 U	2 U
4-Methyl-2-pentanone (MIBK)	--	--	--		5 U	5 U
Acetone	0.05	0.05	100		5 U	5 U
Acrylonitrile	--	--	--		5 U	5 U
Benzene, 1,4-Diethyl	--	-	--		2 U	2 U
Benzene	0.06	0.06	4.8		0.5 U	0.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 6/4/2014	TRIP BLANK 6/6/2014
Bromobenzene	--	--	--		2.5 U	2.5 U
Bromochloromethane	--	--	--		2.5 U	2.5 U
Bromodichloromethane	--	--	--		0.5 U	0.5 U
Bromoform	--	--	--		2 U	2 U
Bromomethane	--	--	--		2.5 U	2.5 U
Carbon disulfide	--	--	--		5 U	5 U
Carbon tetrachloride	0.76	0.76	2.4		0.5 U	0.5 U
Chlorobenzene	1.1	1.1	100		2.5 U	2.5 U
Chloroethane	--	--	--		2.5 U	2.5 U
Chloroform	0.37	0.37	49		2.5 U	2.5 U
Chloromethane	--	--	--		2.5 U	2.5 U
cis-1,2-Dichloroethene	0.25	0.25	100		2.5 U	2.5 U
cis-1,3-Dichloropropene	--	--	--		0.5 U	0.5 U
Dibromochloromethane	--	--	--		0.5 U	0.5 U
Dibromochloropropane	--	--	--		2.5 U	2.5 U
Dibromomethane	--	--	--		5 U	5 U
Dichlorodifluoromethane	--	--	--		5 U	5 U
Diethyl Ether	--	--	--		2.5 U	2.5 U
Ethylbenzene	1	1	41		2.5 U	2.5 U
Hexachlorobutadiene	--	--	--		2.5 U	2.5 U
Isopropylbenzene	--	--	--		2.5 U	2.5 U
m+p-Xylene	--	--	--		2.5 U	2.5 U
Methylene chloride	0.05	0.05	100		2.5 U	2.5 U
MTBE	0.93	0.93	100		2.5 U	2.5 U
Naphthalene	12	12	100		2.5 U	2.5 U
n-Butylbenzene	12	12	100		2.5 U	2.5 U
n-Propylbenzene	3.9	3.9	100		2.5 U	2.5 U
o-Chlorotoluene	--	--	--		2.5 U	2.5 U
o-Xylene	--	--	--		2.5 U	2.5 U
p-Chlorotoluene	--	--	--		2.5 U	2.5 U
p-Isopropyltoluene	--	--	--		2.5 U	2.5 U
sec-Butylbenzene	11	11	100		2.5 U	2.5 U

Table 3. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	TRIP BLANK 6/4/2014	TRIP BLANK 6/6/2014
Styrene	--	--	--		2.5 U	2.5 U
tert-Butylbenzene	5.9	5.9	100		2.5 U	2.5 U
Tetrachloroethene	1.3	1.3	19		0.5 U	0.5 U
Toluene	0.7	0.7	100		2.5 U	2.5 U
trans-1,2-Dichloroethene	0.19	0.19	100		2.5 U	2.5 U
trans-1,3-Dichloropropene	--	--	--		0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	--	--	--		2.5 U	2.5 U
Trichloroethene	0.47	0.47	21		0.5 U	0.5 U
Trichlorofluoromethane	--	--	--		2.5 U	2.5 U
Vinyl acetate	--	--	--		5 U	5 U
Vinyl chloride	0.02	0.02	0.9		1 U	1 U
Xylenes (total)	0.26	1.6	100		2.5 U	2.5 U

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Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32
1,1'-Biphenyl	--	--	--		1.9 U	0.38 U	0.38 U	0.39 U	0.41 U
1,2,4,5-Tetrachlorobenzene	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
1,2,4-Trichlorobenzene	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
1,2-Dichlorobenzene	1.1	1.1	100		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
1,3-Dichlorobenzene	2.4	2.4	49		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
1,4-Dichlorobenzene	1.8	1.8	13		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2,2'-oxybis (1-chloropropane)	--	--	--		0.98 U	0.2 U	0.2 U	0.2 U	0.22 U
2,4,5-Trichlorophenol	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2,4,6-Trichlorophenol	--	--	--		0.49 U	0.1 U	0.1 U	0.1 U	0.11 U
2,4-Dichlorophenol	--	--	--		0.73 U	0.15 U	0.15 U	0.15 U	0.16 U
2,4-Dimethylphenol	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2,4-Dinitrophenol	--	--	--		3.9 U	0.81 U	0.8 U	0.82 U	0.87 U
2,4-Dinitrotoluene	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2,6-Dinitrotoluene	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2-Chloronaphthalene	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2-Chlorophenol	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2-Methylnaphthalene	--	--	--		0.98 U	0.2 U	0.2 U	0.2 U	0.22 U
2-Methylphenol	0.33	0.33	100		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2-Nitroaniline	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
2-Nitrophenol	--	--	--		1.8 U	0.36 U	0.36 U	0.37 U	0.39 U
3&4-Methylphenol	0.33	0.33	100		1.2 U	0.24 U	0.24 U	0.25 U	0.26 U
3,3'-Dichlorobenzidine	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
3-Nitroaniline	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
4,6-Dinitro-2-methylphenol	--	--	--		2.1 U	0.44 U	0.43 U	0.44 U	0.47 U
4-Bromophenyl phenyl ether	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
4-Chloro-3-methylphenol	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
4-Chloroaniline	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
4-Chlorophenyl phenyl ether	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
4-Nitroaniline	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
4-Nitrophenol	--	--	--		1.1 U	0.24 U	0.23 U	0.24 U	0.25 U
Acenaphthene	20	98	100		0.65 U	0.13 U	0.13 U	0.14 U	0.14 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32
Acenaphthylene	100	107	100		0.65 U	0.13 U	0.13 U	0.14 U	0.14 U
Acetophenone	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Anthracene	100	1000	100		0.49 U	0.1 U	0.1 U	0.1 U	0.11 U
Benzo[a]anthracene	1	1	1		0.47 J	0.1 U	0.1 U	0.1 U	0.11 U
Benzo[a]pyrene	1	22	1		0.54 J	0.13 U	0.13 U	0.14 U	0.14 U
Benzo[b]fluoranthene	1	1.7	1		0.97	0.1 U	0.1 U	0.1 U	0.11 U
Benzo[g,h,i]perylene	100	1000	100		0.55 J	0.13 U	0.13 U	0.14 U	0.14 U
Benzo[k]fluoranthene	0.8	1.7	3.9		0.37 J	0.1 U	0.1 U	0.1 U	0.11 U
Benzoic Acid	--	--	--		2.6 U	0.55 U	0.54 U	0.55 U	0.59 U
Benzyl Alcohol	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Bis(2-chloroethoxy)methane	--	--	--		0.88 U	0.18 U	0.18 U	0.18 U	0.2 U
Bis(2-chloroethyl) ether	--	--	--		0.73 U	0.15 U	0.15 U	0.15 U	0.16 U
Bis(2-ethylhexyl) phthalate	--	--	--		30	0.17 U	0.16 U	0.17 U	0.18 U
Butylbenzyl phthalate	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Carbazole	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Chrysene	1	1	3.9		0.89	0.1 U	0.1 U	0.1 U	0.11 U
Dibenzo[a,h]anthracene	0.33	1000	0.33		0.49 U	0.1 U	0.1 U	0.1 U	0.11 U
Dibenzofuran	7	210	59		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Diethyl phthalate	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Dimethyl phthalate	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Di-n-butyl phthalate	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Di-n-octyl phthalate	--	--	--		2.8	0.17 U	0.16 U	0.17 U	0.18 U
Fluoranthene	100	1000	100		1.5	0.1 U	0.1 U	0.1 U	0.11 U
Fluorene	30	386	100		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Hexachlorobenzene	0.33	3.2	1.2		0.49 U	0.1 U	0.1 U	0.1 U	0.11 U
Hexachlorobutadiene	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Hexachlorocyclopentadiene	--	--	--		2.3 U	0.48 U	0.48 U	0.49 U	0.52 U
Hexachloroethane	--	--	--		0.65 U	0.13 U	0.13 U	0.14 U	0.14 U
Indeno[1,2,3-cd]pyrene	0.5	8.2	0.5		0.48 J	0.13 U	0.13 U	0.14 U	0.14 U
Isophorone	--	--	--		0.73 U	0.15 U	0.15 U	0.15 U	0.16 U
Naphthalene	12	12	100		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation:	DW-1	RXSB-01	RXSB-2	RXSB-3	RXSB-4
				Sample Date:	6/6/2014	5/29/2014	5/30/2014	6/3/2014	6/4/2014
				Sample Depth (ft bls):	-	13 - 15	28 - 30	27 - 29	30 - 32
Nitrobenzene	--	--	--		0.73 U	0.15 U	0.15 U	0.15 U	0.16 U
n-Nitrosodi-n-propylamine	--	--	--		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
n-Nitrosodiphenylamine	--	--	--		0.65 U	0.13 U	0.13 U	0.14 U	0.14 U
Pentachlorophenol	0.8	0.8	6.7		0.65 U	0.13 U	0.13 U	0.14 U	0.14 U
Phenanthrene	100	1000	100		0.93	0.1 U	0.1 U	0.1 U	0.11 U
Phenol	0.33	0.33	100		0.82 U	0.17 U	0.16 U	0.17 U	0.18 U
Pyrene	100	1000	100		1.4	0.1 U	0.1 U	0.1 U	0.11 U

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1,1'-Biphenyl	--	--	--		0.42 U	0.39 U	0.47 U	0.38 U	0.4 U
1,2,4,5-Tetrachlorobenzene	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
1,2,4-Trichlorobenzene	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
1,2-Dichlorobenzene	1.1	1.1	100		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
1,3-Dichlorobenzene	2.4	2.4	49		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
1,4-Dichlorobenzene	1.8	1.8	13		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2,2'-oxybis (1-chloropropane)	--	--	--		0.22 U	0.2 U	0.25 U	0.2 U	0.21 U
2,4,5-Trichlorophenol	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2,4,6-Trichlorophenol	--	--	--		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
2,4-Dichlorophenol	--	--	--		0.16 U	0.15 U	0.19 U	0.15 U	0.16 U
2,4-Dimethylphenol	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2,4-Dinitrophenol	--	--	--		0.87 U	0.81 U	1 U	0.81 U	0.85 U
2,4-Dinitrotoluene	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2,6-Dinitrotoluene	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2-Chloronaphthalene	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2-Chlorophenol	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2-Methylnaphthalene	--	--	--		0.22 U	0.2 U	0.25 U	0.2 U	0.21 U
2-Methylphenol	0.33	0.33	100		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2-Nitroaniline	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
2-Nitrophenol	--	--	--		0.39 U	0.37 U	0.45 U	0.36 U	0.38 U
3&4-Methylphenol	0.33	0.33	100		0.26 U	0.24 U	0.3 U	0.24 U	0.26 U
3,3'-Dichlorobenzidine	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
3-Nitroaniline	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
4,6-Dinitro-2-methylphenol	--	--	--		0.47 U	0.44 U	0.54 U	0.44 U	0.46 U
4-Bromophenyl phenyl ether	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
4-Chloro-3-methylphenol	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
4-Chloroaniline	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
4-Chlorophenyl phenyl ether	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
4-Nitroaniline	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
4-Nitrophenol	--	--	--		0.25 U	0.24 U	0.29 U	0.24 U	0.25 U
Acenaphthene	20	98	100		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37	RXSB-8 6/5/2014 35 - 37
Acenaphthylene	100	107	100		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U
Acetophenone	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Anthracene	100	1000	100		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Benzo[a]anthracene	1	1	1		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Benzo[a]pyrene	1	22	1		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U
Benzo[b]fluoranthene	1	1.7	1		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Benzo[g,h,i]perylene	100	1000	100		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U
Benzo[k]fluoranthene	0.8	1.7	3.9		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Benzoic Acid	--	--	--		0.59 U	0.55 U	0.67 U	0.54 U	0.58 U
Benzyl Alcohol	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Bis(2-chloroethoxy)methane	--	--	--		0.2 U	0.18 U	0.22 U	0.18 U	0.19 U
Bis(2-chloroethyl) ether	--	--	--		0.16 U	0.15 U	0.19 U	0.15 U	0.16 U
Bis(2-ethylhexyl) phthalate	--	--	--		0.64	0.17 U	0.21 U	0.17 U	0.18 U
Butylbenzyl phthalate	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Carbazole	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Chrysene	1	1	3.9		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Dibenzo[a,h]anthracene	0.33	1000	0.33		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Dibenzofuran	7	210	59		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Diethyl phthalate	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Dimethyl phthalate	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Di-n-butyl phthalate	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Di-n-octyl phthalate	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Fluoranthene	100	1000	100		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Fluorene	30	386	100		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Hexachlorobenzene	0.33	3.2	1.2		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Hexachlorobutadiene	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Hexachlorocyclopentadiene	--	--	--		0.52 U	0.49 U	0.6 U	0.48 U	0.51 U
Hexachloroethane	--	--	--		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U
Indeno[1,2,3-cd]pyrene	0.5	8.2	0.5		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U
Isophorone	--	--	--		0.16 U	0.15 U	0.19 U	0.15 U	0.16 U
Naphthalene	12	12	100		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37	RXSB-8 6/5/2014 35 - 37
Nitrobenzene	--	--	--		0.16 U	0.15 U	0.19 U	0.15 U	0.16 U
n-Nitrosodi-n-propylamine	--	--	--		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
n-Nitrosodiphenylamine	--	--	--		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U
Pentachlorophenol	0.8	0.8	6.7		0.14 U	0.14 U	0.17 U	0.13 U	0.14 U
Phenanthrene	100	1000	100		0.11 U	0.1 U	0.12 U	0.1 U	0.11 U
Phenol	0.33	0.33	100		0.18 U	0.17 U	0.21 U	0.17 U	0.18 U
Pyrene	100	1000	100		0.096 J	0.1 U	0.12 U	0.1 U	0.11 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375	NYSDEC Part 375	NYSDEC Part 375	Sample Designation:				
	Unrestricted	Protection of	Restricted	Sample Date:	RXSB-9	RXSB-10	RXSB-11	RXSB-12A
	Use	Groundwater	Residential	Sample Depth (ft bls):	5/29/2014	5/30/2014	6/3/2014	5/28/2014
					34 - 36	24 - 26	28 - 30	16 - 18
1,1'-Biphenyl	--	--	--		0.49 U	0.41 U	0.39 U	0.41 U
1,2,4,5-Tetrachlorobenzene	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
1,2,4-Trichlorobenzene	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
1,2-Dichlorobenzene	1.1	1.1	100		0.21 U	0.18 U	0.17 U	0.18 U
1,3-Dichlorobenzene	2.4	2.4	49		0.21 U	0.18 U	0.17 U	0.18 U
1,4-Dichlorobenzene	1.8	1.8	13		0.21 U	0.18 U	0.17 U	0.18 U
2,2'-oxybis (1-chloropropane)	--	--	--		0.26 U	0.21 U	0.2 U	0.21 U
2,4,5-Trichlorophenol	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
2,4,6-Trichlorophenol	--	--	--		0.13 U	0.11 U	0.1 U	0.11 U
2,4-Dichlorophenol	--	--	--		0.19 U	0.16 U	0.15 U	0.16 U
2,4-Dimethylphenol	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
2,4-Dinitrophenol	--	--	--		1 U	0.86 U	0.82 U	0.86 U
2,4-Dinitrotoluene	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
2,6-Dinitrotoluene	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
2-Chloronaphthalene	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
2-Chlorophenol	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
2-Methylnaphthalene	--	--	--		0.26 U	0.21 U	0.2 U	0.21 U
2-Methylphenol	0.33	0.33	100		0.21 U	0.18 U	0.17 U	0.18 U
2-Nitroaniline	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
2-Nitrophenol	--	--	--		0.46 U	0.39 U	0.37 U	0.38 U
3&4-Methylphenol	0.33	0.33	100		0.31 U	0.26 U	0.25 U	0.26 U
3,3'-Dichlorobenzidine	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
3-Nitroaniline	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
4,6-Dinitro-2-methylphenol	--	--	--		0.55 U	0.46 U	0.44 U	0.46 U
4-Bromophenyl phenyl ether	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
4-Chloro-3-methylphenol	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
4-Chloroaniline	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
4-Chlorophenyl phenyl ether	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
4-Nitroaniline	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U
4-Nitrophenol	--	--	--		0.3 U	0.25 U	0.24 U	0.25 U
Acenaphthene	20	98	100		0.17 U	0.14 U	0.14 U	0.14 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375	NYSDEC Part 375	NYSDEC Part 375	Sample Designation:	RXSB-9	RXSB-10	RXSB-11	RXSB-12A	RXSB-12
	Unrestricted	Protection of	Restricted	Sample Date:	5/29/2014	5/30/2014	6/3/2014	5/28/2014	6/2/2014
	Use	Groundwater	Residential	Sample Depth (ft bls):	34 - 36	24 - 26	28 - 30	16 - 18	34 - 36
Acenaphthylene	100	107	100		0.17 U	0.14 U	0.14 U	0.14 U	0.13 U
Acetophenone	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Anthracene	100	1000	100		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Benzo[a]anthracene	1	1	1		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Benzo[a]pyrene	1	22	1		0.17 U	0.14 U	0.14 U	0.14 U	0.13 U
Benzo[b]fluoranthene	1	1.7	1		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Benzo[g,h,i]perylene	100	1000	100		0.17 U	0.14 U	0.14 U	0.14 U	0.13 U
Benzo[k]fluoranthene	0.8	1.7	3.9		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Benzoic Acid	--	--	--		0.69 U	0.58 U	0.56 U	0.58 U	0.52 U
Benzyl Alcohol	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Bis(2-chloroethoxy)methane	--	--	--		0.23 U	0.19 U	0.18 U	0.19 U	0.18 U
Bis(2-chloroethyl) ether	--	--	--		0.19 U	0.16 U	0.15 U	0.16 U	0.14 U
Bis(2-ethylhexyl) phthalate	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Butylbenzyl phthalate	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Carbazole	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Chrysene	1	1	3.9		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Dibenzo[a,h]anthracene	0.33	1000	0.33		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Dibenzofuran	7	210	59		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Diethyl phthalate	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Dimethyl phthalate	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Di-n-butyl phthalate	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Di-n-octyl phthalate	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Fluoranthene	100	1000	100		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Fluorene	30	386	100		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Hexachlorobenzene	0.33	3.2	1.2		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Hexachlorobutadiene	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Hexachlorocyclopentadiene	--	--	--		0.61 U	0.51 U	0.49 U	0.51 U	0.46 U
Hexachloroethane	--	--	--		0.17 U	0.14 U	0.14 U	0.14 U	0.13 U
Indeno[1,2,3-cd]pyrene	0.5	8.2	0.5		0.17 U	0.14 U	0.14 U	0.14 U	0.13 U
Isophorone	--	--	--		0.19 U	0.16 U	0.15 U	0.16 U	0.14 U
Naphthalene	12	12	100		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation:	RXSB-9	RXSB-10	RXSB-11	RXSB-12A	RXSB-12
				Sample Date:	5/29/2014	5/30/2014	6/3/2014	5/28/2014	6/2/2014
				Sample Depth (ft bls):	34 - 36	24 - 26	28 - 30	16 - 18	34 - 36
Nitrobenzene	--	--	--		0.19 U	0.16 U	0.15 U	0.16 U	0.14 U
n-Nitrosodi-n-propylamine	--	--	--		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
n-Nitrosodiphenylamine	--	--	--		0.17 U	0.14 U	0.14 U	0.14 U	0.13 U
Pentachlorophenol	0.8	0.8	6.7		0.17 U	0.14 U	0.14 U	0.14 U	0.13 U
Phenanthrene	100	1000	100		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U
Phenol	0.33	0.33	100		0.21 U	0.18 U	0.17 U	0.18 U	0.16 U
Pyrene	100	1000	100		0.13 U	0.11 U	0.1 U	0.11 U	0.097 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375	NYSDEC Part 375	NYSDEC Part 375	Sample Designation:	RXSB-13	RXSB-14	RXSB-15	RXSB-16	RXSB-17
	Unrestricted	Protection of	Restricted	Sample Date:	5/28/2014	5/28/2014	5/29/2014	5/27/2014	5/28/2014
	Use	Groundwater	Residential	Sample Depth (ft bls):	37 - 39	37 - 39	30 - 32	40 - 42.5	42 - 44
1,1'-Biphenyl	--	--	--		0.39 U	0.4 U	0.38 U	0.39 U	0.39 U
1,2,4,5-Tetrachlorobenzene	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,2,4-Trichlorobenzene	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,2-Dichlorobenzene	1.1	1.1	100		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,3-Dichlorobenzene	2.4	2.4	49		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,4-Dichlorobenzene	1.8	1.8	13		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2,2'-oxybis (1-chloropropane)	--	--	--		0.21 U	0.21 U	0.2 U	0.21 U	0.21 U
2,4,5-Trichlorophenol	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2,4,6-Trichlorophenol	--	--	--		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4-Dichlorophenol	--	--	--		0.16 U	0.16 U	0.15 U	0.16 U	0.16 U
2,4-Dimethylphenol	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2,4-Dinitrophenol	--	--	--		0.83 U	0.83 U	0.81 U	0.83 U	0.83 U
2,4-Dinitrotoluene	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2,6-Dinitrotoluene	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2-Chloronaphthalene	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2-Chlorophenol	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2-Methylnaphthalene	--	--	--		0.21 U	0.21 U	0.2 U	0.21 U	0.21 U
2-Methylphenol	0.33	0.33	100		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2-Nitroaniline	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
2-Nitrophenol	--	--	--		0.37 U	0.38 U	0.36 U	0.37 U	0.37 U
3&4-Methylphenol	0.33	0.33	100		0.25 U	0.25 U	0.24 U	0.25 U	0.25 U
3,3'-Dichlorobenzidine	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
3-Nitroaniline	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
4,6-Dinitro-2-methylphenol	--	--	--		0.45 U	0.45 U	0.44 U	0.45 U	0.45 U
4-Bromophenyl phenyl ether	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
4-Chloro-3-methylphenol	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
4-Chloroaniline	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
4-Chlorophenyl phenyl ether	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
4-Nitroaniline	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
4-Nitrophenol	--	--	--		0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Acenaphthene	20	98	100		0.14 U	0.14 U	0.14 U	0.14 U	0.14 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375	NYSDEC Part 375	NYSDEC Part 375	Sample Designation: RXSB-13 RXSB-14 RXSB-15 RXSB-16 RXSB-17					
	Unrestricted	Protection of	Restricted	Sample Date: 5/28/2014 5/28/2014 5/29/2014 5/27/2014 5/28/2014					
	Use	Groundwater	Residential	Sample Depth (ft bls): 37 - 39 37 - 39 30 - 32 40 - 42.5 42 - 44					
Acenaphthylene	100	107	100		0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Acetophenone	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Anthracene	100	1000	100		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo[a]anthracene	1	1	1		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo[a]pyrene	1	22	1		0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Benzo[b]fluoranthene	1	1.7	1		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzo[g,h,i]perylene	100	1000	100		0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Benzo[k]fluoranthene	0.8	1.7	3.9		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzoic Acid	--	--	--		0.56 U	0.56 U	0.55 U	0.56 U	0.56 U
Benzyl Alcohol	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Bis(2-chloroethoxy)methane	--	--	--		0.19 U	0.19 U	0.18 U	0.19 U	0.19 U
Bis(2-chloroethyl) ether	--	--	--		0.16 U	0.16 U	0.15 U	0.16 U	0.16 U
Bis(2-ethylhexyl) phthalate	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Butylbenzyl phthalate	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Carbazole	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Chrysene	1	1	3.9		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzo[a,h]anthracene	0.33	1000	0.33		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenzofuran	7	210	59		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Diethyl phthalate	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Dimethyl phthalate	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Di-n-butyl phthalate	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Di-n-octyl phthalate	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Fluoranthene	100	1000	100		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluorene	30	386	100		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Hexachlorobenzene	0.33	3.2	1.2		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobutadiene	--	--	--		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Hexachlorocyclopentadiene	--	--	--		0.5 U	0.5 U	0.48 U	0.49 U	0.5 U
Hexachloroethane	--	--	--		0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Indeno[1,2,3-cd]pyrene	0.5	8.2	0.5		0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Isophorone	--	--	--		0.16 U	0.16 U	0.15 U	0.16 U	0.16 U
Naphthalene	12	12	100		0.17 U	0.17 U	0.17 U	0.17 U	0.17 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375	NYSDEC Part 375	NYSDEC Part 375	Sample Designation:				
	Unrestricted	Protection of	Restricted	Sample Date:				
	Use	Groundwater	Residential	Sample Depth (ft bls):				
				RXSB-13	RXSB-14	RXSB-15	RXSB-16	RXSB-17
				5/28/2014	5/28/2014	5/29/2014	5/27/2014	5/28/2014
				37 - 39	37 - 39	30 - 32	40 - 42.5	42 - 44
Nitrobenzene	--	--	--	0.16 U	0.16 U	0.15 U	0.16 U	0.16 U
n-Nitrosodi-n-propylamine	--	--	--	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
n-Nitrosodiphenylamine	--	--	--	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Pentachlorophenol	0.8	0.8	6.7	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Phenanthrene	100	1000	100	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Phenol	0.33	0.33	100	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Pyrene	100	1000	100	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

	NYSDEC Part 375	NYSDEC Part 375	NYSDEC Part 375	Sample Designation:	FIELD BLANK	FIELD BLANK	FIELD BLANK
Parameter	Unrestricted	Protection of	Restricted	Sample Date:	5/27/2014	5/28/2014	5/29/2014
(Concentrations in mg/kg)	Use	Groundwater	Residential	Sample Depth (ft bls):			
1,1'-Biphenyl	--	--	--		2.0 U	2.0 U	2.0 U
1,2,4,5-Tetrachlorobenzene	--	--	--		10 U	10 U	10 U
1,2,4-Trichlorobenzene	--	--	--		5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	1.1	1.1	100		2.0 U	2.0 U	2.0 U
1,3-Dichlorobenzene	2.4	2.4	49		2.0 U	2.0 U	2.0 U
1,4-Dichlorobenzene	1.8	1.8	13		2.0 U	2.0 U	2.0 U
2,2'-oxybis (1-chloropropane)	--	--	--		2.0 U	2.0 U	2.0 U
2,4,5-Trichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4,6-Trichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dimethylphenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dinitrophenol	--	--	--		20 U	20 U	20 U
2,4-Dinitrotoluene	--	--	--		5.0 U	5.0 U	5.0 U
2,6-Dinitrotoluene	--	--	--		5.0 U	5.0 U	5.0 U
2-Chloronaphthalene	--	--	--		0.20 U	0.20 U	0.20 U
2-Chlorophenol	--	--	--		2.0 U	2.0 U	2.0 U
2-Methylnaphthalene	--	--	--		0.20 U	0.20 U	0.20 U
2-Methylphenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
2-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
2-Nitrophenol	--	--	--		10 U	10 U	10 U
3&4-Methylphenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
3,3'-Dichlorobenzidine	--	--	--		5.0 U	5.0 U	5.0 U
3-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4,6-Dinitro-2-methylphenol	--	--	--		10 U	10 U	10 U
4-Bromophenyl phenyl ether	--	--	--		2.0 U	2.0 U	2.0 U
4-Chloro-3-methylphenol	--	--	--		2.0 U	2.0 U	2.0 U
4-Chloroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4-Chlorophenyl phenyl ether	--	--	--		2.0 U	2.0 U	2.0 U
4-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4-Nitrophenol	--	--	--		10 U	10 U	10 U
Acenaphthene	20	98	100		0.20 U	0.20 U	0.20 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation:	FIELD BLANK	FIELD BLANK	FIELD BLANK
				Sample Date:	5/27/2014	5/28/2014	5/29/2014
				Sample Depth (ft bls):			
Acenaphthylene	100	107	100		0.20 U	0.20 U	0.20 U
Acetophenone	--	--	--		5.0 U	5.0 U	5.0 U
Anthracene	100	1000	100		0.20 U	0.20 U	0.20 U
Benzo[a]anthracene	1	1	1		0.20 U	0.20 U	0.20 U
Benzo[a]pyrene	1	22	1		0.20 U	0.09 J	0.20 U
Benzo[b]fluoranthene	1	1.7	1		0.20 U	0.20 U	0.20 U
Benzo[g,h,i]perylene	100	1000	100		0.20 U	0.20 U	0.20 U
Benzo[k]fluoranthene	0.8	1.7	3.9		0.20 U	0.20 U	0.20 U
Benzoic Acid	--	--	--		50 U	50 U	50 U
Benzyl Alcohol	--	--	--		2.0 U	2.0 U	2.0 U
Bis(2-chloroethoxy)methane	--	--	--		5.0 U	5.0 U	5.0 U
Bis(2-chloroethyl) ether	--	--	--		2.0 U	2.0 U	2.0 U
Bis(2-ethylhexyl) phthalate	--	--	--		3.0 U	3.0 U	3.0 U
Butylbenzyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Carbazole	--	--	--		2.0 U	2.0 U	2.0 U
Chrysene	1	1	3.9		0.20 U	0.20 U	0.20 U
Dibenzo[a,h]anthracene	0.33	1000	0.33		0.20 U	0.20 U	0.20 U
Dibenzofuran	7	210	59		2.0 U	2.0 U	2.0 U
Diethyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Dimethyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Di-n-octyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Fluoranthene	100	1000	100		0.20 U	0.20 U	0.20 U
Fluorene	30	386	100		0.20 U	0.20 U	0.20 U
Hexachlorobenzene	0.33	3.2	1.2		0.80 U	0.80 U	0.80 U
Hexachlorobutadiene	--	--	--		0.50 U	0.50 U	0.50 U
Hexachlorocyclopentadiene	--	--	--		20 U	20 U	20 U
Hexachloroethane	--	--	--		0.80 U	0.80 U	0.80 U
Indeno[1,2,3-cd]pyrene	0.5	8.2	0.5		0.20 U	0.11 J	0.20 U
Isophorone	--	--	--		5.0 U	5.0 U	5.0 U
Naphthalene	12	12	100		0.20 U	0.20 U	0.20 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/27/2014	FIELD BLANK 5/28/2014	FIELD BLANK 5/29/2014
Nitrobenzene	--	--	--		2.0 U	2.0 U	2.0 U
n-Nitrosodi-n-propylamine	--	--	--		5.0 U	5.0 U	5.0 U
n-Nitrosodiphenylamine	--	--	--		2.0 U	2.0 U	2.0 U
Pentachlorophenol	0.8	0.8	6.7		0.80 U	0.80 U	0.80 U
Phenanthrene	100	1000	100		0.20 U	0.20 U	0.20 U
Phenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
Pyrene	100	1000	100		0.20 U	0.20 U	0.20 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

	NYSDEC Part 375	NYSDEC Part 375	NYSDEC Part 375	Sample Designation:	FIELD BLANK	FIELD BLANK	FIELD BLANK
Parameter	Unrestricted	Protection of	Restricted	Sample Date:	5/30/2014	6/2/2014	6/3/2014
(Concentrations in mg/kg)	Use	Groundwater	Residential	Sample Depth (ft bls):			
1,1'-Biphenyl	--	--	--		2.0 U	2.0 U	2.0 U
1,2,4,5-Tetrachlorobenzene	--	--	--		10 U	10 U	10 U
1,2,4-Trichlorobenzene	--	--	--		5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	1.1	1.1	100		2.0 U	2.0 U	2.0 U
1,3-Dichlorobenzene	2.4	2.4	49		2.0 U	2.0 U	2.0 U
1,4-Dichlorobenzene	1.8	1.8	13		2.0 U	2.0 U	2.0 U
2,2'-oxybis (1-chloropropane)	--	--	--		2.0 U	2.0 U	2.0 U
2,4,5-Trichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4,6-Trichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dimethylphenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dinitrophenol	--	--	--		20 U	20 U	20 U
2,4-Dinitrotoluene	--	--	--		5.0 U	5.0 U	5.0 U
2,6-Dinitrotoluene	--	--	--		5.0 U	5.0 U	5.0 U
2-Chloronaphthalene	--	--	--		0.20 U	0.20 U	0.20 U
2-Chlorophenol	--	--	--		2.0 U	2.0 U	2.0 U
2-Methylnaphthalene	--	--	--		0.20 U	0.20 U	0.20 U
2-Methylphenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
2-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
2-Nitrophenol	--	--	--		10 U	10 U	10 U
3&4-Methylphenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
3,3'-Dichlorobenzidine	--	--	--		5.0 U	5.0 U	5.0 U
3-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4,6-Dinitro-2-methylphenol	--	--	--		10 U	10 U	10 U
4-Bromophenyl phenyl ether	--	--	--		2.0 U	2.0 U	2.0 U
4-Chloro-3-methylphenol	--	--	--		2.0 U	2.0 U	2.0 U
4-Chloroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4-Chlorophenyl phenyl ether	--	--	--		2.0 U	2.0 U	2.0 U
4-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4-Nitrophenol	--	--	--		10 U	10 U	10 U
Acenaphthene	20	98	100		0.20 U	0.20 U	0.20 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/30/2014	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014
Acenaphthylene	100	107	100		0.20 U	0.20 U	0.20 U
Acetophenone	--	--	--		5.0 U	5.0 U	5.0 U
Anthracene	100	1000	100		0.20 U	0.20 U	0.20 U
Benzo[a]anthracene	1	1	1		0.20 U	0.20 U	0.20 U
Benzo[a]pyrene	1	22	1		0.20 U	0.20 U	0.20 U
Benzo[b]fluoranthene	1	1.7	1		0.20 U	0.20 U	0.20 U
Benzo[g,h,i]perylene	100	1000	100		0.20 U	0.20 U	0.20 U
Benzo[k]fluoranthene	0.8	1.7	3.9		0.20 U	0.20 U	0.20 U
Benzoic Acid	--	--	--		50 U	50 U	50 U
Benzyl Alcohol	--	--	--		2.0 U	2.0 U	2.0 U
Bis(2-chloroethoxy)methane	--	--	--		5.0 U	5.0 U	5.0 U
Bis(2-chloroethyl) ether	--	--	--		2.0 U	2.0 U	2.0 U
Bis(2-ethylhexyl) phthalate	--	--	--		3.0 U	3.0 U	3.0 U
Butylbenzyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Carbazole	--	--	--		2.0 U	2.0 U	2.0 U
Chrysene	1	1	3.9		0.20 U	0.20 U	0.20 U
Dibenzo[a,h]anthracene	0.33	1000	0.33		0.20 U	0.20 U	0.20 U
Dibenzofuran	7	210	59		2.0 U	2.0 U	2.0 U
Diethyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Dimethyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Di-n-octyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Fluoranthene	100	1000	100		0.20 U	0.20 U	0.20 U
Fluorene	30	386	100		0.20 U	0.20 U	0.20 U
Hexachlorobenzene	0.33	3.2	1.2		0.80 U	0.80 U	0.80 U
Hexachlorobutadiene	--	--	--		0.50 U	0.50 U	0.50 U
Hexachlorocyclopentadiene	--	--	--		20 U	20 U	20 U
Hexachloroethane	--	--	--		0.80 U	0.80 U	0.80 U
Indeno[1,2,3-cd]pyrene	0.5	8.2	0.5		0.20 U	0.20 U	0.20 U
Isophorone	--	--	--		5.0 U	5.0 U	5.0 U
Naphthalene	12	12	100		0.20 U	0.20 U	0.20 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/30/2014	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014
Nitrobenzene	--	--	--		2.0 U	2.0 U	2.0 U
n-Nitrosodi-n-propylamine	--	--	--		5.0 U	5.0 U	5.0 U
n-Nitrosodiphenylamine	--	--	--		2.0 U	2.0 U	2.0 U
Pentachlorophenol	0.8	0.8	6.7		0.80 U	0.80 U	0.80 U
Phenanthrene	100	1000	100		0.20 U	0.20 U	0.20 U
Phenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
Pyrene	100	1000	100		0.20 U	0.20 U	0.20 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

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Field Blanks are expressed in µg/L

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Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

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Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
1,1'-Biphenyl	--	--	--		2.0 U	2.0 U	2.0 U
1,2,4,5-Tetrachlorobenzene	--	--	--		10 U	10 U	10 U
1,2,4-Trichlorobenzene	--	--	--		5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	1.1	1.1	100		2.0 U	2.0 U	2.0 U
1,3-Dichlorobenzene	2.4	2.4	49		2.0 U	2.0 U	2.0 U
1,4-Dichlorobenzene	1.8	1.8	13		2.0 U	2.0 U	2.0 U
2,2'-oxybis (1-chloropropane)	--	--	--		2.0 U	2.0 U	2.0 U
2,4,5-Trichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4,6-Trichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dichlorophenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dimethylphenol	--	--	--		5.0 U	5.0 U	5.0 U
2,4-Dinitrophenol	--	--	--		20 U	20 U	20 U
2,4-Dinitrotoluene	--	--	--		5.0 U	5.0 U	5.0 U
2,6-Dinitrotoluene	--	--	--		5.0 U	5.0 U	5.0 U
2-Chloronaphthalene	--	--	--		0.20 U	0.20 U	0.20 U
2-Chlorophenol	--	--	--		2.0 U	2.0 U	2.0 U
2-Methylnaphthalene	--	--	--		0.20 U	0.20 U	0.20 U
2-Methylphenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
2-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
2-Nitrophenol	--	--	--		10 U	10 U	10 U
3&4-Methylphenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
3,3'-Dichlorobenzidine	--	--	--		5.0 U	5.0 U	5.0 U
3-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4,6-Dinitro-2-methylphenol	--	--	--		10 U	10 U	10 U
4-Bromophenyl phenyl ether	--	--	--		2.0 U	2.0 U	2.0 U
4-Chloro-3-methylphenol	--	--	--		2.0 U	2.0 U	2.0 U
4-Chloroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4-Chlorophenyl phenyl ether	--	--	--		2.0 U	2.0 U	2.0 U
4-Nitroaniline	--	--	--		5.0 U	5.0 U	5.0 U
4-Nitrophenol	--	--	--		10 U	10 U	10 U
Acenaphthene	20	98	100		0.20 U	0.20 U	0.20 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
Acenaphthylene	100	107	100		0.20 U	0.20 U	0.20 U
Acetophenone	--	--	--		5.0 U	5.0 U	5.0 U
Anthracene	100	1000	100		0.20 U	0.20 U	0.20 U
Benzo[a]anthracene	1	1	1		0.20 U	0.20 U	0.20 U
Benzo[a]pyrene	1	22	1		0.20 U	0.20 U	0.20 U
Benzo[b]fluoranthene	1	1.7	1		0.20 U	0.20 U	0.20 U
Benzo[g,h,i]perylene	100	1000	100		0.20 U	0.20 U	0.20 U
Benzo[k]fluoranthene	0.8	1.7	3.9		0.20 U	0.20 U	0.20 U
Benzoic Acid	--	--	--		50 U	50 U	50 U
Benzyl Alcohol	--	--	--		2.0 U	2.0 U	2.0 U
Bis(2-chloroethoxy)methane	--	--	--		5.0 U	5.0 U	5.0 U
Bis(2-chloroethyl) ether	--	--	--		2.0 U	2.0 U	2.0 U
Bis(2-ethylhexyl) phthalate	--	--	--		3.0 U	3.0 U	3.0 U
Butylbenzyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Carbazole	--	--	--		2.0 U	2.0 U	2.0 U
Chrysene	1	1	3.9		0.20 U	0.20 U	0.20 U
Dibenzo[a,h]anthracene	0.33	1000	0.33		0.20 U	0.20 U	0.20 U
Dibenzofuran	7	210	59		2.0 U	2.0 U	2.0 U
Diethyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Dimethyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Di-n-octyl phthalate	--	--	--		5.0 U	5.0 U	5.0 U
Fluoranthene	100	1000	100		0.20 U	0.20 U	0.20 U
Fluorene	30	386	100		0.20 U	0.20 U	0.20 U
Hexachlorobenzene	0.33	3.2	1.2		0.80 U	0.80 U	0.80 U
Hexachlorobutadiene	--	--	--		0.50 U	0.50 U	0.50 U
Hexachlorocyclopentadiene	--	--	--		20 U	20 U	20 U
Hexachloroethane	--	--	--		0.80 U	0.80 U	0.80 U
Indeno[1,2,3-cd]pyrene	0.5	8.2	0.5		0.20 U	0.20 U	0.20 U
Isophorone	--	--	--		5.0 U	5.0 U	5.0 U
Naphthalene	12	12	100		0.20 U	0.20 U	0.20 U

Table 4. Summary of Semivolatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
Nitrobenzene	--	--	--		2.0 U	2.0 U	2.0 U
n-Nitrosodi-n-propylamine	--	--	--		5.0 U	5.0 U	5.0 U
n-Nitrosodiphenylamine	--	--	--		2.0 U	2.0 U	2.0 U
Pentachlorophenol	0.8	0.8	6.7		0.80 U	0.80 U	0.80 U
Phenanthrene	100	1000	100		0.20 U	0.20 U	0.20 U
Phenol	0.33	0.33	100		5.0 U	5.0 U	5.0 U
Pyrene	100	1000	100		0.20 U	0.20 U	0.20 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 5. Summary of Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34
Aluminum	--	--	--		5800	4400	2400	2000	2400	2200	2800
Antimony	--	--	--		19	3.9 U	4.1 U	4.1 U	4.3 U	4.3 U	4 U
Arsenic	13	16	16		5	3.3	1.3	1.7	0.36 J	0.27 J	2
Barium	350	820	400		56	78 JV	22	20	18	16	56
Beryllium	7.2	47	72		0.28 J	0.16 J	0.14 J	0.1 J	0.13 J	0.11 J	0.16 J
Cadmium	2.5	7.5	4.3		4.9	0.16 J	0.81 U	0.82 U	0.86 U	0.87 U	0.27 J
Calcium	--	--	--		18000	8800 JV	8700	1800	1100	710	5700
Chromium, Hexavalent	1	19	110		1.3 U	0.2 J	0.81 U	0.42 J	0.88 U	0.88 U	0.83 U
Chromium	30	--	180		100	16	6.9	11	9.6	10	9.6
Cobalt	--	--	--		7	7.1	3.2	4.5	4.3	3.8	4.6
Copper	50	1720	270		220	31	11	12	8.2	8.4	14
Cyanide	27	40	27		1.2 J	0.95 U	1 U	0.97 U	1 U	1 U	1 U
Iron	--	--	--		20000	22000	9200	11000	12000	12000	11000
Lead	63	450	400		130	3.9 U	4.1 UV	5.5	2.2 J	2.1 J	4 UV
Magnesium	--	--	--		11000	6600	4700	1600	1200	1000	3800
Manganese	1600	2000	2000		130	1000 JV	180	200	230	180	990
Mercury	0.18	0.73	0.81		0.05 J	0.07 U	0.07 U	0.02 J	0.08 U	0.08 U	0.07 U
Nickel	30	130	310		45	15	6.5	9.3	9	8.3	8.4
Potassium	--	--	--		730	1400	800	490	760	520	680
Selenium	3.9	4	180		0.85 J	1.6 U	1.6 U	1.6 U	0.48 J	0.42 J	1.6 U
Silver	2	8.3	180		0.59 J	0.78 U	0.81 U	0.82 U	0.86 U	0.87 U	0.81 U
Sodium	--	--	--		240 J	160	88 J	39 J	55 J	58 J	66 J
Thallium	--	--	--		2.7 U	1.6 UJV	1.6 U	1.6 U	1.7 U	1.7 U	1.6 U
Vanadium	--	--	--		48	25	10	11	15	14	12
Zinc	109	2480	10000		1700	28	13	18	44	16	16

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

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Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 5. Summary of Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37	RXSB-8 6/5/2014 35 - 37	RXSB-9 5/29/2014 34 - 36	RXSB-10 5/30/2014 24 - 26	RXSB-11 6/3/2014 28 - 30	RXSB-12A 5/28/2014 16 - 18
Aluminum	--	--	--		16000	2000	2600	13000	5200	3100	3700
Antimony	--	--	--		5 U	4.1 U	4.4 U	5 U	4.4 U	4.1 U	4.4 U
Arsenic	13	16	16		2.3	1	1.1	3.8	2	4.2	2.5
Barium	350	820	400		150	18	30	130	31	24	24
Beryllium	7.2	47	72		0.62	0.1 J	0.11 J	0.52	0.24 J	0.18 J	0.21 J
Cadmium	2.5	7.5	4.3		1 U	0.81 U	0.88 U	1 U	0.88 U	0.81 U	0.88 U
Calcium	--	--	--		2800	7400	6500	12000	530	890	1200
Chromium, Hexavalent	1	19	110		0.46 J	0.2 J	0.88 U	0.25 J	0.88 U	0.2 J	0.22 J
Chromium	30	--	180		43	5.9	8.2	38	17	11	15
Cobalt	--	--	--		15	2.5	4.4	12	5.5	4.7	5.4
Copper	50	1720	270		32	8.4	12	28	14	14	12
Cyanide	27	40	27		1.2 U	0.98 U	1 U	1.3 U	1 U	1 U	1.1 U
Iron	--	--	--		33000	7600	10000	28000	16000	18000	21000
Lead	63	450	400		9.6	1.7 J	4.4 U	4 J	4.4 UV	1.6 J	1.1 J
Magnesium	--	--	--		7400	3400	3900	10000	1500	1700	1700
Manganese	1600	2000	2000		400	120	190	410	270	330	380
Mercury	0.18	0.73	0.81		0.08 U	0.07 U	0.07 U	0.08 U	0.07 U	0.07 U	0.07 U
Nickel	30	130	310		31	5.4	8.2	28	10	9.2	10
Potassium	--	--	--		6600	610	830	5400	900	580	490
Selenium	3.9	4	180		1.5 J	1.6 U	1.8 U	2 U	1.8 U	1.6 U	1.8 U
Silver	2	8.3	180		1 U	0.81 U	0.88 U	1 U	0.88 U	0.81 U	0.88 U
Sodium	--	--	--		230	78 J	100 J	240	69 J	67 J	95 J
Thallium	--	--	--		2 U	1.6 U	1.8 U	2 U	1.8 U	1.6 U	1.8 U
Vanadium	--	--	--		48	7.4	13	45	22	17	19
Zinc	109	2480	10000		78	11	14	65	21	20	21

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

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Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 5. Summary of Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation:	RXSB-12	RXSB-13	RXSB-14	RXSB-15	RXSB-16	RXSB-17
				Sample Date:	6/2/2014	5/28/2014	5/28/2014	5/29/2014	5/27/2014	5/28/2014
				Sample Depth (ft bls):	34 - 36	37 - 39	37 - 39	30 - 32	40 - 42.5	42 - 44
Aluminum	--	--	--		3000	2700	2500	3100	2900	2700
Antimony	--	--	--		4 U	4.2 U	4 U	3.9 U	4.2 U	4.2 U
Arsenic	13	16	16		0.35 J	1.1	1.5	1.4	6	1.2
Barium	350	820	400		44	28	23	24	30	20
Beryllium	7.2	47	72		0.17 J	0.09 J	0.12 J	0.17 J	0.27 J	0.12 J
Cadmium	2.5	7.5	4.3		0.79 U	0.83 U	0.8 U	0.78 U	0.84 U	0.83 U
Calcium	--	--	--		8300	9000	880	760	5100	960
Chromium, Hexavalent	1	19	110		0.3 J	0.85 U	0.85 U	0.21 J	0.85 U	0.85 U
Chromium	30	--	180		15	8.8	10	12	9	9.8
Cobalt	--	--	--		4.7	4	3.6	4.2	5.3	3.6
Copper	50	1720	270		16	14	12	12	31	11
Cyanide	27	40	27		0.96 U	1 U	1 U	0.33 J	0.98 U	1 U
Iron	--	--	--		17000	11000	14000	16000	23000	11000
Lead	63	450	400		3.1 J	0.49 J	4 U	3.9 U	3.2 J	0.42 J
Magnesium	--	--	--		4700	4200	1200	1400	3200	1200
Manganese	1600	2000	2000		520	170	360	280	580	190
Mercury	0.18	0.73	0.81		0.07 U	0.07 U	0.07 U	0.07 U	0.08 U	0.07 U
Nickel	30	130	310		9.6	8.3	8.2	8.7	8.2	7.6
Potassium	--	--	--		790	790	470	490	490	530
Selenium	3.9	4	180		0.33 J	1.7 U	1.6 U	1.6 U	1.7 U	1.7 U
Silver	2	8.3	180		0.79 U	0.83 U	0.8 U	0.78 U	0.84 U	0.83 U
Sodium	--	--	--		76 J	85 J	61 J	87 J	140 J	160 J
Thallium	--	--	--		1.6 U	1.7 U	1.6 U	1.6 U	1.7 U	1.7 U
Vanadium	--	--	--		15	13	13	16	13	12
Zinc	109	2480	10000		18	14	14	17	22	14

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Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 5. Summary of Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/27/2014	FIELD BLANK 5/28/2014	FIELD BLANK 5/29/2014	FIELD BLANK 5/30/2014
Aluminum	--	--	--		2.35 J	2.96 J	2.3 J	10 UV
Antimony	--	--	--		2 UV	2 UV	2 UV	1 U
Arsenic	13	16	16		0.5 U	0.5 U	0.5 U	0.5 U
Barium	350	820	400		0.5 U	0.5 U	0.5 U	0.5 U
Beryllium	7.2	47	72		0.5 U	0.5 U	0.5 U	0.5 U
Cadmium	2.5	7.5	4.3		0.2 U	0.2 U	0.2 U	0.2 U
Calcium	--	--	--		100 U	100 U	100 U	100 U
Chromium, Hexavalent	1	19	110		4 J	10 U	10 U	10 U
Chromium	30	--	180		1.33	1 UV	1 UV	0.31 J
Cobalt	--	--	--		0.2 U	0.2 U	0.2 U	0.5 U
Copper	50	1720	270		1 UV	1 UV	1 UV	0.11 J
Cyanide	27	40	27		5 U	2 J	5 U	1 J
Iron	--	--	--		50 U	50 U	50 U	50 U
Lead	63	450	400		1 U	1 U	1 U	1 U
Magnesium	--	--	--		2.51 J	2.59 J	2.9 J	3.8 J
Manganese	1600	2000	2000		0.5 U	0.91	0.5 U	0.23 J
Mercury	0.18	0.73	0.81		0.2 U	0.2 U	0.2 U	0.2 U
Nickel	30	130	310		0.4 J	0.5 U	0.5 U	0.5 U
Potassium	--	--	--		100 U	100 U	100 U	100 U
Selenium	3.9	4	180		5 U	5 U	5 U	5 U
Silver	2	8.3	180		0.4 U	0.4 U	0.4 U	0.4 U
Sodium	--	--	--		100 U	100 U	16.8 J	29.6 J
Thallium	--	--	--		0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	--	--	--		5 U	5 U	5 U	5 U
Zinc	109	2480	10000		10 UV	10 UV	12.38	14.09 JV

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DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

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-- No NYSDEC Part 375 Standards available

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µg/L - Micrograms per liter

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Table 5. Summary of Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014
Aluminum	--	--	--		9.38 J	10 UV	4.9 J	10 U
Antimony	--	--	--		0.2 J	1 U	2 UV	2 UV
Arsenic	13	16	16		0.5 U	0.5 U	0.5 U	0.5 U
Barium	350	820	400		0.12 J	0.5 U	0.5 U	0.5 U
Beryllium	7.2	47	72		0.5 U	0.5 U	0.5 U	0.5 U
Cadmium	2.5	7.5	4.3		0.2 U	0.2 U	0.2 U	0.2 U
Calcium	--	--	--		100 U	100 U	100 U	100 U
Chromium, Hexavalent	1	19	110		10 U	10 U	10 U	10 U
Chromium	30	--	180		0.24 J	0.27 J	1 U	1 U
Cobalt	--	--	--		0.5 U	0.5 U	0.2 U	0.2 U
Copper	50	1720	270		1 U	1 U	1 UV	1 U
Cyanide	27	40	27		3 J	5 U	3 J	5 U
Iron	--	--	--		16.7 J	50 U	50 U	50 U
Lead	63	450	400		1 U	1 U	1 U	1 U
Magnesium	--	--	--		70 UV	70 UV	70 U	70 U
Manganese	1600	2000	2000		1 UV	1 U	0.5 U	0.5 U
Mercury	0.18	0.73	0.81		0.2 U	0.2 U	0.2 U	0.2 U
Nickel	30	130	310		0.5 U	0.5 U	0.5 U	0.5 U
Potassium	--	--	--		100 U	100 U	100 U	100 U
Selenium	3.9	4	180		5 U	5 U	5 U	5 U
Silver	2	8.3	180		0.4 UV	0.4 U	0.4 U	0.4 U
Sodium	--	--	--		100 UV	100 UV	200 U	100 U
Thallium	--	--	--		0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	--	--	--		5 U	5 U	5 U	5 U
Zinc	109	2480	10000		10 UV	10 UV	10 UV	10 UV

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

V - Value altered or qualifier added during data validation

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 5. Summary of Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
Aluminum	--	--	--		10 U	10 UV
Antimony	--	--	--		1 U	2 UV
Arsenic	13	16	16		0.5 U	0.5 U
Barium	350	820	400		0.12 J	0.5 UV
Beryllium	7.2	47	72		0.5 U	0.5 U
Cadmium	2.5	7.5	4.3		0.2 U	0.2 U
Calcium	--	--	--		100 U	100 U
Chromium, Hexavalent	1	19	110		NA	10 U
Chromium	30	--	180		1 U	1 U
Cobalt	--	--	--		0.5 U	0.2 U
Copper	50	1720	270		1 U	1 UV
Cyanide	27	40	27		NA	5 U
Iron	--	--	--		50 U	50 U
Lead	63	450	400		1 U	1 U
Magnesium	--	--	--		70 U	70 U
Manganese	1600	2000	2000		0.55 J	0.5 U
Mercury	0.18	0.73	0.81		0.2 U	0.2 U
Nickel	30	130	310		0.13 J	0.5 U
Potassium	--	--	--		100 U	100 U
Selenium	3.9	4	180		5 U	5 U
Silver	2	8.3	180		0.4 U	0.4 U
Sodium	--	--	--		100 UV	100 U
Thallium	--	--	--		0.5 U	0.5 U
Vanadium	--	--	--		5 U	5 U
Zinc	109	2480	10000		10 U	10 UV

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

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Field Blanks are expressed in µg/L

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Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 6. Summary of TCLP Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/L)	USEPA Regulatory Levels (mg/L)	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32	RXSB-4 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37
Arsenic	5		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Barium	100		0.5 UV	0.5 UV	0.23 J	0.5 UV	0.5 UV	0.5 UV	0.24 J	0.3 J
Cadmium	1		0.08 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	5		0.2 U	0.03 J	0.2 U	0.03 J	0.2 U	0.2 U	0.04 J	0.2 U
Lead	5		0.1 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Mercury	0.2		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Selenium	1		0.5 U	0.5 U	0.5 U	0.5 UV	0.5 U	0.5 U	0.5 U	0.5 U
Silver	5		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/L - Milligrams per liter

USEPA - United States Environmental Protection Agency

TCLP - Toxicity Characteristic Leaching Procedure

USEPA Regulatory Levels - United States Environmental Protection

Agency Limits for RCRA Characteristic Waste for Toxicity

RCRA - Resource Conservation and Recovery Act

Bold - Parameter was detected above USEPA Regulatory Limits

Table 6. Summary of TCLP Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/L)	USEPA Regulatory Levels (mg/L)	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-7 5/28/2014 35 - 37	RXSB-8 6/5/2014 35 - 37	RXSB-9 5/29/2014 34 - 36	RXSB-10 5/30/2014 24 - 26	RXSB-11 6/3/2014 28 - 30	RXSB-12A 5/28/2014 16 - 18	RXSB-12 6/2/2014 34 - 36	RXSB-13 5/28/2014 37 - 39
Arsenic	5		1 U	0.03 J	1 U	1 U	1 U	1 U	0.02 J	0.02 J
Barium	100		0.5 UV	0.5 UV	0.74 JV	0.22 J	0.5 UV	0.5 UV	0.28 J	0.5 UV
Cadmium	1		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lead	5		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Mercury	0.2		0.001 U	0.001 U	0.001 U	0.0004 J	0.001 U	0.001 U	0.001 U	0.001 U
Selenium	1		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Silver	5		0.1 UV	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UV	0.1 U	0.1 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/L - Milligrams per liter

USEPA - United States Environmental Protection Agency

TCLP - Toxicity Characteristic Leaching Procedure

USEPA Regulatory Levels - United States Environmental Protection

Agency Limits for RCRA Characteristic Waste for Toxicity

RCRA - Resource Conservation and Recovery Act

Bold - Parameter was detected above USEPA Regulatory Limits

Table 6. Summary of TCLP Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/L)	USEPA Regulatory Levels (mg/L)	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-14 5/28/2014 37 - 39	RXSB-15 5/29/2014 30 - 32	RXSB-16 5/27/2014 40 - 42.5	RXSB-17 5/28/2014 42 - 44	FIELD BLANK 5/27/2014 -	FIELD BLANK 5/28/2014 -
Arsenic	5		1 U	1 U	1 U	1 U	1 U	1 U
Barium	100		0.5 UV	0.5 UV	0.25 J	0.5 UV	0.5 U	0.5 U
Cadmium	1		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lead	5		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Mercury	0.2		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Selenium	1		0.5 U	0.5 U	0.04 J	0.5 U	0.5 U	0.5 U
Silver	5		0.1 UV	0.1 U	0.1 U	0.1 UV	0.1 U	0.1 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/L - Milligrams per liter

USEPA - United States Environmental Protection Agency

TCLP - Toxicity Characteristic Leaching Procedure

USEPA Regulatory Levels - United States Environmental Protection

Agency Limits for RCRA Characteristic Waste for Toxicity

RCRA - Resource Conservation and Recovery Act

Bold - Parameter was detected above USEPA Regulatory Limits

Table 6. Summary of TCLP Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/L)	USEPA Regulatory Levels (mg/L)	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/29/2014 -	FIELD BLANK 5/30/2014 -	FIELD BLANK 6/2/2014 -	FIELD BLANK 6/3/2014 -	FIELD BLANK 6/4/2014 -
Arsenic	5		1 UV	1 U	1 U	1 U	1 UV
Barium	100		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cadmium	1		0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chromium	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Lead	5		0.02 J	0.5 UV	0.5 U	0.5 U	0.5 U
Mercury	0.2		0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Selenium	1		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Silver	5		0.1 U	0.04 J	0.1 U	0.1 U	0.1 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/L - Milligrams per liter

USEPA - United States Environmental Protection Agency

TCLP - Toxicity Characteristic Leaching Procedure

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Agency Limits for RCRA Characteristic Waste for Toxicity

RCRA - Resource Conservation and Recovery Act

Bold - Parameter was detected above USEPA Regulatory Limits

Table 6. Summary of TCLP Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/L)	USEPA Regulatory Levels (mg/L)	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/5/2014 -	FIELD BLANK 6/6/2014 -	FIELD BLANK 6/12/2014 -
Arsenic	5		1 U	0.02 J	1 U
Barium	100		0.5 U	0.5 U	0.5 U
Cadmium	1		0.1 U	0.1 U	0.1 U
Chromium	5		0.2 U	0.2 U	0.2 U
Lead	5		0.5 U	0.5 U	0.5 U
Mercury	0.2		0.001 U	0.001 U	0.001 U
Selenium	1		0.5 U	0.5 U	0.5 U
Silver	5		0.1 U	0.1 U	0.1 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/L - Milligrams per liter

USEPA - United States Environmental Protection Agency

TCLP - Toxicity Characteristic Leaching Procedure

USEPA Regulatory Levels - United States Environmental Protection

Agency Limits for RCRA Characteristic Waste for Toxicity

RCRA - Resource Conservation and Recovery Act

Bold - Parameter was detected above USEPA Regulatory Limits

Table 7. Summary of Polychlorinated Biphenyls in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32
Aroclor-1016	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1221	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1232	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1242	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1248	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1254	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1260	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1262	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
Aroclor-1268	--	--	--		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U
PCBS, TOTAL	0.1	3.2	1		0.055 U	0.0327 U	0.033 U	0.0342 U	0.0346 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

PCBs - Polychlorinated Biphenyls

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 7. Summary of Polychlorinated Biphenyls in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37
Aroclor-1016	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1221	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1232	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1242	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1248	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1254	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1260	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1262	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
Aroclor-1268	--	--	--		0.0352 U	0.0347 U	0.0421 U	0.0337 U
PCBS, TOTAL	0.1	3.2	1		0.0352 U	0.0347 U	0.0421 U	0.0337 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

PCBs - Polychlorinated Biphenyls

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 7. Summary of Polychlorinated Biphenyls in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-8 6/5/2014 35 - 37	RXSB-9 5/29/2014 34 - 36	RXSB-10 5/30/2014 24 - 26	RXSB-11 6/3/2014 28 - 30	RXSB-12A 5/28/2014 16 - 18
Aroclor-1016	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1221	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1232	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1242	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1248	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1254	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1260	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1262	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
Aroclor-1268	--	--	--		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U
PCBS, TOTAL	0.1	3.2	1		0.0348 U	0.0417 U	0.0358 U	0.0342 U	0.035 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

PCBs - Polychlorinated Biphenyls

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 7. Summary of Polychlorinated Biphenyls in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-12 6/2/2014 34 - 36	RXSB-13 5/28/2014 37 - 39	RXSB-14 5/28/2014 37 - 39	RXSB-15 5/29/2014 30 - 32	RXSB-16 5/27/2014 40 - 42.5
Aroclor-1016	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1221	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1232	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1242	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1248	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1254	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1260	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1262	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
Aroclor-1268	--	--	--		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U
PCBS, TOTAL	0.1	3.2	1		0.0338 U	0.0336 U	0.0348 U	0.0335 U	0.0344 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

PCBs - Polychlorinated Biphenyls

Field Blanks are expressed in µg/L

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Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 7. Summary of Polychlorinated Biphenyls in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-17 5/28/2014 42 - 44	FIELD BLANK 5/27/2014	FIELD BLANK 5/28/2014	FIELD BLANK 5/29/2014
Aroclor-1016	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1221	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1232	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1242	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1248	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1254	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1260	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1262	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
Aroclor-1268	--	--	--		0.035 U	0.100 U	0.083 U	0.083 U
PCBS, TOTAL	0.1	3.2	1		0.035 U	0.100 U	0.083 U	0.083 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

PCBs - Polychlorinated Biphenyls

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 7. Summary of Polychlorinated Biphenyls in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/30/2014	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014
Aroclor-1016	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1221	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1232	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1242	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1248	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1254	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1260	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1262	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1268	--	--	--		0.083 U	0.083 U	0.083 U
PCBS, TOTAL	0.1	3.2	1		0.083 U	0.083 U	0.083 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

PCBs - Polychlorinated Biphenyls

Field Blanks are expressed in µg/L

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Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 7. Summary of Polychlorinated Biphenyls in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
Aroclor-1016	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1221	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1232	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1242	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1248	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1254	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1260	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1262	--	--	--		0.083 U	0.083 U	0.083 U
Aroclor-1268	--	--	--		0.083 U	0.083 U	0.083 U
PCBS, TOTAL	0.1	3.2	1		0.083 U	0.083 U	0.083 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

PCBs - Polychlorinated Biphenyls

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 8. Summary of Pesticides in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	DW-1 6/6/2014 -	RXSB-01 5/29/2014 13 - 15	RXSB-2 5/30/2014 28 - 30	RXSB-3 6/3/2014 27 - 29	RXSB-4 6/4/2014 30 - 32
4,4'-DDD	0.0033	14	13		0.00258 U	0.00157 U	0.00154 U	0.0017 JV	0.00167 U
4,4'-DDE	0.0033	17	8.9		0.00258 U	0.00157 U	0.00154 U	0.00159 U	0.00167 U
4,4'-DDT	0.0033	136	7.9		0.00483 U	0.00294 U	0.0029 U	0.00299 U	0.00247 J
Aldrin	0.005	0.19	0.097		0.00258 U	0.00157 U	0.00154 U	0.000593 J	0.00167 U
alpha-BHC	0.02	0.02	0.48		0.00107 U	0.000654 U	0.000644 U	0.000664 U	0.000695 U
alpha-Chlordane	0.094	2.9	4.2		0.00322 U	0.00196 U	0.00193 U	0.00199 U	0.00208 U
beta-BHC	0.036	0.09	0.36		0.00258 U	0.00157 U	0.00154 U	0.00159 U	0.00167 U
Chlordane	--	--	--		0.0209 U	0.0128 U	0.0126 U	0.0129 U	0.0136 U
delta-BHC	0.04	0.25	100		0.00258 U	0.00157 U	0.00154 U	0.00159 U	0.00167 U
Dieldrin	0.005	0.1	0.2		0.00161 U	0.000981 U	0.000965 U	0.000996 U	0.00104 U
Endosulfan I	2.4	102	24		0.00258 U	0.00157 U	0.00154 U	0.00159 U	0.00167 U
Endosulfan II	2.4	102	24		0.00258 U	0.00157 U	0.00154 U	0.00159 U	0.00167 U
Endosulfan sulfate	2.4	1000	24		0.00107 U	0.000654 U	0.000644 U	0.000664 U	0.00129 PI
Endrin ketone	--	--	--		0.00258 U	0.00157 U	0.00154 U	0.00159 U	0.00167 U
Endrin	0.014	0.06	11		0.00107 U	0.000654 U	0.000644 U	0.000664 U	0.000695 U
gamma-BHC (Lindane)	0.1	0.1	1.3		0.00107 U	0.000654 U	0.000644 U	0.000664 U	0.000695 U
gamma-Chlordane	--	--	--		0.00322 U	0.00196 U	0.00193 U	0.00199 U	0.00208 U
Heptachlor epoxide	--	--	--		0.00483 U	0.00294 U	0.0029 U	0.00299 U	0.00313 U
Heptachlor	0.042	0.38	2.1		0.00129 U	0.000785 U	0.000772 U	0.000796 U	0.000834 U
Methoxychlor	--	--	--		0.00483 U	0.00294 U	0.0029 U	0.00299 U	0.00313 U
Toxaphene	--	--	--		0.0483 U	0.0294 U	0.029 U	0.0299 U	0.0313 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 8. Summary of Pesticides in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-4 DUP 6/4/2014 30 - 32	RXSB-5 5/30/2014 32 - 34	RXSB-6 6/2/2014 35 - 37	RXSB-7 5/28/2014 35 - 37
4,4'-DDD	0.0033	14	13		0.00166 U	0.00158 U	0.00198 U	0.00156 U
4,4'-DDE	0.0033	17	8.9		0.00166 U	0.00158 U	0.00198 U	0.00156 U
4,4'-DDT	0.0033	136	7.9		0.00205 J	0.00296 U	0.00372 U	0.00294 U
Aldrin	0.005	0.19	0.097		0.00166 U	0.00158 U	0.00198 U	0.00156 U
alpha-BHC	0.02	0.02	0.48		0.000692 U	0.000657 U	0.000827 U	0.000652 U
alpha-Chlordane	0.094	2.9	4.2		0.00208 U	0.00197 U	0.00248 U	0.00196 U
beta-BHC	0.036	0.09	0.36		0.00166 U	0.00158 U	0.00198 U	0.00156 U
Chlordane	--	--	--		0.0135 U	0.0128 U	0.0161 U	0.0127 U
delta-BHC	0.04	0.25	100		0.00166 U	0.00158 U	0.00198 U	0.00156 U
Dieldrin	0.005	0.1	0.2		0.00104 U	0.000986 U	0.00124 U	0.000978 U
Endosulfan I	2.4	102	24		0.00166 U	0.00158 U	0.00198 U	0.00156 U
Endosulfan II	2.4	102	24		0.00166 U	0.00158 U	0.00198 U	0.00156 U
Endosulfan sulfate	2.4	1000	24		0.00109 PI	0.000657 U	0.000827 U	0.000652 U
Endrin ketone	--	--	--		0.00166 U	0.00158 U	0.00198 U	0.00156 U
Endrin	0.014	0.06	11		0.000692 U	0.000657 U	0.000827 U	0.000652 U
gamma-BHC (Lindane)	0.1	0.1	1.3		0.000692 U	0.000657 U	0.000827 U	0.000652 U
gamma-Chlordane	--	--	--		0.00208 U	0.00197 U	0.00248 U	0.00196 U
Heptachlor epoxide	--	--	--		0.00312 U	0.00296 U	0.00372 U	0.00294 U
Heptachlor	0.042	0.38	2.1		0.000831 U	0.000789 U	0.000992 U	0.000783 U
Methoxychlor	--	--	--		0.00312 U	0.00296 U	0.00372 U	0.00294 U
Toxaphene	--	--	--		0.0312 U	0.0296 U	0.0372 U	0.0294 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 8. Summary of Pesticides in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-8 6/5/2014 35 - 37	RXSB-9 5/29/2014 34 - 36	RXSB-10 5/30/2014 24 - 26	RXSB-11 6/3/2014 28 - 30	RXSB-12A 5/28/2014 16 - 18
4,4'-DDD	0.0033	14	13		0.00172 U	0.00207 U	0.00165 U	0.00112 J	0.00168 U
4,4'-DDE	0.0033	17	8.9		0.00172 U	0.00207 U	0.00165 U	0.00159 U	0.00168 U
4,4'-DDT	0.0033	136	7.9		0.00322 U	0.00388 U	0.0031 U	0.00298 U	0.00315 U
Aldrin	0.005	0.19	0.097		0.00172 U	0.00207 U	0.00165 U	0.00159 U	0.00168 U
alpha-BHC	0.02	0.02	0.48		0.000715 U	0.000861 U	0.000688 U	0.000662 U	0.0007 U
alpha-Chlordane	0.094	2.9	4.2		0.00214 U	0.00258 U	0.00206 U	0.00199 U	0.0021 U
beta-BHC	0.036	0.09	0.36		0.00172 U	0.00207 U	0.00165 U	0.00159 U	0.00168 U
Chlordane	--	--	--		0.0139 U	0.0168 U	0.0134 U	0.0129 U	0.0136 U
delta-BHC	0.04	0.25	100		0.00172 U	0.00207 U	0.00165 U	0.00159 U	0.00168 U
Dieldrin	0.005	0.1	0.2		0.00107 U	0.00129 U	0.00103 U	0.000993 U	0.00105 U
Endosulfan I	2.4	102	24		0.00172 U	0.00207 U	0.00165 U	0.00159 U	0.00168 U
Endosulfan II	2.4	102	24		0.00172 U	0.00207 U	0.00165 U	0.00159 U	0.00168 U
Endosulfan sulfate	2.4	1000	24		0.000715 U	0.000861 U	0.000688 U	0.000662 U	0.0007 U
Endrin ketone	--	--	--		0.00172 U	0.00207 U	0.00165 U	0.00159 U	0.00168 U
Endrin	0.014	0.06	11		0.000715 U	0.000861 U	0.000688 U	0.000662 U	0.0007 U
gamma-BHC (Lindane)	0.1	0.1	1.3		0.000715 U	0.000861 U	0.000688 U	0.000662 U	0.0007 U
gamma-Chlordane	--	--	--		0.00214 U	0.00258 U	0.00206 U	0.00199 U	0.0021 U
Heptachlor epoxide	--	--	--		0.00322 U	0.00388 U	0.0031 U	0.00298 U	0.00315 U
Heptachlor	0.042	0.38	2.1		0.000858 U	0.00103 U	0.000825 U	0.000795 U	0.00084 U
Methoxychlor	--	--	--		0.00322 U	0.00388 U	0.0031 U	0.00298 U	0.00315 U
Toxaphene	--	--	--		0.0322 U	0.0388 U	0.031 U	0.0298 U	0.0315 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 8. Summary of Pesticides in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-12 6/2/2014 34 - 36	RXSB-13 5/28/2014 37 - 39	RXSB-14 5/28/2014 37 - 39	RXSB-15 5/29/2014 30 - 32	RXSB-16 5/27/2014 40 - 42.5
4,4'-DDD	0.0033	14	13		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
4,4'-DDE	0.0033	17	8.9		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
4,4'-DDT	0.0033	136	7.9		0.00299 U	0.00319 U	0.00315 U	0.00308 U	0.00305 U
Aldrin	0.005	0.19	0.097		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
alpha-BHC	0.02	0.02	0.48		0.000664 U	0.000709 U	0.0007 U	0.000684 U	0.000678 U
alpha-Chlordane	0.094	2.9	4.2		0.00199 U	0.00213 U	0.0021 U	0.00205 U	0.00203 U
beta-BHC	0.036	0.09	0.36		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
Chlordane	--	--	--		0.013 U	0.0138 U	0.0136 U	0.0133 U	0.0132 U
delta-BHC	0.04	0.25	100		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
Dieldrin	0.005	0.1	0.2		0.000997 U	0.00106 U	0.00105 U	0.00103 U	0.00102 U
Endosulfan I	2.4	102	24		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
Endosulfan II	2.4	102	24		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
Endosulfan sulfate	2.4	1000	24		0.000664 U	0.000709 U	0.0007 U	0.000684 U	0.000678 U
Endrin ketone	--	--	--		0.00159 U	0.0017 U	0.00168 U	0.00164 U	0.00163 U
Endrin	0.014	0.06	11		0.000664 U	0.000709 U	0.0007 U	0.000684 U	0.000678 U
gamma-BHC (Lindane)	0.1	0.1	1.3		0.000664 U	0.000709 U	0.0007 U	0.000684 U	0.000678 U
gamma-Chlordane	--	--	--		0.00199 U	0.00213 U	0.0021 U	0.00205 U	0.00203 U
Heptachlor epoxide	--	--	--		0.00299 U	0.00319 U	0.00315 U	0.00308 U	0.00305 U
Heptachlor	0.042	0.38	2.1		0.000797 U	0.000851 U	0.00084 U	0.000821 U	0.000813 U
Methoxychlor	--	--	--		0.00299 U	0.00319 U	0.00315 U	0.00308 U	0.00305 U
Toxaphene	--	--	--		0.0299 U	0.0319 U	0.0315 U	0.0308 U	0.0305 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 8. Summary of Pesticides in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	RXSB-17 5/28/2014 42 - 44	FIELD BLANK 5/27/2014	FIELD BLANK 5/28/2014	FIELD BLANK 5/29/2014
4,4'-DDD	0.0033	14	13		0.00168 U	0.040 U	0.040 U	0.040 U
4,4'-DDE	0.0033	17	8.9		0.00168 U	0.040 U	0.040 U	0.040 U
4,4'-DDT	0.0033	136	7.9		0.00314 U	0.040 U	0.040 U	0.040 U
Aldrin	0.005	0.19	0.097		0.00168 U	0.020 U	0.020 U	0.020 U
alpha-BHC	0.02	0.02	0.48		0.000698 U	0.020 U	0.020 U	0.020 U
alpha-Chlordane	0.094	2.9	4.2		0.0021 U	0.020 U	0.020 U	0.020 U
beta-BHC	0.036	0.09	0.36		0.00168 U	0.020 U	0.020 U	0.020 U
Chlordane	--	--	--		0.0136 U	0.200 U	0.200 U	0.200 U
delta-BHC	0.04	0.25	100		0.00168 U	0.020 U	0.020 U	0.020 U
Dieldrin	0.005	0.1	0.2		0.00105 U	0.040 U	0.040 U	0.040 U
Endosulfan I	2.4	102	24		0.00168 U	0.020 U	0.020 U	0.020 U
Endosulfan II	2.4	102	24		0.00168 U	0.040 U	0.040 U	0.040 U
Endosulfan sulfate	2.4	1000	24		0.000698 U	0.040 U	0.040 U	0.040 U
Endrin ketone	--	--	--		0.00168 U	0.040 U	0.040 U	0.040 U
Endrin	0.014	0.06	11		0.000698 U	0.040 U	0.040 U	0.040 U
gamma-BHC (Lindane)	0.1	0.1	1.3		0.000698 U	0.020 U	0.020 U	0.020 U
gamma-Chlordane	--	--	--		0.0021 U	0.020 U	0.020 U	0.020 U
Heptachlor epoxide	--	--	--		0.00314 U	0.020 U	0.020 U	0.020 U
Heptachlor	0.042	0.38	2.1		0.000838 U	0.020 U	0.020 U	0.020 U
Methoxychlor	--	--	--		0.00314 U	0.200 U	0.200 U	0.200 U
Toxaphene	--	--	--		0.0314 U	0.200 U	0.200 U	0.200 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC Part 375 Unrestricted Use Standards

Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 8. Summary of Pesticides in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 5/30/2014	FIELD BLANK 6/2/2014	FIELD BLANK 6/3/2014
4,4'-DDD	0.0033	14	13		0.040 U	0.040 U	0.040 U
4,4'-DDE	0.0033	17	8.9		0.040 U	0.040 U	0.040 U
4,4'-DDT	0.0033	136	7.9		0.040 U	0.040 U	0.040 U
Aldrin	0.005	0.19	0.097		0.020 U	0.020 U	0.020 U
alpha-BHC	0.02	0.02	0.48		0.020 U	0.020 U	0.020 U
alpha-Chlordane	0.094	2.9	4.2		0.020 U	0.020 U	0.020 U
beta-BHC	0.036	0.09	0.36		0.020 U	0.020 U	0.020 U
Chlordane	--	--	--		0.200 U	0.200 U	0.200 U
delta-BHC	0.04	0.25	100		0.020 U	0.020 U	0.020 U
Dieldrin	0.005	0.1	0.2		0.040 U	0.040 U	0.040 U
Endosulfan I	2.4	102	24		0.020 U	0.020 U	0.020 U
Endosulfan II	2.4	102	24		0.040 U	0.040 U	0.040 U
Endosulfan sulfate	2.4	1000	24		0.040 U	0.040 U	0.040 U
Endrin ketone	--	--	--		0.040 U	0.040 U	0.040 U
Endrin	0.014	0.06	11		0.040 U	0.040 U	0.040 U
gamma-BHC (Lindane)	0.1	0.1	1.3		0.020 U	0.020 U	0.020 U
gamma-Chlordane	--	--	--		0.020 U	0.020 U	0.020 U
Heptachlor epoxide	--	--	--		0.020 U	0.020 U	0.020 U
Heptachlor	0.042	0.38	2.1		0.020 U	0.020 U	0.020 U
Methoxychlor	--	--	--		0.200 U	0.200 U	0.200 U
Toxaphene	--	--	--		0.200 U	0.200 U	0.200 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

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Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 8. Summary of Pesticides in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Protection of Groundwater	NYSDEC Part 375 Restricted Residential	Sample Designation: Sample Date: Sample Depth (ft bls):	FIELD BLANK 6/4/2014	FIELD BLANK 6/5/2014	FIELD BLANK 6/6/2014
4,4'-DDD	0.0033	14	13		0.040 U	0.040 U	0.040 U
4,4'-DDE	0.0033	17	8.9		0.040 U	0.040 U	0.040 U
4,4'-DDT	0.0033	136	7.9		0.040 U	0.040 U	0.040 U
Aldrin	0.005	0.19	0.097		0.020 U	0.020 U	0.020 U
alpha-BHC	0.02	0.02	0.48		0.020 U	0.020 U	0.020 U
alpha-Chlordane	0.094	2.9	4.2		0.020 U	0.020 U	0.020 U
beta-BHC	0.036	0.09	0.36		0.020 U	0.020 U	0.020 U
Chlordane	--	--	--		0.200 U	0.200 U	0.200 U
delta-BHC	0.04	0.25	100		0.020 U	0.020 U	0.020 U
Dieldrin	0.005	0.1	0.2		0.040 U	0.040 U	0.040 U
Endosulfan I	2.4	102	24		0.020 U	0.020 U	0.020 U
Endosulfan II	2.4	102	24		0.040 U	0.040 U	0.040 U
Endosulfan sulfate	2.4	1000	24		0.040 U	0.040 U	0.040 U
Endrin ketone	--	--	--		0.040 U	0.040 U	0.040 U
Endrin	0.014	0.06	11		0.040 U	0.040 U	0.040 U
gamma-BHC (Lindane)	0.1	0.1	1.3		0.020 U	0.020 U	0.020 U
gamma-Chlordane	--	--	--		0.020 U	0.020 U	0.020 U
Heptachlor epoxide	--	--	--		0.020 U	0.020 U	0.020 U
Heptachlor	0.042	0.38	2.1		0.020 U	0.020 U	0.020 U
Methoxychlor	--	--	--		0.200 U	0.200 U	0.200 U
Toxaphene	--	--	--		0.200 U	0.200 U	0.200 U

J - Estimated value

U - Indicates that the compound was analyzed for but not detected

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

-- No NYSDEC Part 375 Standards available

Field Blanks are expressed in µg/L

µg/L - Micrograms per liter

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Shaded data indicates that parameter was detected above the NYSDEC Part 375 Restricted Residential Standards

Boxed data indicates that parameter was detected above the NYSDEC Part 375 Protection of Groundwater Standards

Table 9. Summary of Water-Level Measurements, 112-21 Northern Blvd., Corona, New York

Well Designation	Date Measured	Measuring Point	Depth to Water (ft bls)	Water Table	Comments
		Elevation (ft rmsl)		Elevation (ft rmsl)	
MW-01	6/18/2014	32.60	27.93	4.67	
MW-02	6/18/2014	36.36	31.47	4.89	
MW-03	6/18/2014	33.84	28.94	4.90	
MW-04	6/18/2014	35.09	30.20	4.89	
MW-05	6/18/2014	39.62	34.87	4.75	
MW-06	6/18/2014	41.98	37.12	4.86	
MW-07	6/18/2014	41.66	36.68	4.98	
MW-08	6/18/2014	42.98	38.00	4.98	
MW-09	6/18/2014	50.40	45.18	5.22	
MW-10	6/18/2014	46.32	41.55	4.77	
MW-11	6/18/2014	36.37	31.46	4.91	
MW-12	6/18/2014	35.48	30.61	4.87	

Notes:

NA- Not available

NM- Not measured

ft rmsl- Feet Relative to Mean Sea Level

ft bls- Feet below Land Surface

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014
1,1,1,2-Tetrachloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	1		1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	0.04		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	5		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,4-Trichlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.6	2.5 U	2.5 U
1,2-Dibromoethane	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.6		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethene (total)	5		2.5 U	2.5 U	2.5 U	0.88 J	6.7	2.5 U	2.5 U
1,2-Dichloropropane	1		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	0.4		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,4-Dioxane	--		250 U	250 U	250 U	250 U	250 U	250 U	250 U
2,2-Dichloropropane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Ethyltoluene	--		2.0 U	2.0 U	2.0 U	2.0 U	0.79 J	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	50		5.0 U	5.0 U	5.0 U	1.1 J	5.0 U	5.0 U	5.0 U
Acrylonitrile	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene, 1,4-Diethyl	--		2.0 U	2.0 U	2.0 U	2.0 U	0.70 J	2.0 U	2.0 U
Benzene	1		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014
Bromobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Bromochloromethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Bromodichloromethane	50		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	50		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromomethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Carbon disulfide	60		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Chloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Chloroform	7		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Chloromethane	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	5		2.5 U	2.5 U	2.5 U	0.88 J	6.7	2.5 U	2.5 U
cis-1,3-Dichloropropene	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	50		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloropropane	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Dibromomethane	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Diethyl Ether	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Ethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Hexachlorobutadiene	0.5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Isopropylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
m+p-Xylene	5		2.5 U	2.5 U	2.5 U	2.5 U	0.72 J	2.5 U	2.5 U
Methylene chloride	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
MTBE	10		2.5 U	2.5 U	2.5 U	2.5 U	2.1 J	2.5 U	1.1 J
Naphthalene	10		2.5 U	2.5 U	2.5 U	2.5 U	1.2 J	2.5 U	2.5 U
n-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
n-Propylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
o-Chlorotoluene	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
o-Xylene	5		2.5 U	2.5 U	2.5 U	2.5 U	0.93 J	2.5 U	2.5 U
p-Chlorotoluene	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
sec-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014
Styrene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Tetrachloroethene	5		1.9	2.1	1.4	4.2	2.8	0.50 U	0.83
Toluene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
trans-1,2-Dichloroethene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Trichloroethene	5		0.50 U	0.50 U	0.50 U	0.50 U	0.21 J	0.50 U	0.27 J
Trichlorofluoromethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Vinyl acetate	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	2		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	5		2.5 U	2.5 U	2.5 U	2.5 U	1.7 J	2.5 U	2.5 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

V - Value altered or qualifier added during data validation

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-7 6/11/2014	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014
1,1,1,2-Tetrachloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	1		1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.29 J
1,1-Dichloropropene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	0.04		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	5		2.0 U	2.0 U	2.0 U	2.0 U	4.8	5.1
1,2,4-Trichlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	61	68
1,2-Dibromoethane	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.6		0.50 U	0.50 U	0.57	0.50 U	0.50 U	0.50 U
1,2-Dichloroethene (total)	5		2.5 U	2.5 U	2.5 U	2.5 U	32	200
1,2-Dichloropropane	1		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3,5-Trimethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	18	16
1,3-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	0.4		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
1,4-Dioxane	--		250 U	250 U	250 U	250 U	250 U	250 U
2,2-Dichloropropane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	50		5.0 U	5.0 U	5.0 U	5.0 U	3.8 J	5.0 U
4-Ethyltoluene	--		2.0 U	2.0 U	2.0 U	2.0 U	41	23
4-Methyl-2-pentanone (MIBK)	--		5.0 U	5.0 U	5.0 U	5.0 U	140 D	2.3 J
Acetone	50		5.0 U	5.1	5 UV	5.0 U	14	3.6 J
Acrylonitrile	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene, 1,4-Diethyl	--		2.0 U	2.0 U	2.0 U	2.0 U	9.6	9.5
Benzene	1		0.50 U	0.50 U	0.98	0.50 U	54	6.2

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-7 6/11/2014	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014
Bromobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Bromochloromethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Bromodichloromethane	50		0.50 U	0.50 U	0.50 U	0.50 U	0.86	0.50 U
Bromoform	50		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromomethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Carbon disulfide	60		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Chloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Chloroform	7		2.5 U	6.4	2.5 U	2.5 U	13	2.8
Chloromethane	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	5		2.5 U	2.5 U	2.5 U	2.5 U	32	200
cis-1,3-Dichloropropene	5		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	50		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloropropane	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Dibromomethane	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Diethyl Ether	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Ethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	22	31
Hexachlorobutadiene	0.5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Isopropylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	0.72 J	2.2 J
m+p-Xylene	5		2.5 U	2.5 U	2.5 U	2.5 U	180	69
Methylene chloride	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
MTBE	10		1.1 J	2.5 U	4.2	2.5	19	2.5 U
Naphthalene	10		2.5 U	2.5 U	2.5 U	2.5 U	23	18
n-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
n-Propylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.0 J	5.4
o-Chlorotoluene	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
o-Xylene	5		2.5 U	2.5 U	2.5 U	2.5 U	100	77
p-Chlorotoluene	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
sec-Butylbenzene	5		2.5 U	2.5 U	0.70 J	2.5 U	2.5 U	2.5 U

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-7 6/11/2014	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014
Styrene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Tetrachloroethene	5		0.50 U	7	0.50 U	1.1	28	8.8
Toluene	5		2.5 U	2.5 U	2.5 U	2.5 U	88	50
trans-1,2-Dichloroethene	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,4-Dichloro-2-butene	--		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Trichloroethene	5		0.50 U	0.50 U	0.50 U	0.46 J	1	0.34 J
Trichlorofluoromethane	5		2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Vinyl acetate	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	2		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (total)	5		2.5 U	2.5 U	2.5 U	2.5 U	280	150

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

V - Value altered or qualifier added during data validation

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	FIELD BLANK 6/11/2014	FIELD BLANK 6/12/2014	TRIP BLANK 6/11/2014	TRIP BLANK 6/12/2014
1,1,1,2-Tetrachloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U
1,1,1-Trichloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	5		0.50 U	0.50 U	0.5 U	0.5 U
1,1,2-Trichloroethane	1		1.5 U	1.5 U	1.5 U	1.5 U
1,1-Dichloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U
1,1-Dichloroethene	5		0.50 U	0.50 U	0.5 U	0.5 U
1,1-Dichloropropene	5		2.5 U	2.5 U	2.5 U	2.5 U
1,2,3-Trichlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
1,2,3-Trichloropropane	0.04		2.5 U	2.5 U	2.5 U	2.5 U
1,2,4,5-Tetramethylbenzene	5		2.0 U	2.0 U	2 U	2 U
1,2,4-Trichlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
1,2,4-Trimethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
1,2-Dibromoethane	--		2.0 U	2.0 U	2 U	2 U
1,2-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U
1,2-Dichloroethane	0.6		0.50 U	0.50 U	0.5 U	0.5 U
1,2-Dichloroethene (total)	5		2.5 U	2.5 U	2.5 U	2.5 U
1,2-Dichloropropane	1		1.0 U	1.0 U	1 U	1 U
1,3,5-Trimethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichloropropane	5		2.5 U	2.5 U	2.5 U	2.5 U
1,3-Dichloropropene	0.4		0.50 U	0.50 U	0.5 U	0.5 U
1,4-Dichlorobenzene	3		2.5 U	2.5 U	2.5 U	2.5 U
1,4-Dioxane	--		250 U	250 U	250 U	250 U
2,2-Dichloropropane	5		2.5 U	2.5 U	2.5 U	2.5 U
2-Butanone (MEK)	50		5.0 U	5.0 U	5 U	5 U
2-Hexanone	50		5.0 U	5.0 U	5 U	5 U
4-Ethyltoluene	--		2.0 U	2.0 U	2 U	2 U
4-Methyl-2-pentanone (MIBK)	--		5.0 U	5.0 U	5 U	5 U
Acetone	50		5.0 U	5.0 U	5 U	5 U
Acrylonitrile	5		5.0 U	5.0 U	5 U	5 U
Benzene, 1,4-Diethyl	--		2.0 U	2.0 U	2 U	2 U
Benzene	1		0.50 U	0.50 U	0.5 U	0.5 U

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	FIELD BLANK 6/11/2014	FIELD BLANK 6/12/2014	TRIP BLANK 6/11/2014	TRIP BLANK 6/12/2014
Bromobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
Bromochloromethane	5		2.5 U	2.5 U	2.5 U	2.5 U
Bromodichloromethane	50		0.50 U	0.50 U	0.5 U	0.5 U
Bromoform	50		2.0 U	2.0 U	2 U	2 U
Bromomethane	5		2.5 U	2.5 U	2.5 U	2.5 U
Carbon disulfide	60		5.0 U	5.0 U	5 U	5 U
Carbon tetrachloride	5		0.50 U	0.50 U	0.5 U	0.5 U
Chlorobenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
Chloroethane	5		2.5 U	2.5 U	2.5 U	2.5 U
Chloroform	7		2.5 U	2.5 U	2.5 U	2.5 U
Chloromethane	--		2.5 U	2.5 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	5		2.5 U	2.5 U	2.5 U	2.5 U
cis-1,3-Dichloropropene	5		0.50 U	0.50 U	0.5 U	0.5 U
Dibromochloromethane	50		0.50 U	0.50 U	0.5 U	0.5 U
Dibromochloropropane	--		2.5 U	2.5 U	2.5 U	2.5 U
Dibromomethane	5		5.0 U	5.0 U	5 U	5 U
Dichlorodifluoromethane	5		5.0 U	5.0 U	5 U	5 U
Diethyl Ether	--		2.5 U	2.5 U	2.5 U	2.5 U
Ethylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
Hexachlorobutadiene	0.5		2.5 U	2.5 U	2.5 U	2.5 U
Isopropylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
m+p-Xylene	5		2.5 U	2.5 U	2.5 U	2.5 U
Methylene chloride	5		2.5 U	2.5 U	2.5 U	2.5 U
MTBE	10		2.5 U	2.5 U	2.5 U	2.5 U
Naphthalene	10		2.5 U	2.5 U	2.5 U	2.5 U
n-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
n-Propylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
o-Chlorotoluene	--		2.5 U	2.5 U	2.5 U	2.5 U
o-Xylene	5		2.5 U	2.5 U	2.5 U	2.5 U
p-Chlorotoluene	--		2.5 U	2.5 U	2.5 U	2.5 U
p-Isopropyltoluene	5		2.5 U	2.5 U	2.5 U	2.5 U
sec-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U

Table 10. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	FIELD BLANK 6/11/2014	FIELD BLANK 6/12/2014	TRIP BLANK 6/11/2014	TRIP BLANK 6/12/2014
Styrene	5		2.5 U	2.5 U	2.5 U	2.5 U
tert-Butylbenzene	5		2.5 U	2.5 U	2.5 U	2.5 U
Tetrachloroethene	5		0.50 U	0.50 U	0.5 U	0.5 U
Toluene	5		2.5 U	2.5 U	2.5 U	2.5 U
trans-1,2-Dichloroethene	5		2.5 U	2.5 U	2.5 U	2.5 U
trans-1,3-Dichloropropene	--		0.50 U	0.50 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	--		2.5 U	2.5 U	2.5 U	2.5 U
Trichloroethene	5		0.50 U	0.50 U	0.5 U	0.5 U
Trichlorofluoromethane	5		2.5 U	2.5 U	2.5 U	2.5 U
Vinyl acetate	--		5.0 U	5.0 U	5 U	5 U
Vinyl chloride	2		1.0 U	1.0 U	1 U	1 U
Xylenes (total)	5		2.5 U	2.5 U	2.5 U	2.5 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

V - Value altered or qualifier added during data validation

Table 11. Summary of Semivolatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date: 6/11/2014	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014	RXMW-7 6/11/2014
1,1'-Biphenyl	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,4,5-Tetrachlorobenzene	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	3		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3-Dichlorobenzene	3		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,4-Dichlorobenzene	3		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,2'-oxybis (1-chloropropane)	5		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4,5-Trichlorophenol	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4,6-Trichlorophenol	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-Dichlorophenol	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-Dimethylphenol	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-Dinitrophenol	10		20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2,4-Dinitrotoluene	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,6-Dinitrotoluene	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chloronaphthalene	10		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
2-Chlorophenol	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Methylnaphthalene	--		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
2-Methylphenol	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Nitroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Nitrophenol	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3&4-Methylphenol	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
3,3'-Dichlorobenzidine	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
3-Nitroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4,6-Dinitro-2-methylphenol	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl phenyl ether	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chloro-3-methylphenol	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chloroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorophenyl phenyl ether	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Nitroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Nitrophenol	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthene	20		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Acenaphthylene	20		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U

Table 11. Summary of Semivolatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date: 6/11/2014	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014	RXMW-7 6/11/2014
Acetophenone	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Anthracene	50		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Benzo[a]anthracene	0.002		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Benzo[a]pyrene	0		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Benzo[b]fluoranthene	0.002		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Benzo[g,h,i]perylene	--		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Benzo[k]fluoranthene	0.002		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Benzoic Acid	--		50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Benzyl Alcohol	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bis(2-chloroethoxy)methane	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bis(2-chloroethyl) ether	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bis(2-ethylhexyl) phthalate	5		3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Butylbenzyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbazole	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chrysene	0.002		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Dibenzo[a,h]anthracene	--		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Dibenzofuran	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Diethyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dimethyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-octyl phthalate	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Fluoranthene	50		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Fluorene	50		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Hexachlorobenzene	0.04		0.80 U	0.80 U	0.80 U	0.80 U	3.2 UD	0.80 U	0.80 U	0.80 U
Hexachlorobutadiene	0.5		0.50 U	0.50 U	0.50 U	0.50 U	2.0 UD	0.50 U	0.50 U	0.50 U
Hexachlorocyclopentadiene	5		20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Hexachloroethane	5		0.80 U	0.80 U	0.80 U	0.80 U	3.2 UD	0.80 U	0.80 U	0.80 U
Indeno[1,2,3-cd]pyrene	0.002		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Isophorone	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	10		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Nitrobenzene	0.4		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
n-Nitrosodi-n-propylamine	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Table 11. Summary of Semivolatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014	RXMW-7 6/11/2014
n-Nitrosodiphenylamine	50		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Pentachlorophenol	1		0.80 U	0.80 U	0.80 U	0.80 U	3.2 UD	0.80 U	0.80 U	0.80 U
Phenanthrene	50		0.20 U	0.20 U	0.20 U	0.20 U	0.80 UD	0.20 U	0.20 U	0.20 U
Phenol	1		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pyrene	50		0.20 U	0.20 U	0.20 U	0.20 U	0.47 JD	0.20 U	0.20 U	0.20 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

- - No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 11. Summary of Semivolatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014	FIELD BLANK 6/11/2014	FIELD BLANK 6/12/2014
1,1'-Biphenyl	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,4,5-Tetrachlorobenzene	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	3		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3-Dichlorobenzene	3		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,4-Dichlorobenzene	3		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,2'-oxybis (1-chloropropane)	5		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2,4,5-Trichlorophenol	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4,6-Trichlorophenol	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-Dichlorophenol	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-Dimethylphenol	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,4-Dinitrophenol	10		20 U	20 U	20 U	20 U	20 U	20 U	20 U
2,4-Dinitrotoluene	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2,6-Dinitrotoluene	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chloronaphthalene	10		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
2-Chlorophenol	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Methylnaphthalene	--		0.20 U	0.20 U	0.20 U	12 D	7.7 D	0.20 U	0.20 U
2-Methylphenol	--		5.0 U	5.0 U	5.0 U	3.6 J	5.0 U	5.0 U	5.0 U
2-Nitroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Nitrophenol	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U
3&4-Methylphenol	--		5.0 U	5.0 U	5.0 U	2.1 J	5.0 U	5.0 U	5.0 U
3,3'-Dichlorobenzidine	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
3-Nitroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4,6-Dinitro-2-methylphenol	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl phenyl ether	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chloro-3-methylphenol	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Chloroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorophenyl phenyl ether	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Nitroaniline	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Nitrophenol	--		10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthene	20		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Acenaphthylene	20		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U

Table 11. Summary of Semivolatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014	FIELD BLANK 6/11/2014	FIELD BLANK 6/12/2014
Acetophenone	--		5.0 U	5.0 U	5.0 U	5.6	5.0 U	5.0 U	5.0 U
Anthracene	50		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Benzo[a]anthracene	0.002		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Benzo[a]pyrene	0		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Benzo[b]fluoranthene	0.002		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Benzo[g,h,i]perylene	--		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Benzo[k]fluoranthene	0.002		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Benzoic Acid	--		50 U	50 U	50 U	50 U	50 U	50 U	50 U
Benzyl Alcohol	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bis(2-chloroethoxy)methane	5		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bis(2-chloroethyl) ether	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bis(2-ethylhexyl) phthalate	5		3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	11	3.0 U
Butylbenzyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbazole	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chrysene	0.002		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Dibenzo[a,h]anthracene	--		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Dibenzofuran	--		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Diethyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dimethyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-octyl phthalate	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Fluoranthene	50		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Fluorene	50		0.20 U	0.20 U	0.20 U	0.31 JD	0.29 JD	0.20 U	0.20 U
Hexachlorobenzene	0.04		0.80 U	0.80 U	0.80 U	3.2 UD	3.2 UD	0.80 U	0.80 U
Hexachlorobutadiene	0.5		0.50 U	0.50 U	0.50 U	2.0 UD	2.0 UD	0.50 U	0.50 U
Hexachlorocyclopentadiene	5		20 U	20 U	20 U	20 U	20 U	20 U	20 U
Hexachloroethane	5		0.80 U	0.80 U	0.80 U	3.2 UD	3.2 UD	0.80 U	0.80 U
Indeno[1,2,3-cd]pyrene	0.002		0.20 U	0.20 U	0.20 U	0.80 UD	0.80 UD	0.20 U	0.20 U
Isophorone	50		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Naphthalene	10		0.20 U	0.20 U	0.20 U	11 D	7.4 D	0.20 U	0.20 U
Nitrobenzene	0.4		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
n-Nitrosodi-n-propylamine	--		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Table 11. Summary of Semivolatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014	FIELD BLANK 6/11/2014	FIELD BLANK 6/12/2014
n-Nitrosodiphenylamine	50		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Pentachlorophenol	1		0.80 U	0.80 U	0.80 U	3.2 UD	3.2 UD	0.80 U	0.80 U
Phenanthrene	50		0.20 U	0.20 U	0.20 U	0.40 JD	0.29 JD	0.20 U	0.20 U
Phenol	1		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pyrene	50		0.20 U	0.20 U	0.20 U	0.27 JD	0.80 UD	0.20 U	0.20 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

- - No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 12. Summary of Metals in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014 Unfiltered	RXMW-1 6/11/2014 Filtered	RXMW-1 DUP 6/11/2014 Unfiltered	RXMW-1 DUP 6/11/2014 Filtered	RXMW-2 6/11/2014 Unfiltered	RXMW-2 6/11/2014 Filtered	RXMW-3 6/12/2014 Unfiltered
Aluminum	--		953 JV	10 UV	48.4 JV	10 UV	198	10 UV	19700
Antimony	3		0.97 J	1 UV	0.35 J	1 UV	0.18 J	1 UV	2 UV
Arsenic	25		0.83	0.5 UV	0.5	0.5 UV	0.64	0.5 UV	5.89
Barium	1000		110.7	96.39	95.11	96.11	81.8	81.32	1061
Beryllium	3		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.88
Cadmium	5		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.96
Calcium	--		94800	92400 JV	91700	95800	71500	76900	88400
Chromium, Hexavalent	50		10 U	NA	10 U	NA	10 U	NA	10 U
Chromium	50		6.63	4.8	4.59	4.31	3.41	3.4	36.89
Cobalt	--		3.64 JV	0.6	1.2 JV	0.54	0.84	0.21 J	54.62
Copper	200		7.08 JV	1.8	2.15 JV	1.82	3.09	2.11	92.02
Cyanide	--		11	NA	13	NA	5 UV	NA	2 J
Iron	300		1680 JV	50 U	107 JV	50 U	372	50 U	24300
Lead	25		1.28 JV	1 U	1 UJV	1 U	0.52 J	1 U	58.57
Magnesium	--		33600 JV	33100	33500	32900	17600	18100	24500
Manganese	300		128.2 JV	4.47	9.77 JV	4.67	39.67	10.35	4310
Mercury	0.7		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.63
Nickel	100		6.45 JV	2.68	2.83 JV	2.43	3.23	3.41	138.7
Potassium	--		4050	3790	3820	3810	5040	5150	9270
Selenium	10		2.97 J	3.31 J	3.23 J	3.1 J	1.36 J	1.63 J	10.6
Silver	50		1.17	0.4 U	1.08	0.4 U	0.4 U	0.4 U	0.57
Sodium	20000		57700 JV	61800	56700	61900	9120	9720	49300
Thallium	0.5		0.03 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.26 J
Vanadium	--		2.33 J	0.69 J	0.3 J	0.58 J	0.86 J	0.67 J	35.57
Zinc	2000		33.16	3.65 J	10 UV	4.85 J	10 UV	3.5 J	198

NYSDEC - New York State Department of Environmental Conservation

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µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

NA - Compound was not analyzed by laboratory

Filtered - Samples were filtered in the field using a 0.45 micron filter

V - Value altered or qualifier added during data validation

Table 12. Summary of Metals in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-3 6/12/2014 Filtered	RXMW-4 6/12/2014 Unfiltered	RXMW-4 6/12/2014 Filtered	RXMW-5 6/11/2014 Unfiltered	RXMW-5 6/11/2014 Filtered	RXMW-6 6/12/2014 Unfiltered	RXMW-6 6/12/2014 Filtered	RXMW-7 6/11/2014 Unfiltered
Aluminum	--		2.27 J	5070	31.8	492	10 UV	305	2.92 J	56.1
Antimony	3		1.18	2 UV	0.24 J	0.26 J	1 UV	2 UV	0.18 J	0.14 J
Arsenic	25		0.35 J	2.14	0.5 U	0.5 UV	0.5 UV	0.33 J	0.38 J	0.57
Barium	1000		68.65	142.4	74.7	97.25	88.87	113.5	104.6	137.5
Beryllium	3		0.5 U	0.31 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cadmium	5		0.05 J	0.16 J	0.11 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	--		56800	52000	51300	84900	85500	104000	99000	89600
Chromium, Hexavalent	50		NA	10 U	NA	10 U	NA	10 U	NA	10 U
Chromium	50		2.91	16.71	2.8	5.2	2.09	5.05	3.26	3.2
Cobalt	--		1.26	14.02	2.73	2.07	0.96	5.78	3.78	1.63
Copper	200		7.64	33.64	3.34	2.84	1.96	4.24	2.48	2.61
Cyanide	--		NA	5 U	NA	5 UV	NA	5 U	NA	5 UV
Iron	300		50 U	13100	102	802	50 U	734	50 U	87.6
Lead	25		2.63	9.31	1.33	0.82 J	1 U	0.65 J	1 U	0.28 J
Magnesium	--		14200	15900	13200	34200	36500	40600	39300	27400
Manganese	300		146.8	2950	1709	104.3	28.17	151.1	110.1	124
Mercury	0.7		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100		9.78	43.83	20.91	5.62	5.83	7.2	4.95	4.86
Potassium	--		6760	7190	6030	4800	4960	4440	5700	7110
Selenium	10		1.99 J	2.33 J	1.66 J	3.04 J	3.03 J	0.32 J	0.4 J	1.92 J
Silver	50		0.4 U	0.16 J	0.4 U	0.35 J	0.4 U	1.9	0.4 U	0.89
Sodium	20000		50200	47600	46300	49200	49600	119000	103000	81900
Thallium	0.5		0.5 U	0.13 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	--		0.74 J	15.33	0.5 J	1.7 J	0.6 J	1.65 J	0.92 J	0.93 J
Zinc	2000		12.49	72.44	7.23 J	10 UV	5.6 J	10 UV	5.69 J	10 UV

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µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

NA - Compound was not analyzed by laboratory

Filtered - Samples were filtered in the field using a 0.45 micron filter

V - Value altered or qualifier added during data validation

Table 12. Summary of Metals in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-7 6/11/2014 Filtered	RXMW-8 6/12/2014 Unfiltered	RXMW-8 6/12/2014 Filtered	RXMW-9 6/11/2014 Unfiltered	RXMW-9 6/11/2014 Filtered	RXMW-10 6/11/2014 Unfiltered	RXMW-10 6/11/2014 Filtered	RXMW-11 6/12/2014 Unfiltered
Aluminum	--		10 UV	38200	27.5	264	10 UV	198	10 UV	34600
Antimony	3		1 UV	2 UV	0.2 J	0.29 J	1 UV	0.18 J	1 UV	2 UV
Arsenic	25		0.59	5.55	0.54	0.77	0.66	0.5	0.5 UV	5.92
Barium	1000		131.7	386.4	94.59	384.8	409.2	126.6	124.4	554.8
Beryllium	3		0.5 U	3.29	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3.46
Cadmium	5		0.2 U	0.23	0.07 J	0.12 J	0.14 J	0.07 J	0.05 J	0.21
Calcium	--		89700	52900	42900	194000	202000	95800	105000	66900
Chromium, Hexavalent	50		NA	10 U	NA	10 U	NA	4 J	NA	4 J
Chromium	50		1.84	114	1.4	2.28	2.15	2.93	2.13	67.9
Cobalt	--		2.28	37.23	12.64	1.29	0.61	3.51	2.77	27.66
Copper	200		2.05	65.65	1.64	3.26	4.45	4.35	1.9	67.6
Cyanide	--		NA	4 J	NA	5 UV	NA	5 UV	NA	5 U
Iron	300		50 U	38800	23 J	601	50 U	622	50 U	32900
Lead	25		1 U	33.23	1 U	2.72	2.15	0.69 J	1 U	29.09
Magnesium	--		25200	20200	12400	45500	48200	34100	34500	19700
Manganese	300		140.2	1532	1227	141.6	94.03	1341	1379	2376
Mercury	0.7		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100		8.5	71.87	45.9	7.11	7.03	8.93	7.06	50.48
Potassium	--		7070	12500	13900	4560	4510	4500	4670	9510
Selenium	10		2.18 J	10.5	3.96 J	1 J	0.8 J	0.56 J	0.42 J	10.9
Silver	50		0.4 U	28.08	0.4 U	0.23 J	0.4 U	0.28 J	0.4 U	0.12 J
Sodium	20000		88300	79900	84200	343000	368000	77900	84700	71800
Thallium	0.5		0.5 U	0.56	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.43 J
Vanadium	--		1.09 J	64.19	0.47 J	1 J	0.55 J	0.8 J	0.6 J	75.28
Zinc	2000		4.01 J	217.2	12.75	10 UV	9.43 J	10 UV	3.9 J	168

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-- No NYSDEC AWQSGV available

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Filtered - Samples were filtered in the field using a 0.45 micron filter

V - Value altered or qualifier added during data validation

Table 12. Summary of Metals in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-11 6/12/2014 Filtered	RXMW-12 6/12/2014 Unfiltered	RXMW-12 6/12/2014 Filtered	FIELD BLANK 6/11/2014 Unfiltered	FIELD BLANK 6/11/2014 Filtered	FIELD BLANK 6/12/2014 Unfiltered	FIELD BLANK 6/12/2014 Filtered
Aluminum	--		5.64 J	25000	8.43 J	3.19 J	10 U	10 U	10 U
Antimony	3		0.16 J	2 UV	0.33 J	1 U	1 U	2 UV	1 U
Arsenic	25		0.48 J	4.78	0.5 U	0.5 UV	0.52	0.5 U	0.5 U
Barium	1000		156.3	278.3	69.24	0.22 J	0.11 J	0.5 U	0.12 J
Beryllium	3		0.5 U	1.92	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Cadmium	5		0.07 J	0.19 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	--		73900	11300	39700	100 U	100 U	100 U	100 U
Chromium, Hexavalent	50		NA	10 U	NA	10 U	NA	10 U	NA
Chromium	50		1.83	53.92	1.58	1 U	1 UV	1 U	1 U
Cobalt	--		1.93	21.43	2.74	0.5 U	0.5 U	0.2 U	0.5 U
Copper	200		1.41	38.82	0.5 J	1 U	1 U	1 U	1 U
Cyanide	--		NA	4 J	NA	1 J	NA	5 U	NA
Iron	300		50 U	23100	50 U	50 U	50 U	50 U	50 U
Lead	25		0.29 J	17.41	1 U	1 U	1 U	1 U	1 U
Magnesium	--		16300	16000	10500	70 UV	70 U	70 U	70 U
Manganese	300		755.8	1226	568	0.18 J	1 UV	0.5 U	0.55 J
Mercury	0.7		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	100		7.63	33.71	5.35	0.5 UV	0.5 UV	0.5 U	0.13 J
Potassium	--		11800	6030	5870	100 U	100 U	100 U	100 U
Selenium	10		2.07 J	8.06	1.87 J	5 U	5 U	5 U	5 U
Silver	50		0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Sodium	20000		116000	135000	156000	100 UV	100 UV	100 U	100 UV
Thallium	0.5		0.5 U	0.25 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vanadium	--		0.73 J	52.24	0.76 J	5 U	5 U	5 U	5 U
Zinc	2000		4.35 J	113.5	2.9 J	10 UV	10 U	10 UV	10 U

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µg/L -Micrograms per liter

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U - Compound was analyzed for but not detected

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-- No NYSDEC AWQSGV available

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Filtered - Samples were filtered in the field using a 0.45 micron filter

V - Value altered or qualifier added during data validation

Table 13. Summary of Polychlorinated Biphenyls in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014
Aroclor-1016	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1221	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1232	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1242	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1248	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1254	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1260	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1262	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1268	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
PCBS, TOTAL	0.09		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U

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AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

PCBs - Polychlorinated Biphenyls

Table 13. Summary of Polychlorinated Biphenyls in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-7 6/11/2014	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014	FIELD BLANK 6/11/2014
Aroclor-1016	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1221	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1232	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1242	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1248	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1254	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1260	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1262	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
Aroclor-1268	--		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U
PCBS, TOTAL	0.09		0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U	0.083 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

PCBs - Polychlorinated Biphenyls

Table 13. Summary of Polychlorinated Biphenyls in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: FIELD BLANK Sample Date: 6/12/2014
Aroclor-1016	--	0.083 U
Aroclor-1221	--	0.083 U
Aroclor-1232	--	0.083 U
Aroclor-1242	--	0.083 U
Aroclor-1248	--	0.083 U
Aroclor-1254	--	0.083 U
Aroclor-1260	--	0.083 U
Aroclor-1262	--	0.083 U
Aroclor-1268	--	0.083 U
PCBS, TOTAL	0.09	0.083 U

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AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

PCBs - Polychlorinated Biphenyls

Table 14. Summary of Pesticides in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014	RXMW-1 DUP 6/11/2014	RXMW-2 6/11/2014	RXMW-3 6/12/2014	RXMW-4 6/12/2014	RXMW-5 6/11/2014	RXMW-6 6/12/2014
4,4'-DDD	0.3		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDE	0.2		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDT	0.2		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Aldrin	0		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
alpha-BHC	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
alpha-Chlordane	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
beta-BHC	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Chlordane	0.05		0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
delta-BHC	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Dieldrin	0.004		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan I	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Endosulfan II	--		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan sulfate	--		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endrin ketone	--		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endrin	0		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
gamma-BHC (Lindane)	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
gamma-Chlordane	0		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor epoxide	0.03		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor	0.04		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Methoxychlor	35		0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Toxaphene	0.06		0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 14. Summary of Pesticides in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-7 6/11/2014	RXMW-8 6/12/2014	RXMW-9 6/11/2014	RXMW-10 6/11/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014	FIELD BLANK 6/11/2014
4,4'-DDD	0.3		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDE	0.2		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4,4'-DDT	0.2		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Aldrin	0		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
alpha-BHC	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
alpha-Chlordane	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
beta-BHC	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Chlordane	0.05		0.200 U	0.200 U	0.506	0.200 U	0.200 U	0.200 U	0.200 U
delta-BHC	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Dieldrin	0.004		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan I	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Endosulfan II	--		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endosulfan sulfate	--		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endrin ketone	--		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Endrin	0		0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
gamma-BHC (Lindane)	--		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
gamma-Chlordane	0		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor epoxide	0.03		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Heptachlor	0.04		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Methoxychlor	35		0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Toxaphene	0.06		0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 14. Summary of Pesticides in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: FIELD BLANK Sample Date: 6/12/2014
4,4'-DDD	0.3	0.040 U
4,4'-DDE	0.2	0.040 U
4,4'-DDT	0.2	0.040 U
Aldrin	0	0.020 U
alpha-BHC	--	0.020 U
alpha-Chlordane	--	0.020 U
beta-BHC	--	0.020 U
Chlordane	0.05	0.200 U
delta-BHC	--	0.020 U
Dieldrin	0.004	0.040 U
Endosulfan I	--	0.020 U
Endosulfan II	--	0.040 U
Endosulfan sulfate	--	0.040 U
Endrin ketone	--	0.040 U
Endrin	0	0.040 U
gamma-BHC (Lindane)	--	0.020 U
gamma-Chlordane	0	0.020 U
Heptachlor epoxide	0.03	0.020 U
Heptachlor	0.04	0.020 U
Methoxychlor	35	0.200 U
Toxaphene	0.06	0.200 U

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

DUP - Duplicate

-- No NYSDEC AWQSGV available

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 15. Summary of Volatile Organic Compounds in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	Sample Designation:	RXSB-4	RXSB-4 DUP
			Sample Date:	6/4/2014	6/4/2014
			Sample Depth (ft bls):	30 - 32	30 - 32
1,2,4-Trimethylbenzene	3.6	52		3.8	3.3
Xylenes (total)	0.26	100		1.4	1.2

DUP - Duplicate sample

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

Bold number indicates exceedance of Unrestricted Use SCO

Table 16. Summary of Metals in Soil, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in mg/kg)	NYSDEC Part 375 Unrestricted Use	NYSDEC Part 375 Restricted Residential	Sample Designation:	DW-1	RXSB-6	RXSB-9
			Sample Date:	6/6/2014	6/2/2014	5/29/2014
			Sample Depth (ft bls):	-	35 - 37	34 - 36
Cadmium	2.5	4.3		4.9	--	--
Chromium	30	180		--	43	38
Copper	50	270		220	--	--
Lead	63	400		130	--	--
Nickel	30	310		45	31	--
Zinc	109	10000		1700	--	--

-- - No exceedance of SCOs

mg/kg - Milligrams per kilogram

ft bls - Feet below land surface

NYSDEC - New York State Department of Environmental Conservation

Bold number indicates exceedance of Unrestricted Use SCO

Shaded cell indicates exceedance of Restricted Residential SCO

Table 17. Summary of Volatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-4 6/12/2014	RXMW-8 6/12/2014	RXMW-11 6/12/2014	RXMW-12 6/12/2014
1,2,4,5-Tetramethylbenzene	5		--	--	--	5.1
1,2,4-Trimethylbenzene	5		--	--	61	68
1,2-Dichloroethene (total)	5		6.7	--	32	200
1,3,5-Trimethylbenzene	5		--	--	18	16
Benzene	1		--	--	54	6.2
Chloroform	7		--	--	13	2.8
cis-1,2-Dichloroethene	5		6.7	--	32	200
Ethylbenzene	5		--	--	22	31
m+p-Xylene	5		--	--	180	69
MTBE	10		--	--	19	--
Naphthalene	10		--	--	23	18
n-Propylbenzene	5		--	--	--	5.4
o-Xylene	5		--	--	100	77
Tetrachloroethene	5		--	7	28	8.8
Toluene	5		--	--	88	50
Xylenes (total)	5		--	--	280	150

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

-- - No exceedance of AWQSGVs

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 18. Summary of Semivolatile Organic Compounds in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-11 6/12/2014
Naphthalene	10		11 D

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

-- - No exceedance of AWQSGVs

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

D -

Table 19. Summary of Metals in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-1 6/11/2014 Filtered	RXMW-1 DUP 6/11/2014 Filtered	RXMW-3 6/12/2014 Filtered	RXMW-4 6/12/2014 Filtered	RXMW-5 6/11/2014 Filtered	RXMW-6 6/12/2014 Filtered	RXMW-7 6/11/2014 Filtered
Barium	1000		--	--	--	--	--	--	--
Beryllium	3		--	--	--	--	--	--	--
Chromium	50		--	--	--	--	--	--	--
Iron	300		--	--	--	--	--	--	--
Lead	25		--	--	--	--	--	--	--
Manganese	300		--	--	--	1709	--	--	--
Nickel	100		--	--	--	--	--	--	--
Selenium	10		--	--	--	--	--	--	--
Sodium	20000		61800	61900	50200	46300	49600	103000	88300
Thallium	0.5		--	--	--	--	--	--	--

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

DUP - Duplicate

-- - No exceedance of AWQSGVs

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Filtered - Samples were filtered in the field using a 0.45 micron filter

V - Value altered or qualifier added during data validation

Table 19. Summary of Metals in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-8 6/12/2014 Filtered	RXMW-9 6/11/2014 Filtered	RXMW-10 6/11/2014 Filtered	RXMW-11 6/12/2014 Filtered	RXMW-12 6/12/2014 Filtered
Barium	1000		--	--	--	--	--
Beryllium	3		--	--	--	--	--
Chromium	50		--	--	--	--	--
Iron	300		--	--	--	--	--
Lead	25		--	--	--	--	--
Manganese	300		1227	--	1379	755.8	568
Nickel	100		--	--	--	--	--
Selenium	10		--	--	--	--	--
Sodium	20000		84200	368000	84700	116000	156000
Thallium	0.5		--	--	--	--	--

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

J - Estimated Value

DUP - Duplicate

-- - No exceedance of AWQSGVs

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Filtered - Samples were filtered in the field using a 0.45 micron filter

V - Value altered or qualifier added during data validation

Table 20. Summary of Pesticides in Groundwater, 112-21 Northern Boulevard, Queens, New York

Parameter (Concentrations in µg/L)	NYSDEC AWQSGVs (µg/L)	Sample Designation: Sample Date:	RXMW-9 6/11/2014
Chlordane	0.05		0.506

NYSDEC - New York State Department of Environmental Conservation

AWQSGVs - Ambient Water-Quality Standards and Guidance Values

µg/L -Micrograms per liter

Bold data indicates that parameter was detected above the NYSDEC AWQSGVs

Table 21. BROWNFIELD CLEANUP PROGRAM TRACK 1 UNRESTRICTED CLEANUP
112-21 NORTHERN BOULEVARD
EASTERN EMERALD GROUP, LLC
ENVIRONMENTAL REMEDIATION COST ESTIMATE - August 7, 2014

ITEM	Description	UNIT	QUANTITY	UNIT COST	TOTAL
<u>Soil Handling and Removal</u>					
1	Non Hazardous Soil Transport & Disposal	Ton	100,000	\$ 30	\$3,000,000
2	Non Hazardous Petroleum Impacted Soil Transport & Disposal	Ton	58,000	\$ 65	\$3,770,000
3	Hazardous Soil Transport & Disposal	Ton	4,000	\$ 120	\$480,000
4	Excavation Support (Soil Nailing)	SF	46,800	\$ 50	\$2,340,000
5	Excavation Support (Sheeting)	SF	4,500	\$ 50	\$225,000
6	Importation and Placement of Clean Backfill (Contingency)	CY	3,000	\$ 45	\$135,000
					\$9,950,000
<u>Dewatering and Treatment</u>					
7	Dewatering Water Container Rental and Disposal/Onsite Treatment and Discharge to NYCDEP Sewer	LS	1	\$ 250,000	\$250,000
8	In-situ Groundwater treatment	LS	1	\$ 159,600	\$159,600
					\$409,600
<u>Supplemental Remediation Costs</u>					
9	Community Air Monitoring Plan (CAMP) Implementation (during excavation and soil handling)	Month	8	\$ 30,000	\$240,000
10	Vapor, Dust, and Odor Suppression	Lump Sum	1	\$ 50,000	\$50,000
11	Vapor Barrier under foundation slab	SF	72,000	\$ 3	\$216,000
11	Post excavation end-point Sampling Analytical cost	Lump Sum	1	\$ 75,500	\$75,500
12	Engineering support and disposal coordination	Month	10	\$ 15,000	\$150,000
					\$731,500
soil handling, dewatering and remediation cost subtotal					\$11,091,100
20% cost contingency					\$2,218,220
5% fees, insurance and bonds					\$554,555
<u>BCP Record Keeping</u>					
13	Citizen Participation: Public Meeting, Fact Sheet Distribution, CPP development	Lump Sum	1	\$ 25,000	\$25,000
14	BCP weekly and monthly reporting requirements	month	12	\$ 4,000	\$48,000
15	Final Engineering Report	Lump Sum	1	\$ 50,000	\$50,000
					\$123,000
Total Remediation Costs					\$13,986,875

Notes

- Engineered cover systems and garage ventilation systems not included in remediation cost estimate.
- Soil handling and removal costs subject to change pending actual remediation costs and excavation extents.
- Soil handling and removal assumes excavation to the property line on all sides of the Site to the depths detailed in the RAWP.
- CAMP implementation assumes one CAMP Technician and two CAMP monitoring stations operating 40 hours per week.
- Excavation screening, end-point sampling, and disposal supervision assumes one part-time engineer/geologist onsite during excavation for field screening of excavated materials, end point soil sampling and waste disposal tracking.

Table 22. BROWNFIELD CLEANUP PROGRAM TRACK 4 RESTRICTED RESIDENTIAL CLEANUP
112-21 NORTHERN BOULEVARD
EASTERN EMERALD GROUP, LLC
ENVIRONMENTAL REMEDIATION COST ESTIMATE - August 7, 2014

ITEM	Description	UNIT	QUANTITY	UNIT COST	TOTAL
<u>Soil Handling and Removal</u>					
1	Soil Transport & Disposal Cost assuming soil is Non Hazardous - Landfill Cover	Ton	100,000	\$ 30	\$3,000,000
2	Soil Transport & Disposal Cost assuming soil is Non Hazardous Petroleum	Ton	58,000	\$ 65	\$3,770,000
3	Soil Transport & Disposal Cost assuming soil is Hazardous	Ton	500	\$ 120	\$60,000
4	Excavation Support (Soil Nailing)	SF	46,800	\$ 50	\$2,340,000
5	Importation and Placement of Clean Backfill	CY	-	\$ 45	\$0
					\$9,170,000
<u>Dewatering and Treatment</u>					
6	Dewatering Water Container Rental and Disposal	LS	1	\$ 25,000	\$25,000
7	Dual-Phase Product Recovery System	LS	1	\$ 250,000	\$250,000
					\$275,000
<u>Supplemental Remediation Costs</u>					
8	Community Air Monitoring Plan (CAMP) Implementation (during excavation and soil handling)	Month	7	\$ 30,000	\$210,000
9	Vapor, Dust, and Odor Suppression	Lump Sum	1	\$ 30,000	\$30,000
10	Post excavation end-point Sampling Analytical cost	Lump Sum	1	\$ 75,500	\$75,500
11	Engineering support and disposal coordination	Month	9	\$ 25,000	\$225,000
12	Vapor Barrier under foundation slab and pile caps	SF	72,000	\$ 3	\$216,000
13	Vapor Barrier for exterior foundation sidewalls	SF	47,000	\$ 3	\$141,000
					\$897,500
soil handling, dewatering and remediation cost subtotal					\$10,342,500
20% cost contingency					\$2,068,500
5% fees, insurance and bonds					\$517,125
<u>BCP Record Keeping</u>					
14	Citizen Participation: Public Meeting, Fact Sheet Distribution, CPP development	Lump Sum	1	\$ 20,000	\$20,000
15	BCP weekly and monthly reporting requirements	month	10	\$ 4,000	\$40,000
16	Final Engineering Report	Lump Sum	1	\$ 50,000	\$50,000
17	Environmental Easement	Lump Sum	1	\$ 40,000	\$40,000
18	Site Management Plan	Lump Sum	1	\$ 25,000	\$25,000
20	Annual Groundwater Treatment System O&M	Year	5	\$ 250,000	\$1,250,000
21	Annual Groundwater Monitoring and Reporting	Year	5	\$ 32,000	\$160,000
22	Annual Engineer Certification for SMP	Year	5	\$ 5,000	\$25,000
23	Annual Brownfield Redevelopment Report	Year	12	\$ 10,000	\$120,000
					\$1,730,000
Total Remediation Costs plus Engineering and Institutional Controls					\$14,658,125

Notes

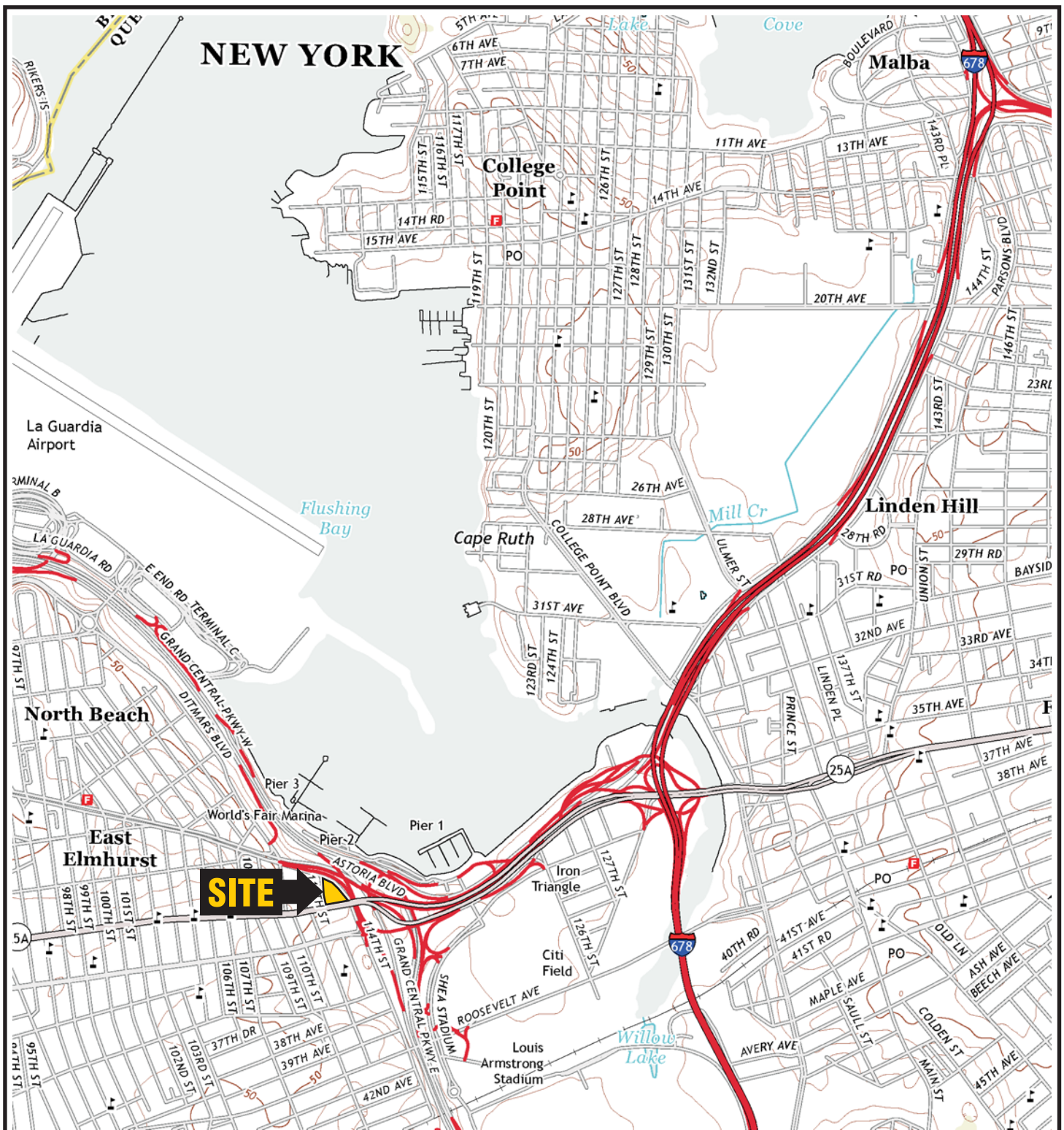
- Engineered cover systems and garage ventilation systems not included in remediation cost estimate.
- Soil handling and removal costs subject to change pending actual remediation costs and excavation extents.
- Soil handling and removal assumes excavation to the property line on all sides of the Site to the depths detailed in the RAWP.
- CAMP implementation assumes one CAMP Technician and two CAMP monitoring stations operating 40 hours per week.
- Excavation screening, end-point sampling, and disposal supervision assumes one part-time engineer/geologist onsite during excavation for field screening of excavated materials, end point soil sampling and waste disposal tracking.
- Environmental Easement and Site Management Plan Costs will be highly dependent upon legal review and editing.

Table 23. Remedial Construction Schedule Draft

Task Name	Start	Finish
Mobilization and Site Preparation	9/22/2014	9/25/2014
<u>Groundwater ISCO Injections</u>		
Baseline Monitoring	9/22/2014	9/23/2014
Installation of Temporary Injection Wells	9/23/2014	10/23/2014
Performance Monitoring	11/6/2014	11/7/2014
Performance Monitoring	12/4/2014	12/5/2014
Performance Monitoring	1/5/2015	1/6/2015
Excavation, SOE Installation, UST Removal and Soil Disposal	9/25/2014	5/26/2015
Post Excavation Sampling and Vapor Barrier Installation	4/27/2014	5/26/2015
Remedial Completion/Demobilization	5/27/2015	5/29/2015
Preparation of FER	6/1/2015	7/7/2015
Submittal of FER and Fact Sheet	7/10/2015	7/13/2015
DEC Review of FER	7/14/2015	8/14/2015
Post Construction Citizen Participation	8/17/2015	9/18/2015
Certificate of Completion	10/15/2015	10/23/2015

FIGURES

1. Site Location Map
2. Previous Sampling Locations
3. Truck Route



QUADRANGLE LOCATION



SOURCE:
USGS; 2013, Flushing, NY
7.5 Minute Topographic Quadrangle



0 2000'

Title:

SITE LOCATION MAP

REMEDIAL ACTION PLAN
112-21 NORTHERN BOULEVARD
SITE NO. C241157

Prepared for:

EASTERN EMERALD GROUP, LLC

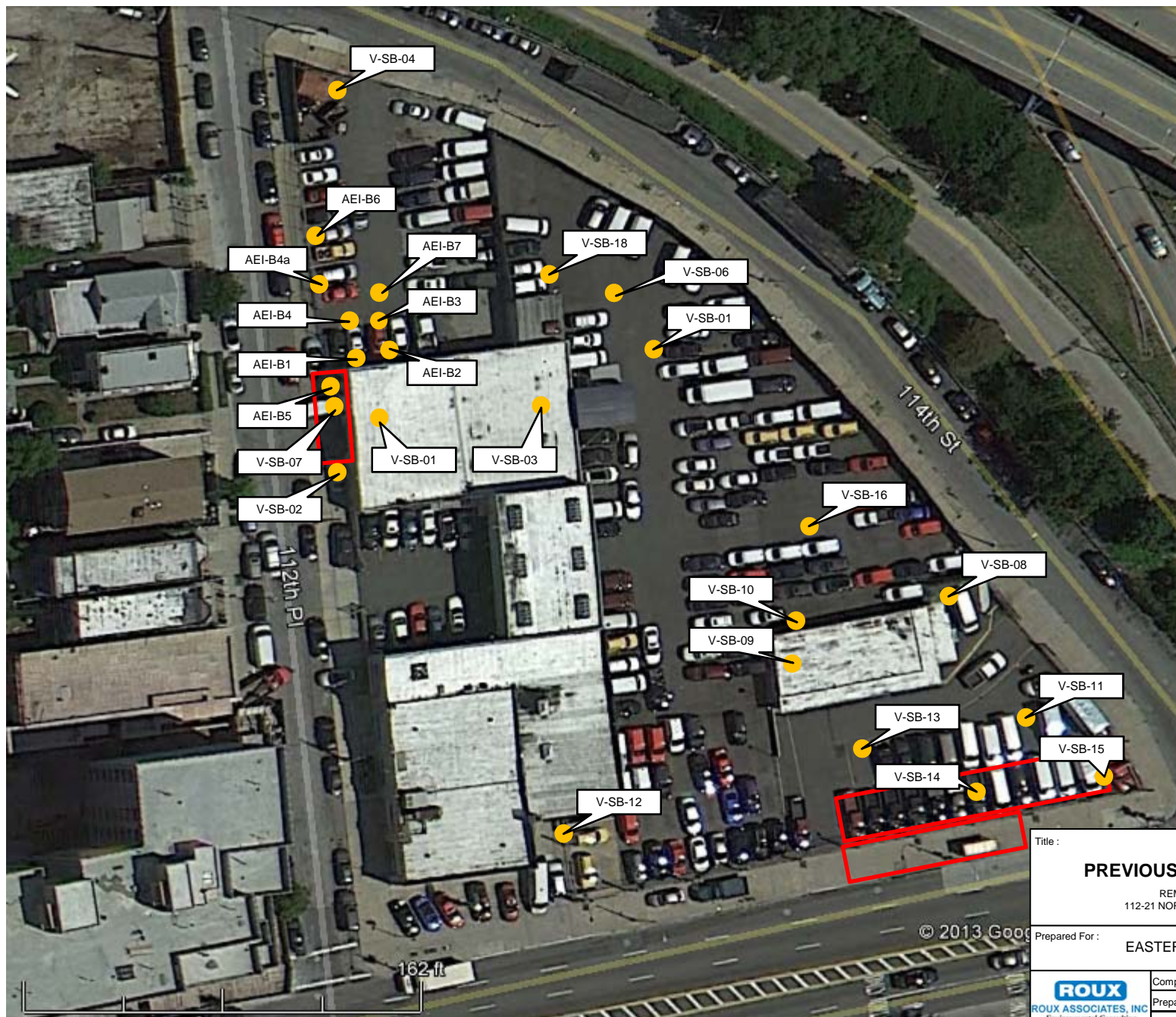


ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: N.E.	Date: 01JUL14
Prepared by: B.H.C.	Scale: AS SHOWN
Project Mgr.: C.B.	Project No.: 2364.0001Y000
File: 2364.0001Y107.04.CDR	

FIGURE

1



EXPLANATION

- PREVIOUS SAMPLING LOCATIONS BY VERTEX AND AEI
- ESTIMATED LOCATION OF UNDERGROUND STORAGE TANKS

Title :

PREVIOUS SAMPLING LOCATIONS

REMEDIAL ACTION WORK PLAN
112-21 NORTHERN BOULEVARD, CORONA, NY
SITE NO. C241157

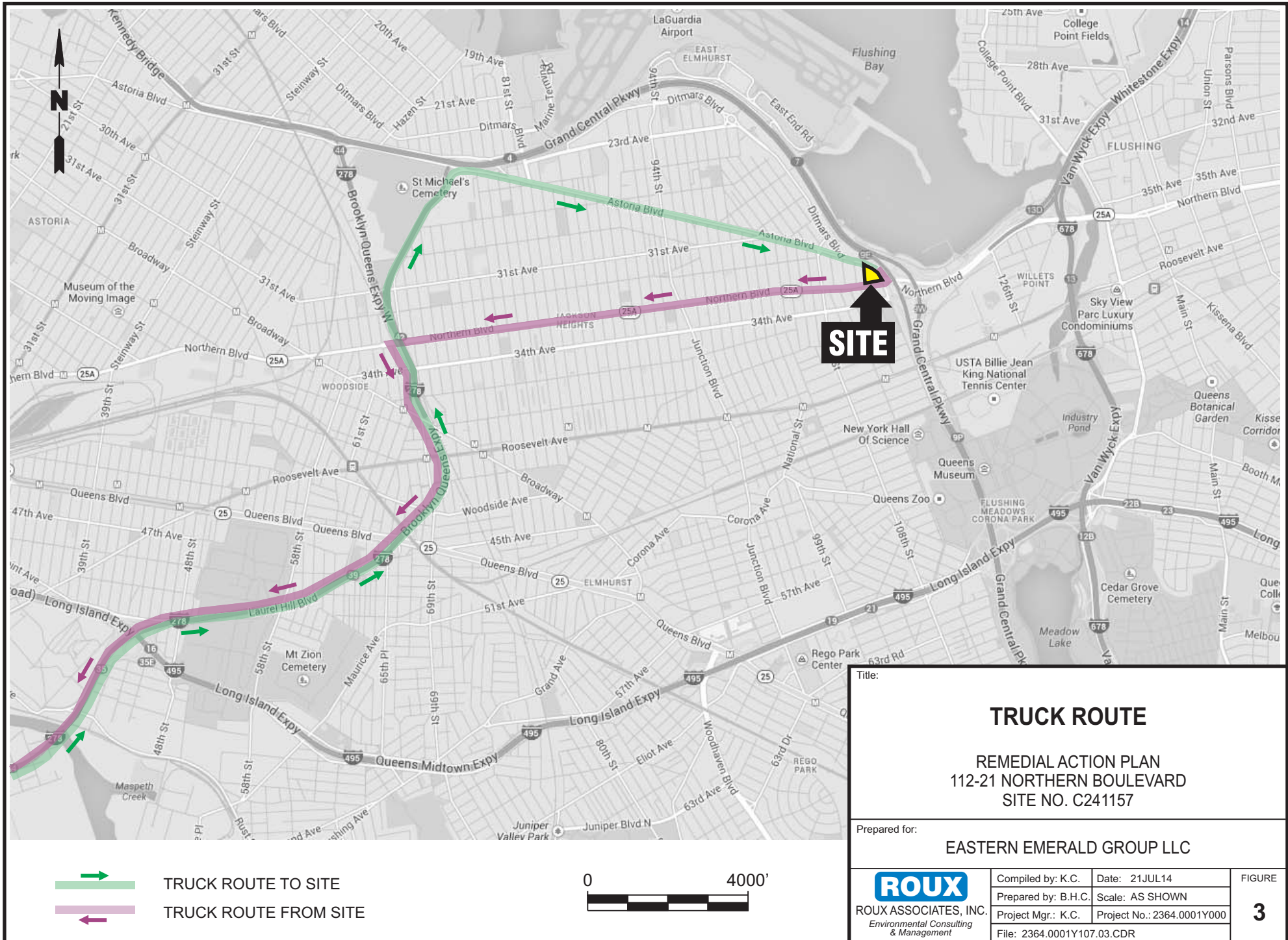
Prepared For :

EASTERN EMERALD GROUP LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled By : NE	Date : 7/1/2014
Prepared By : NE	Scale : SHOWN
Project Manager : NE	Office : NY
2364.0001Y.107.02.PPT	

FIGURE
2



APPENDICES

- A. Redevelopment Plans
- B. Health and Safety Plan
- C. Quality Assurance Project Plan
- D. Citizen Participation Plan
- E. Professional Profiles
- F. Chemical Oxidant Information

Redevelopment Plans

112-21 NORTHERN BOULEVARD DEVELOPMENT

SUPPORT OF EXCAVATION

Drawing List	
Sheet Number	Sheet Title
T-001.00	COVER SHEET
G-001.00	GENERAL NOTES
SOE-001.00	SUPPORT OF EXCAVATION PLAN
SOE-002.00	SUPPORT OF EXCAVATION ELEVATIONS
SOE-003.00	SUPPORT OF EXCAVATION SECTIONS
SOE-101.00	DETAILS

PROJECT INFOJOB # 1102

112-21 NORTHERN BLVD

QUEENS, NY 11368

BLOCK: 1707LOT: 8
ZONING MAP: 10BZONE: C2-4

OWNER

FLEET FINANCIAL GROUP, INC
136-20 38TH AVE, 10F, QUEENS, NY 11354
T 212-359-0801
F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
136-20 38TH AVE, 10F, QUEENS, NY 11354
T 212-359-0802
F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

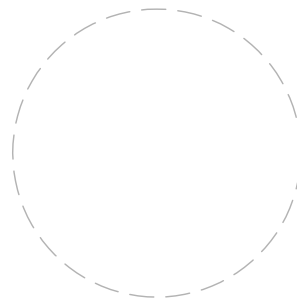
FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

ISSUE	DESCRIPTION	DATE
	FOR APPROVAL	2014-05-28

SEAL & SIGNATURE



SHEET NAME

COVER SHEET

SHEET #1 OF 6

T-001.00

APPLICATION #

NOTES:

1. ALL TIE-BACKS SHALL BE TESTED LOADED TO 1.33X DESIGN LOAD AND LOCKED OFF AT LOADS INDICATED ON THE DRAWINGS.
2. TESTING PROCEDURE SHALL BE IN ACCORDANCE WITH PROCEDURES DESCRIBED IN FHWA PUBLICATION NO. FHWA-IF-99-015 (GROUND ANCHORS AND ANCHORS SYSTEMS) SECTION 7.4.3 – PROOF TESTS.
3. THE FIXED LENGTH SHOWN ON THE DRAWINGS IS APPROXIMATE AND ACTUAL LENGTH CAN BE MORE OR LESS DEPENDING ON THE TECHNOLOGY AND GROUT PRESSURE USED. CONTRACTOR SHALL SELECT THE FIXED LENGTH TO ACHIEVE AN ACCEPTABLE TIE-BACK.
4. GROUT SHALL HAVE A 28 DAY STRENGTH OF 7,000 PSI.

NOTICES:

1. THE CONSENT FROM OWNERS OF ADJACENT PROPERTIES SHALL BE OBTAINED SIDEWALK CLOSING PERMIT FROM NYCDOT SHALL BE OBTAINED TO OVERCUT SIDEWALK OR TO PLACE SOIL NAILS OR TIE-BACKS IN SIDEWALK/STREET.
2. CONTRACTOR SHALL ENSURE THAT PILES WILL NOT INTERSECT EXISTING UTILITIES, ENGINEER SHALL BE NOTIFIED OF SUCH CONDITIONS SO A RE-DESIGN CAN BE MADE.
3. NOTICE SHALL BE GIVEN TO ADJACENT PROPERTY OWNERS AT LEAST 48 HOURS PRIOR TO START OF WORK.
4. ALL SHORING AND UNDERPINNING SHALL BE PERFORMED IN ACCORDANCE WITH THE RELEVANT PROVISIONS NEW YORK CITY BUILDING CODE.
5. ALL LOTS, BUILDINGS AND SERVICES ADJOINING THE WORK SHALL BE PROTECTED AND SUPPORTED AND ALLOW PERMISSION OF ANY CONSTRUCTION, AND TIEBACKS THAT WILL EXTEND PASS THE PROPERTY LINE.

STEEL:

1. STEEL FOR PIPE SHALL BE 50 KSI (COMPOSITE PIPE PILE WITH (2) #8 REBAR IS Fy (MODIFIED) = 97 KSI WITH 5,000 PSI GROUT). STEEL FOR STEEL WALERS SHALL CONFORM TO ASTM A572 GRADE 50.
2. STEEL REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
3. STEEL FOR TIE-BACKS SHALL CONFORM TO ASTM A722, GRADE 150. THE BAR SHALL BE SIZED SUCH THAT THE TEST LOAD IS LESS THAN 0.8 X ULTIMATE CAPACITY OF THE BAR, BEARING PLATE ASTM A36.

MONITORING:

- (A) CONTRACTOR SHALL INSTALL MONITORING STATIONS (PRISMS) AT ADJACENT STRUCTURES AND STRUCTURE TO BE UNDERPINNED AS FOLLOWED:
- (a) 4-STORY BUILDING – 10 PRISMS
- (b) ONE-STORY BRICK BUILDING – 6 PRISMS
- (c) 6-STORY BUILDING – 10 PRISMS
- (d) GARAGE – 8 PRISMS
- (e) 2 1/2 STORY BRICK AND FRAME BUILDING – 6 PRISMS
- (f) STREET (UNION AVE.) – 6 MARKERS

PRISMS SHALL BE SECURELY FASTENED TO THE WALLS OF EXISTING STRUCTURES.

(B) PRISMS SHALL BE OF THE TYPE MANUFACTURED BY SI MANUFACTURING INC. (CODE SI-3550) OR EQUAL.

(C) ALONG UNION ST., SURVEY MARKERS (3) SHALL BE ESTABLISHED ON SIDEWALK.

(D) BASELINE READING SHALL BE TAKEN TWICE PRIOR TO START ON CONSTRUCTION.

(E) DISPLACEMENTS (VERTICAL AND LATERAL) SHALL BE RECORDED ON A WEEKLY BASIS UNLESS OTHERWISE REQUESTED BY THE ENGINEER.

NAIL INSTALLATION

PROVIDED THE EXCAVATED FACE IS STABLE, THE SOIL NAILS MAY BE INSTALLED EITHER BEFORE OR AFTER APPLYING THE SHOTCRETE FACING. DRILL THE HOLES FOR THE SOIL NAILS AT THE LOCATIONS SHOWN. PROVIDE NAIL LENGTH AND DRILL HOLE DIAMETER NECESSARY TO DEVELOP THE LOAD CAPACITY. THE DESIGN DIAMETER OF THE SOIL NAIL DRILL HOLES IS 4". THIS DIAMETER MAY BE INCREASED OR REDUCED, IF REQUIRED, AS LONG AS THE ULTIMATE BOND CAPACITY PER UNIT LENGTH OF NAIL IS MAINTAINED.

ENSURE THAT ALL SOIL NAIL ACCESSORIES ARE AVAILABLE AT THE SITE PRIOR TO NAIL INSTALLATION AND PROPERLY INSTALLED.

VERIFY THE DIAMETER OF THE DRILL BIT TO ENSURE THE CORRECT DRILL HOLE BODY DIAMETER.

VERIFY THAT CENTRALIZERS (IF REQUIRED) ARE USED AS SPECIFIED. IT IS RECOMMENDED THAT A CENTRALIZED BE USED NEAR THE COLLAR OF THE HOLE TO SUPPORT THE NAIL AND ENSURE THAT IT IS REASONABLE CENTERED IN THE HOLE.

VERIFY THAT THE BEARING PLATE IS FLUSH SET IN THE FRESH CONCRETE AND THAT THE NUT IS TIGHTENED IMMEDIATELY AFTER THE BEARING PLATE IS SET. ENSURE THAT THE CORRECT BEVELED WASHER IS USED BETWEEN THE BEARING PLATE AND THE NUT.

VERIFY THAT THE DRILL RIG HAS THE APPROPRIATE MOTOR TO INSTALL THE HOLLOW-CORE BARS. HOLLOW-CORE BARS EQUAL TO OR GREATER THAN 2 INCHES OD HAVE A RIGHT HAND THREAD.

VERIFY THAT A TOOL SUCH AS A CLAMP OR A PIPE WRENCH IS USED TO DISCONNECT THE HOLLOW-CORE BAR FROM THE FLUSHING HEAD (OR SWIVEL). THIS IS NECESSARY TO PREVENT THE HOLLOW-CORE BAR FROM TURNING OUT OF THE COUPPLES BELOW THE GROUND. THE POINT OF CONTACT BETWEEN THE TOOL AND THE BAR SHOULD BE PROTECTED TO AVOID DAMAGE TO THE COATING USED FOR CORROSSION PROTECTION.

INJECT GROUT AT THE LOWEST POINT OF THE DRILL HOLE. PUMP GROUT THROUGH GROUT TUBES, CASING, HOLLOW STEM AUGERS OR DRILL RODS SUCH THAT THE HOLE IS FILLED COMPLETELY WITH CLEAN GROUT. PROVIDE GROUTING EQUIPMENT CAPABLE OF CONTINUOUS MIXING AND PLACEMENT, PRODUCING A GROUT FREE OF LUMPS.

PROVIDE SHOTCRETE, MORTAR PACKING, OR SECONDING GROUTING AROUND THE SOIL NAIL TO THE FACE OF THE WALL AS SOON AS PRACTICAL AFTER NAIL INSTALLATION. INSTALL THE NAIL BEARING PLATE WITH CEMENT MORTAR OR SHOTCRETE BENEATH TO PROVIDE FULL AND EVEN BEARING AGAINST THE SHOTCRETE FACING.

IN THE EVENT THAT SLOUGHING OF AN EXCAVATED FACE OCCURS PRIOR TO APPLYING THE SHOTCRETE FACING, ONE OR MORE OF THE FOLLOWING REMEDIAL AND/OR PREVENTIVE STEPS SHALL BE TAKEN:

- (a) FILL-IN OR BUILD-UP THE SLOUGHED AREA WITH SHOTCRETE SUFFICIENTLY TO STABILIZED THE EXCAVATED AREA.
- (b) REDUCE THE HEIGHT OF THE EXCAVATED FACE TO THAT REQUIRED FOR STABILITY AGAINST SLOUGHING.
- (c) REDUCE THE WIDTH OF THE EXCAVATED FACE TO THAT WIDTH WHICH CAN BE NAILED AND SHOTCRETED WITHOUT SLOUGHING.

NAIL TESTING

1. A DIAL GAUGE CAPABLE OF MEASURING TO 0.0001 INCH SHALL BE USED TO APPLY THE TEST LOAD. TEST LOADS SHALL BE APPLIED INCREMENTALLY, TEST NAIL TENDONS SHALL BE REBARS (SEE PLAN).

TESTING: INSTALL AT LEAST 1 TEST NAIL PER HORIZONTAL ROW WALL SECTION AS NON-SERVICE NAILS AND LOAD TEST TO PULLOUT FAILURE. PULL OUT FAILURE SHALL BE DEFINED AS MOVEMENT IN EXCESS OF 0.04 INCHES BETWEEN THE 1 MINUTE AND 10 MINUTE READING OR 0.08 INCHES BETWEEN 6 MINUTES AND 60 MINUTES. THE LENGTH OF THE TEST NAILS SHALL BE CHOSEN TO CAUSE PULLOUT FAILURE PRIOR TO STEEL YIELD, BUT SHALL NOT BE LESS THAN 8 FEET IN SOIL. A MINIMUM UNGROUTEDZONE OF 5 FEET IN LENGTH SHALL BE USED IMMEDIATELY BEHIND THE WALL FACE. AFTER GROUTING, THE TEST NAIL SHALL NOT BE LOADED UNTIL THE GROUT HAS DEVELOPED SUFFICIENT STRENGTH.

THE PULLOUT TEST SHALL BE MADE BY INCREMENTALLY LOADING THE NAIL AND MEASURING NAIL MOVEMENT AT EACH LOAD INCREMENT TO 0.001 INCHES WITH RESPECT TO AN INDEPENDENT, FIXED, REFERENCE POINT. EACH TEST LOAD INCREMENT SHALL BE NO MORE THAN THAT 25% IF THE THEORETICAL ULTIMATE CAPACITY OF THE TEST NAIL BASED ON ITS TEST BOND LENGTH AND DESIGN ULTIMATE BOND STRESS OF 40 PSI TO 50 PSI DEPENDING ON LOCATION AS DIRECTED BY THE ENGINEER.

ACCEPTANCE: THE TEST NAIL SHALL BE DEEMED ACCEPTABLE IF THE DESIGN ULTIMATE STRESS IS SUCCESSFULLY HELD WITHOUT EXCESSIVE CREEP. UNACCEPTABLE TEST RESULTS SHALL BE CAUSE FOR MODIFICATIONS TO THE DESIGN AND/OR CONSTRUCTION PROCEDURES INCLUDING, BUT NOT LIMITED TO, NAIL LENGTHS, HOLE DIAMETERS, NAIL SPACINGS, OR RE-GROUTING.

2. PROOF TESTING: TEST 5% OF THE NAILS ON A MINIMUM OF ONE PER ROW.

PERFORM PROOF TESTING ON 5% (1 OF 20) OF THE PRODUCTION NAILS IN EACH ROW OR A MINIMUM OF 1 PER ROW. THE LOCATIONS SHALL BE DESIGNATED BY THE ENGINEER.

PRODUCTION PROOF TEST NAILS SHALL HAVE A MINIMUM UNBONDED LENGTH OF 3 FEET. THE UNBOUNDED LENGTH SHALL BE GROUTED AFTER TESTING.

INCREMENTALLY LOAD THE PROOF TEST NAIL TO A MAXIMUM TEST LOAD OF 1.33 TIMES THE DESIGN LOAD (P) IN ACCORDANCE WITH THE FOLLOWING SCHEDULE. RECORD THE SOIL NAIL MOVEMENTS AT EACH LOAD INCREMENT.

LOAD	HOLD TIME
AL	MINIMUM OF 1 MINUTE
0.25 P	MINIMUM OF 1 MINUTE
0.50 P	MINIMUM OF 1 MINUTE
0.75 P	MINIMUM OF 1 MINUTE
1.00 P	MINIMUM OF 1 MINUTE
1.33 P (MAX. TEST LOAD SEE BELOW)	

HOLD EACH LOAD INCREMENTS, EXCEPT FOR THE 1.33 (P) LOAD, UNTIL THE DEFLECTION STABILIZES.

ALL LOAD INCREMENTS SHALL BE MAINTAINED WITHIN 5% OF THE INTENDED LOAD, DEPENDING ON THE PERFORMANCE, EITHER 10-MINUTE CREEP TESTS SHALL BE PERFORMED AT THE MAXIMUM TEST LOAD (1.33 P). THE CREEP PERIOD SHALL START AS SOON AS THE MAXIMUM TEST LOAD IS APPLIED AND THE NAIL MOVEMENT SHALL BE MEASURED AND RECORDED AT 1 MINUTE, 2, 3, 5, 6, AND 10 MINUTES. WHERE THE NAIL MOVEMENT BETWEEN 1 MINUTE AND 10 MINUTES EXCEEDS 0.04 INCHES, THE MAXIMUM TEST LOAD SHALL BE MAINTAINED AN ADDITIONAL 50 MINUTES AND MOVEMENTS SHALL BE RECORDED AT 20 MINUTES, 30, 50, AND 60 MINUTES. IF AFTER 60 MINUTES, THE MOVEMENT BETWEEN 6 MINUTES AND 60 MINUTES IS LESS THAN 0.08 INCHES THEN THE TEST IS DEEMED SUCCESSFUL.

112-21 NORTHERN BLVD

QUEENS, NY 11368

BLOCK: 1707ZONING MAP: 10BLot: 8Zone: C2-4

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STRUCTURAL CONSULTANT

MEP CONSULTANT

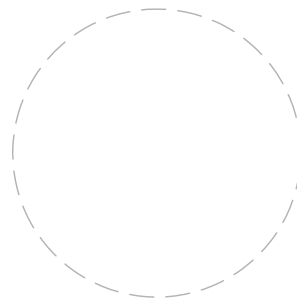
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VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

ISSUE	DESCRIPTION	DATE
	FOR APPROVAL	2014-05-28

SEAL & SIGNATURE



SHEET NAME

GENERAL NOTES

112-21 NORTHERN BLVD

QUEENS, NY 11368

BLOCK: 1707 LOT: 8
ZONING MAP: 10B ZONE: C2-4

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	FOR APPROVAL	2014-05-28

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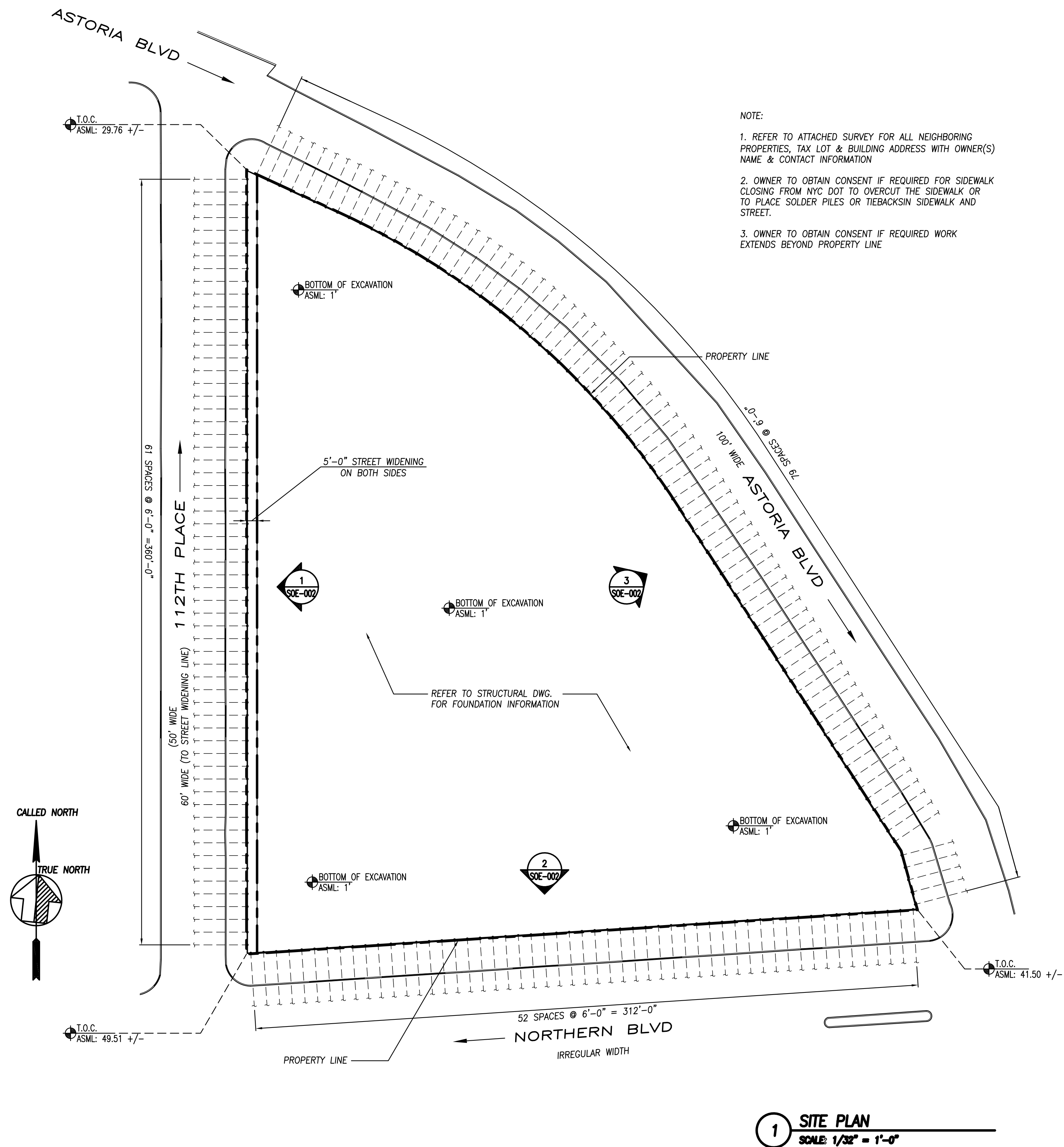
SHEET NAME

SUPPORT OF EXCAVATION PLAN

SHEET # 3 OF 6

SOE-001.00

APPLICATION #



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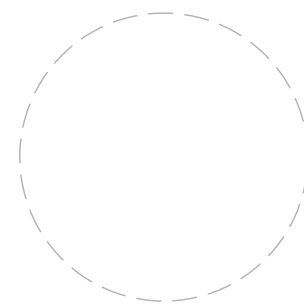
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	FOR APPROVAL	2014-05-28

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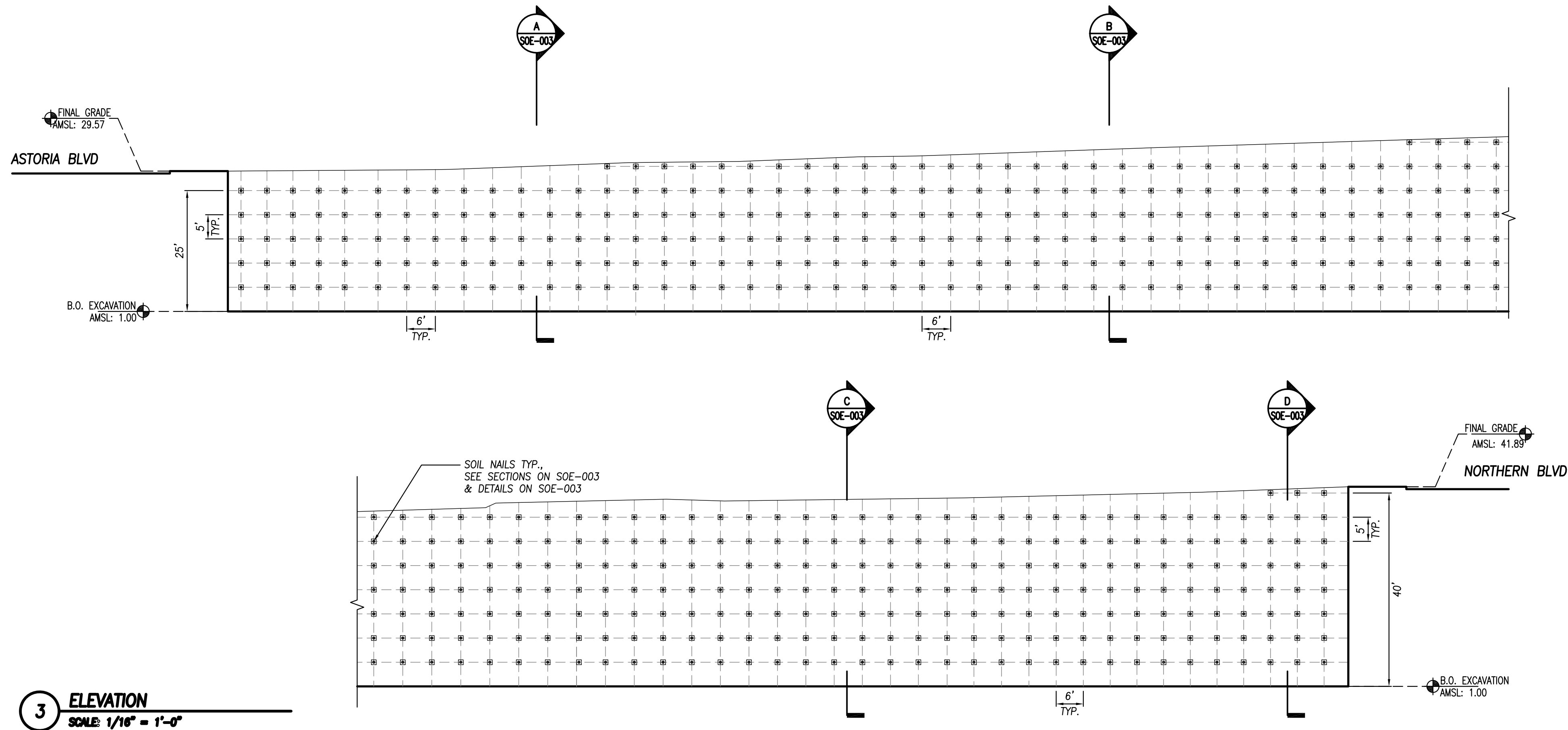
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SUPPORT OF
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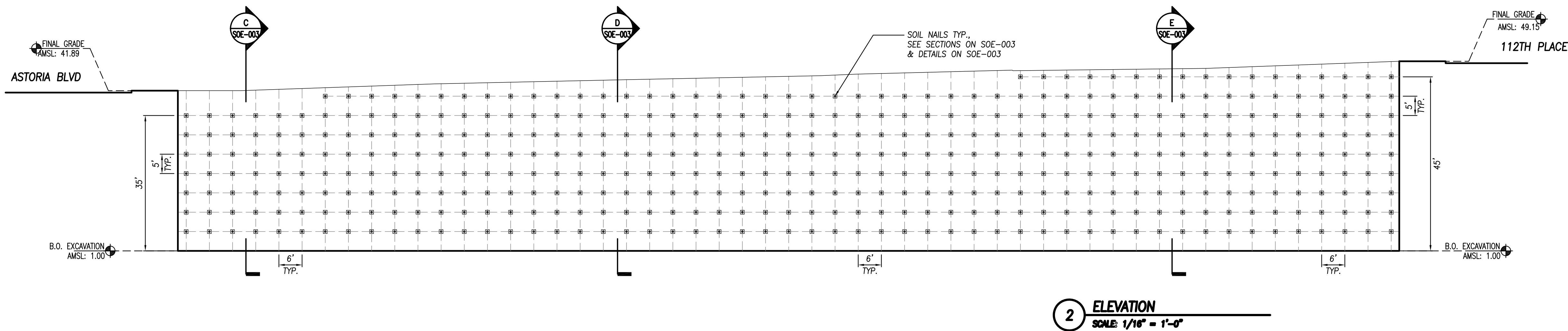
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SOE-002.00

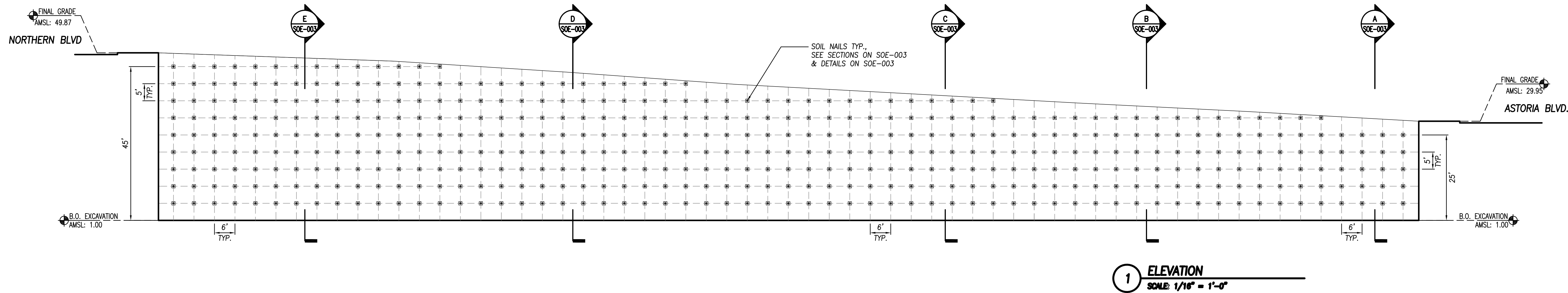
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3 ELEVATION
SCALE: 1/16" = 1'-0"



2 ELEVATION
SCALE: 1/16" = 1'-0"



1 ELEVATION
SCALE: 1/16" = 1'-0"

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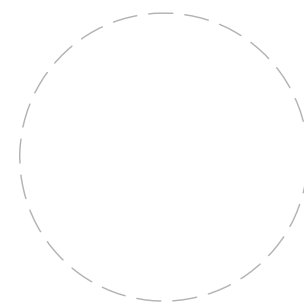
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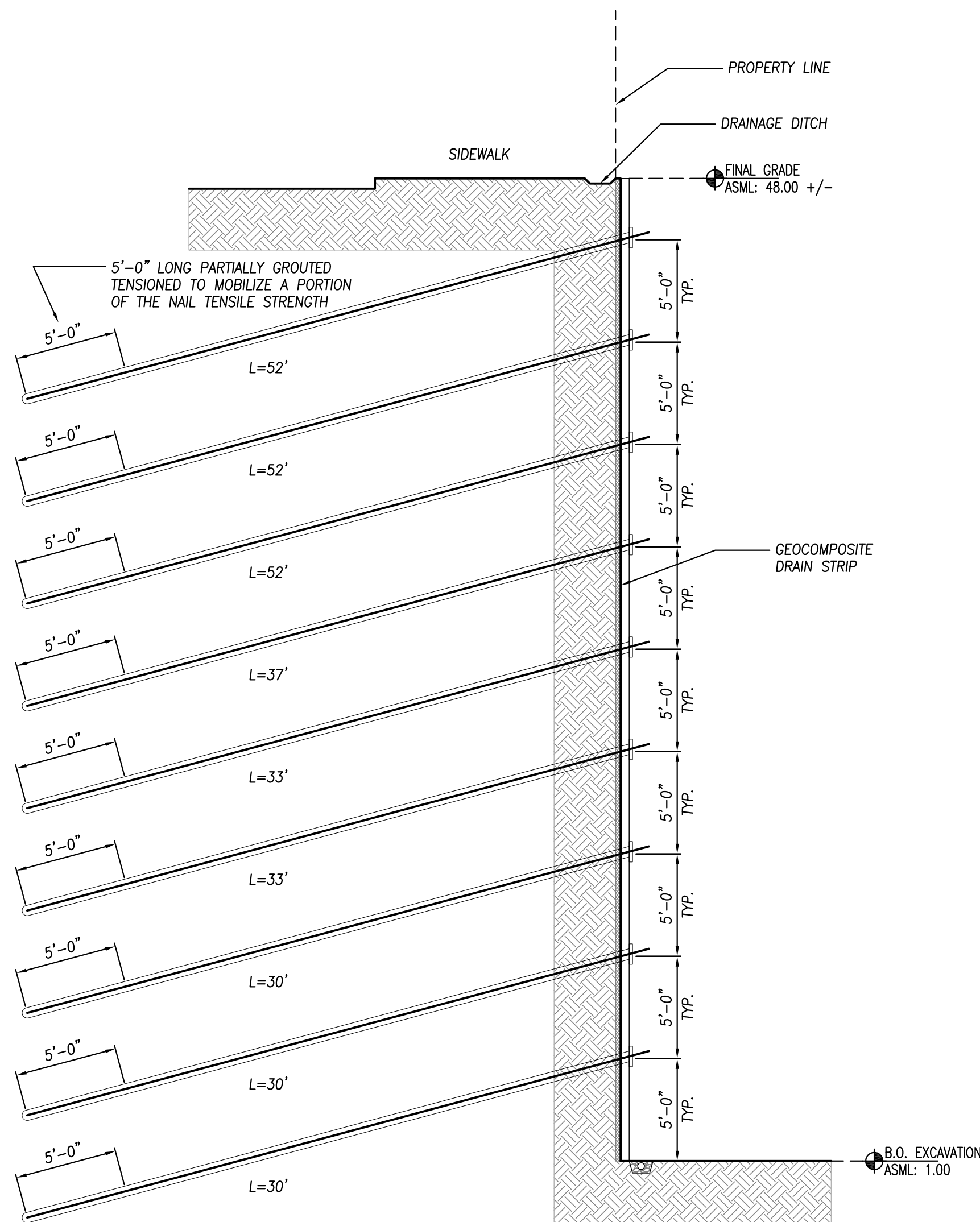
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SUPPORT OF
EXCAVATION
SECTIONS

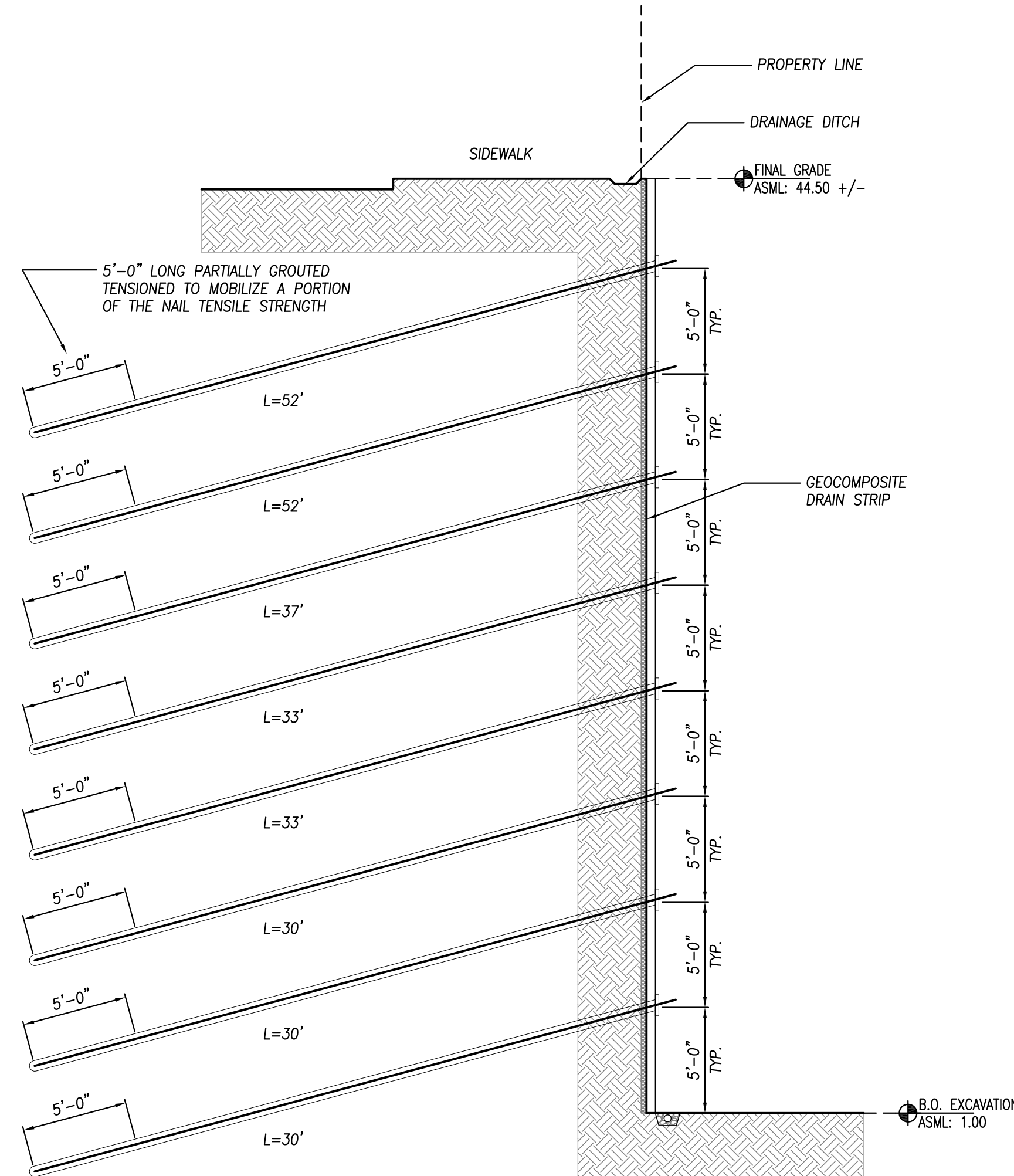
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SOE-003.00

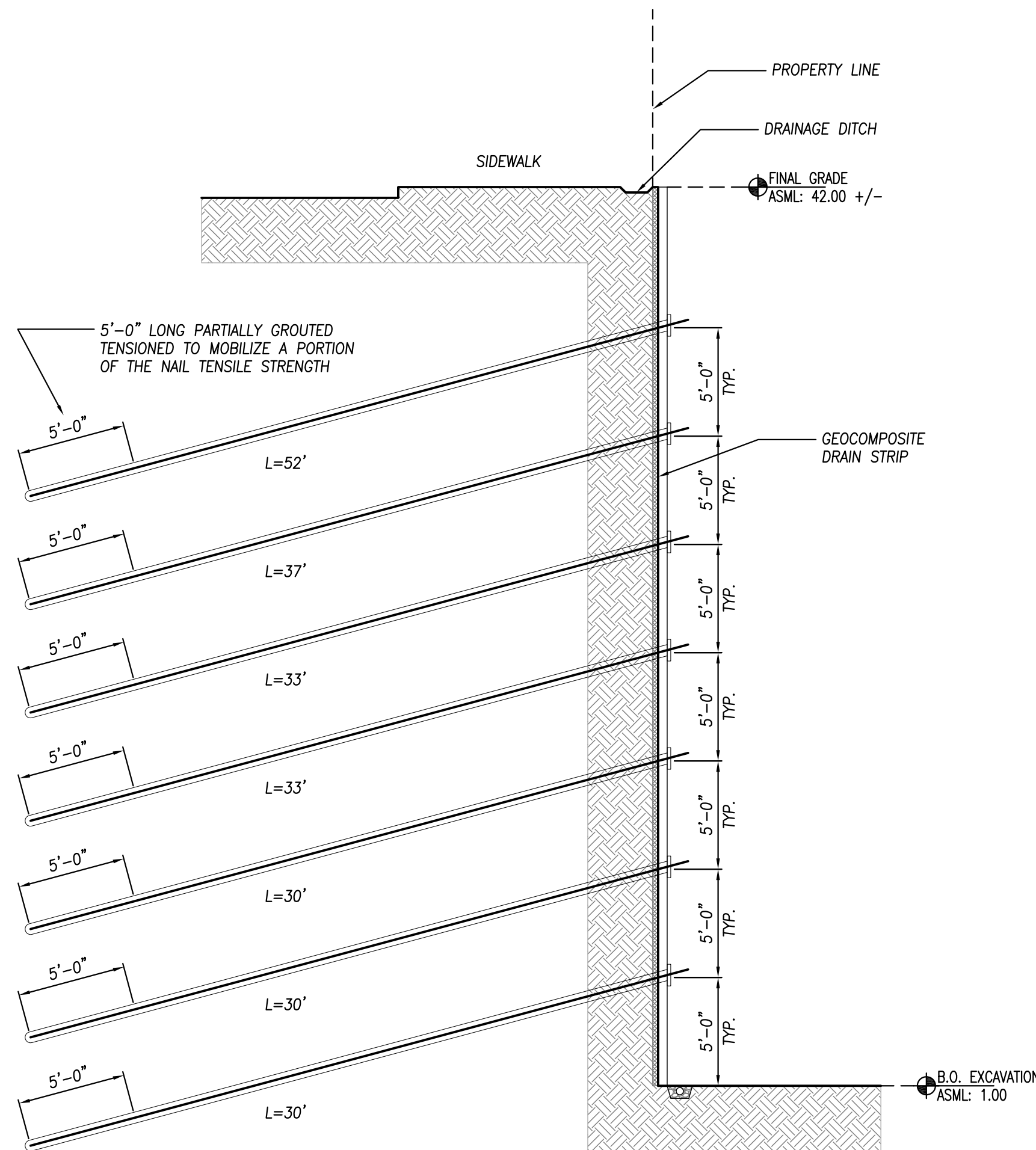
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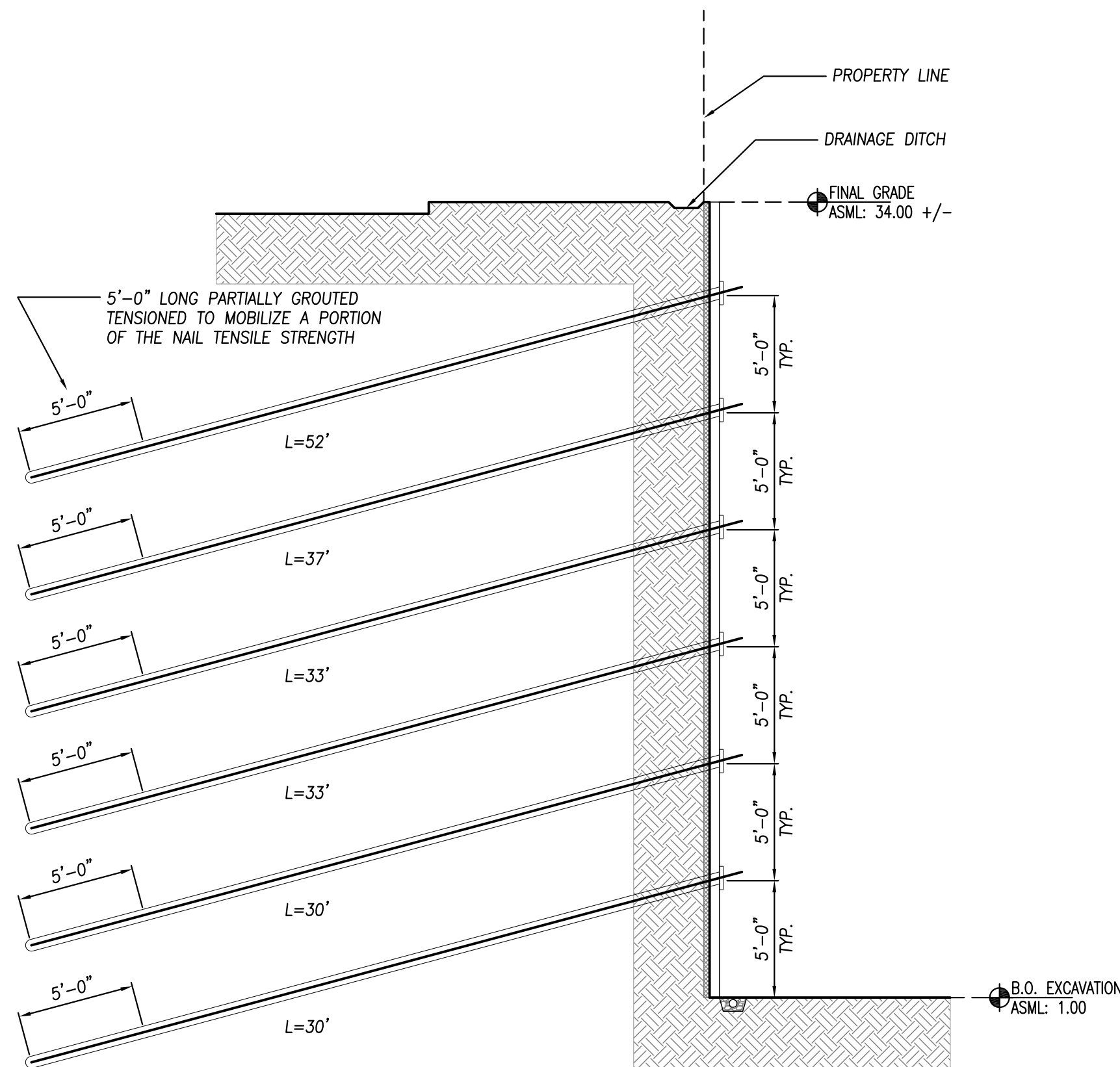
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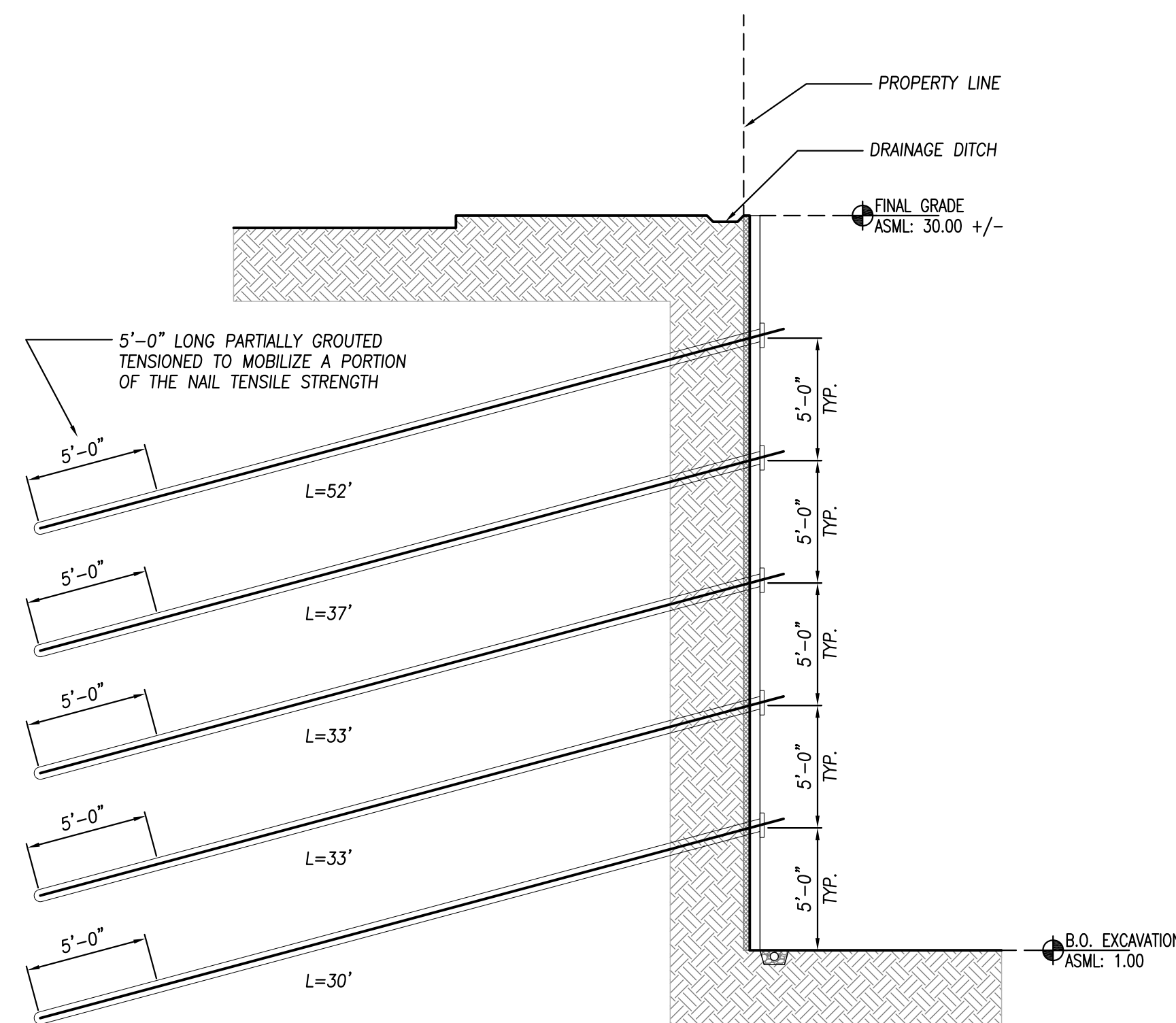
D SECTION
SCALE: 3/16" = 1'-0"



C SECTION
SCALE: 3/16" = 1'-0"



B SECTION
SCALE: 3/16" = 1'-0"



A SECTION
SCALE: 3/16" = 1'-0"

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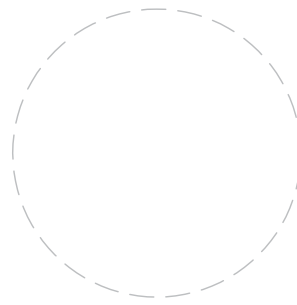
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SHEET NAME

DETAILS

SHEET #

6 OF 6

SOE-101.00

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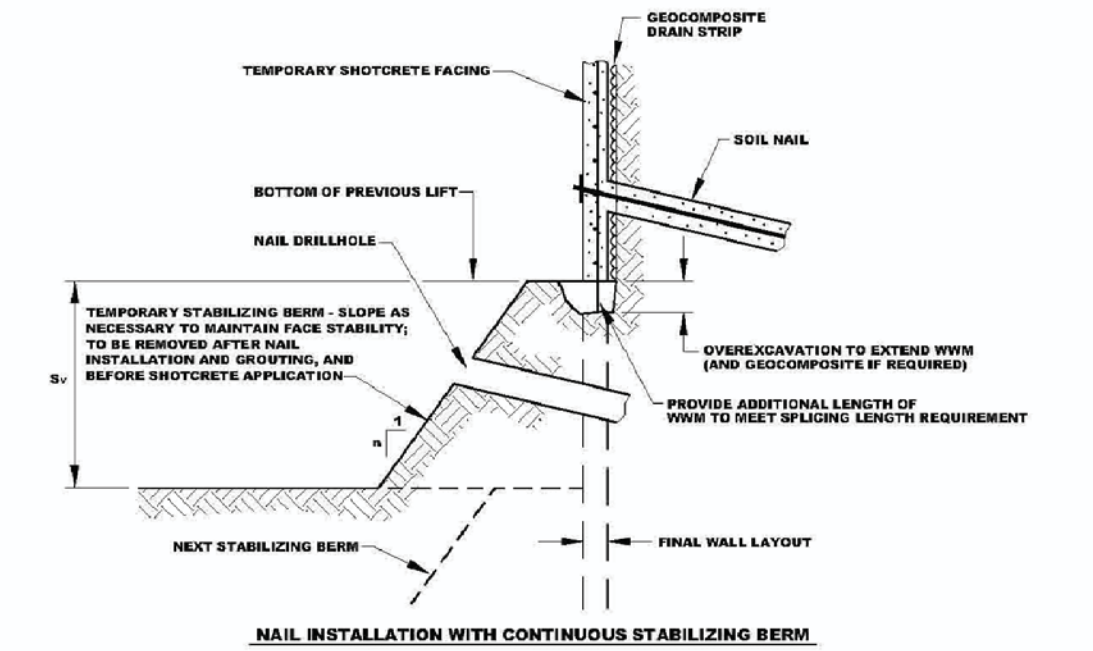


Figure 4.7 (a): Examples of Alternative Temporary Excavation Support: Stabilizing Berm.

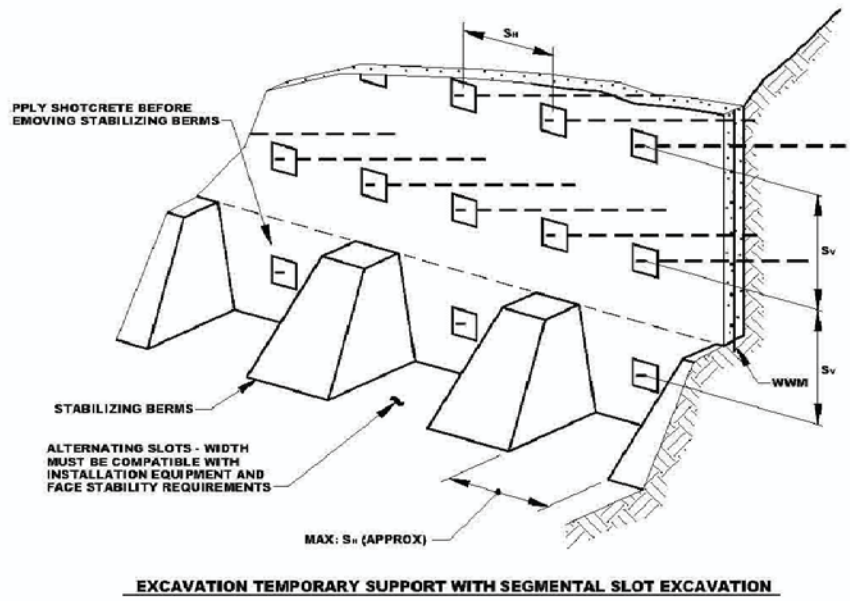
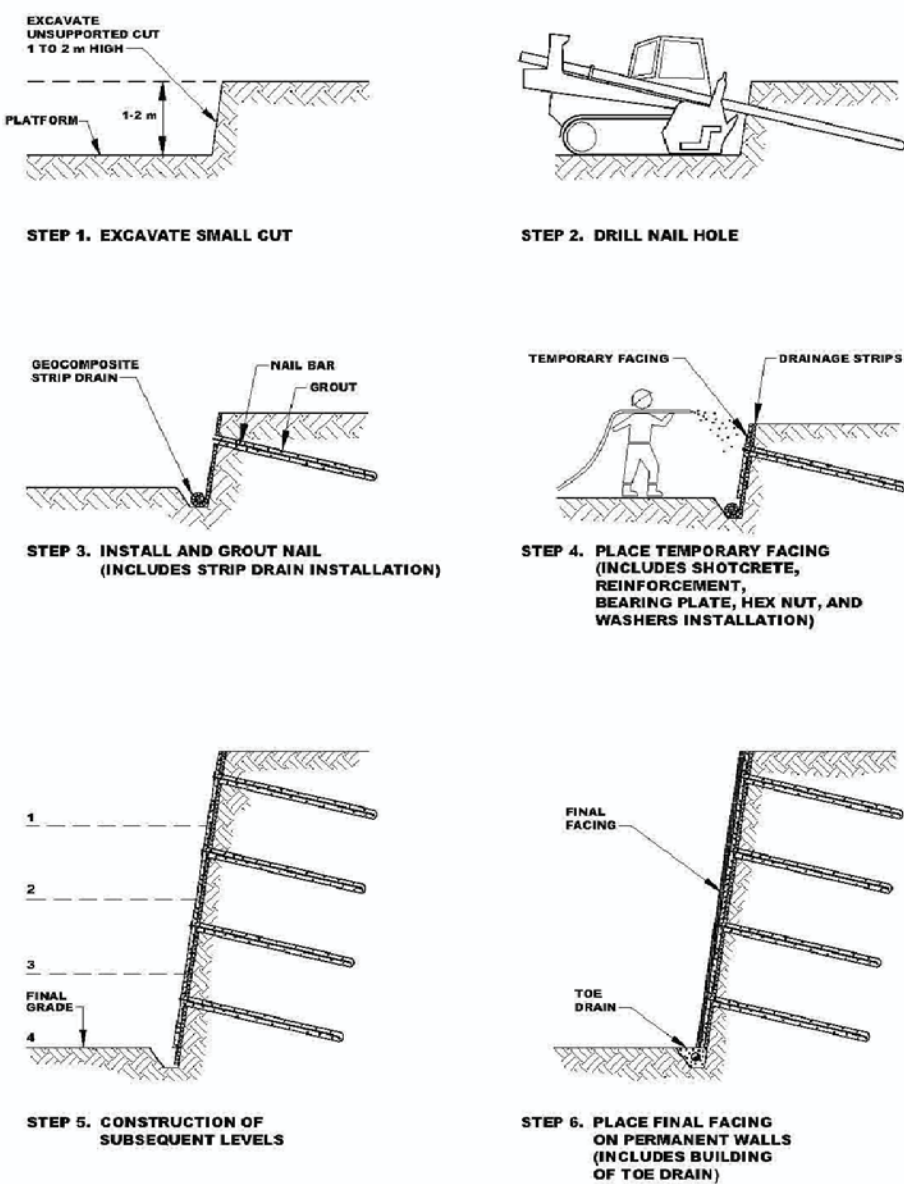


Figure 4.7 (b): Examples of Alternative Temporary Excavation Support: Slot Excavation.



Modified after Porterfield et al. (1994).

Figure 2.2: Typical Soil Nail Wall Construction Sequence.

Variations of the steps described above may be necessary to accommodate additional preparation tasks or supplementary activities for specific project conditions. For example, shotcrete may be applied at each lift immediately after excavation and prior to nail hole drilling and installation,

recommended factors of safety are only applicable to the ASD method where loads are unfactored (see Section 5.10).

Table 5.3: Minimum Recommended Factors of Safety for the Design of Soil Nail Walls using the ASD Method.

Failure Mode	Resisting Component	Symbol	Minimum Recommended Factors of Safety		
			Static Load ⁽¹⁾	Seismic Loads ⁽²⁾	(Temporary and Permanent Structures)
External Stability	Global Stability (long-term)	FS _g	1.35	1.5 ⁽³⁾	1.1
	Global Stability (excavation)	FS _g	1.2-1.3 ⁽³⁾	NA	
	Sliding	FS _s	1.3	1.5	1.1
	Bearing Capacity	FS _b	2.5 ⁽³⁾	3.0 ⁽³⁾	2.3 ⁽³⁾
Internal Stability	Pullout Resistance	FS _p	2.0		1.5
	Nail Bar Tensile Strength	FS _t	1.8		1.35
Facing Strength	Facing Flexure	FS _{ff}	1.35	1.5	1.1
	Facing Punching Shear	FS _{ps}	1.35	1.5	1.1
	H-Stub Tensile (A307 Bolt)	FS _{st}	1.8	2.0	1.5
	H-Stub Tensile (A325 Bolt)	FS _{st}	1.5	1.7	1.3

Notes: (1) For non-critical, permanent structures, some agencies may accept a design for static loads and long-term conditions with FS_g = 1.35 when less uncertainty exists due to sufficient geotechnical information and successful local experience on soil nailing.
(2) The second set of safety factors for global stability corresponds to the case of temporary excavation lifts that are unsupported for up to 48 hours before nails are installed. The larger value may be applied to more critical structures or when more uncertainty exists regarding soil conditions.
(3) The safety factors for bearing capacity are applicable when using standard bearing-capacity equations. When using stability analysis programs to evaluate these failure modes, the factors of safety for global stability apply.

5.10 LOAD COMBINATIONS

Soil nail walls used on typical highway projects are subjected to different loads during their service life. Typical applied loads are dead loads (e.g., weight of the soil nail wall system, lateral earth pressure, weight of a nearby above-ground structure), traffic loads, impact loads (e.g., vehicle collision on barriers above soil nail wall), and earthquake loads. Table 5.4 presents a list of the load types considered for highway structures by AASHTO (1996).

Several load combinations that include two or more load types must be considered in design to assess the most critical loading condition. Each load combination (or "load group" per AASHTO, 1996) takes into consideration the occurrence of simultaneous loads of different types that a structure may be subjected to during its service life. The effect of a load group (N) can be expressed, in its most general form, as:

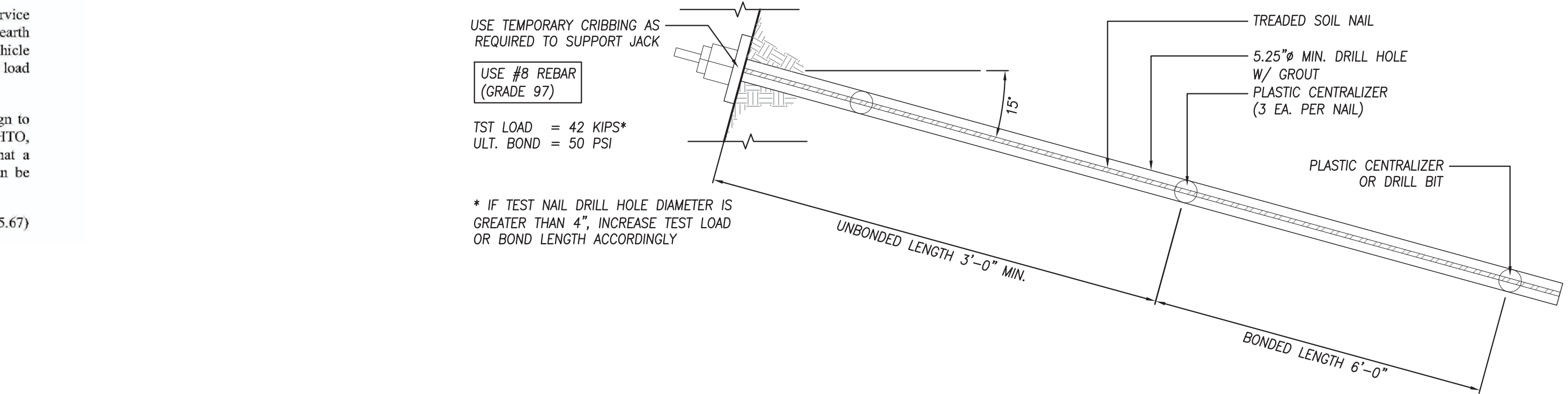
$$N = \gamma_n \left(\sum \beta_{in} Q_{in} \right) \quad (\text{Equation 5.67})$$

Table 3.10: Estimated Bond Strength of Soil Nails in Soil and Rock.

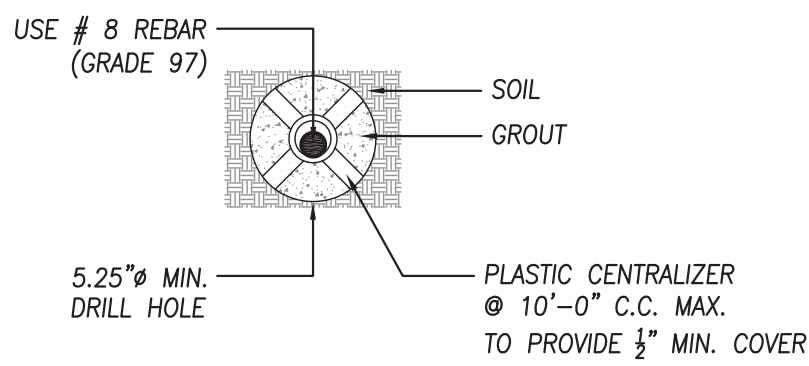
(Source: Elias and Juran, 1991).

Material	Construction Method	Soil/Rock Type	Ultimate Bond Strength, q _b (kPa)
Rock	Rotary Drilled	Marl/limestone	300 - 400
		Phyllite	100 - 300
		Chalk	500 - 600
		Soft dolomite	400 - 600
		Fissured dolomite	600 - 1000
		Weathered sandstone	200 - 300
		Weathered shale	100 - 150
		Weathered schist	100 - 175
		Basalt	500 - 600
		Slate/Hard shale	300 - 400
Cohesionless Soils	Rotary Drilled	Sand/gravel	100 - 180
		Silty sand	100 - 150
		Silt	60 - 75
		Piedmont residual	40 - 120
		Fine colluvium	75 - 150
	Driven Casing	Sand/gravel	190 - 240
		low overburden	280 - 430
		Dense Moraine	380 - 480
	Augered	Colluvium	100 - 180
		Silty sand fill	20 - 40
Fine-Grained Soils	Rotary Drilled	Silty fine sand	55 - 90
		Silty clayey sand	60 - 140
		Jet Grouted	380
		Sand	700
		Sand/gravel	700
	Driven Casing	Silty clay	35 - 50
		Clayey silt	90 - 140
	Augered	Loess	25 - 75
		Soft clay	20 - 30
		Stiff clay	40 - 60
		Stiff clayey silt	40 - 100
		Calcareous sandy clay	90 - 140

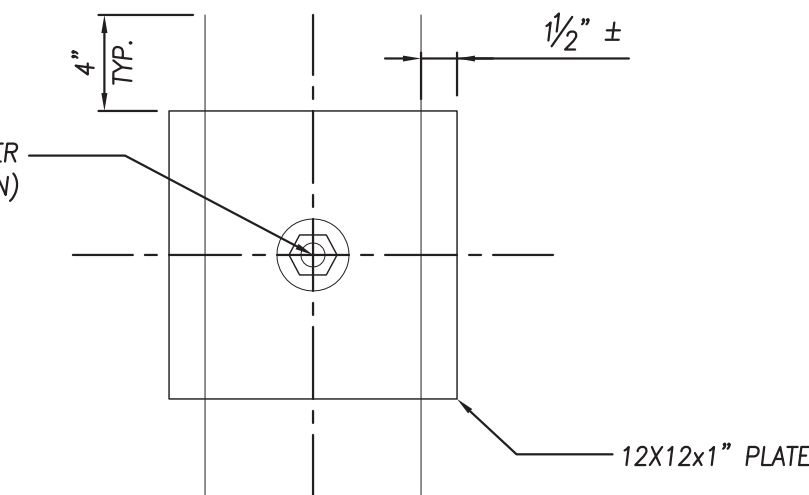
Notes: Convert values in kPa to psf by multiplying by 20.9
Convert values in kPa to psi by multiplying by 0.145



2 TEST NAIL DETAIL SCALE: N.T.S.



B-B SECTION SCALE: 1" = 1'-0"



A-A SECTION SCALE: N.T.S.

1 SOIL NAIL DETAIL SCALE: N.T.S.

112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

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INTERIOR CONSULTANT

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SHEET NAME

SITE PLAN

SHEET # OF

A-100

APPLICATION #



112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

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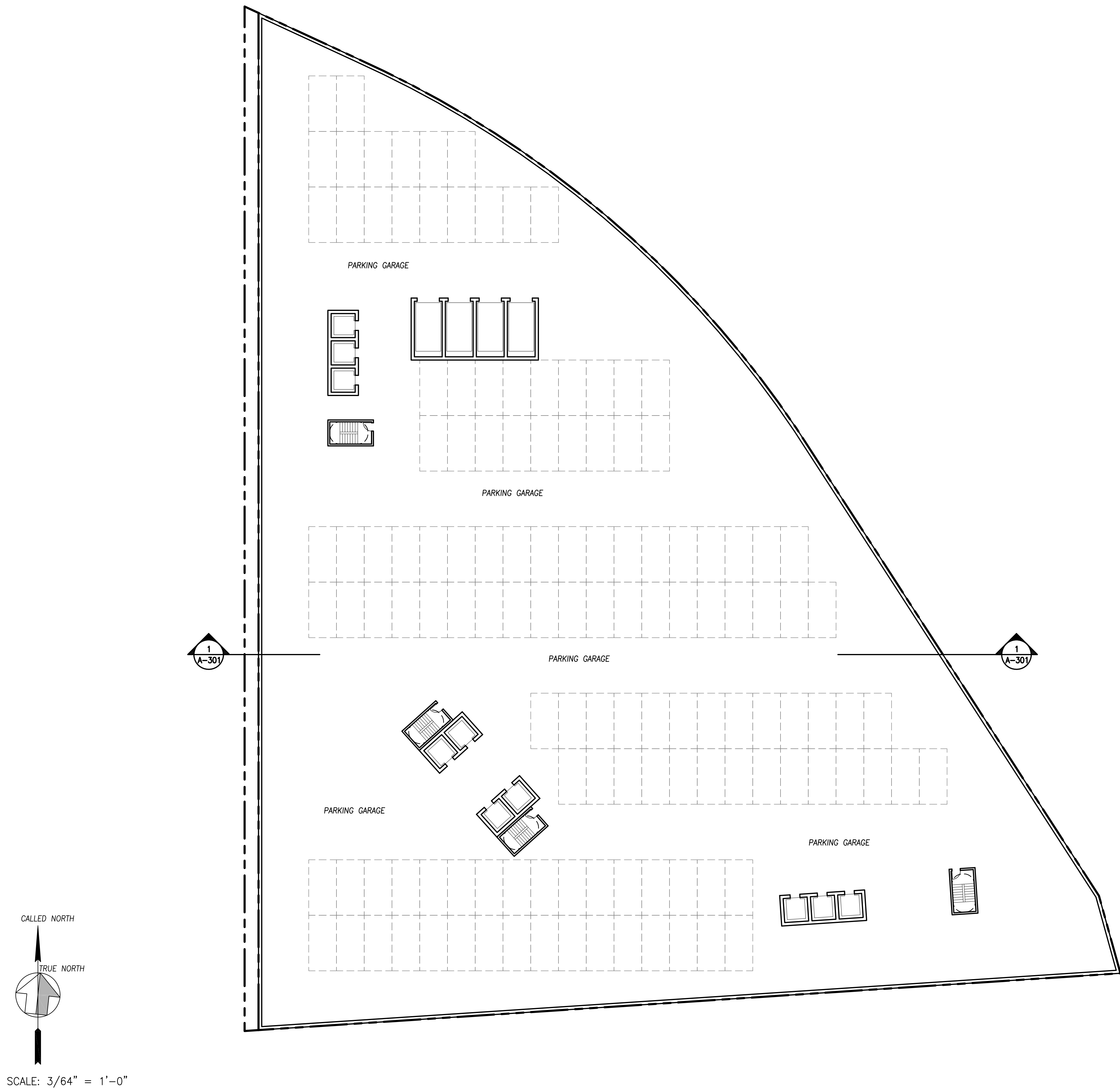
SHEET NAME

FLOOR PLAN –
SUBCELLAR 2

SHEET # OF

A-101

APPLICATION #



112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 LOT: 8
ZONING MAP: 10b ZONE: PRIM. R6, C2-4 OVLY

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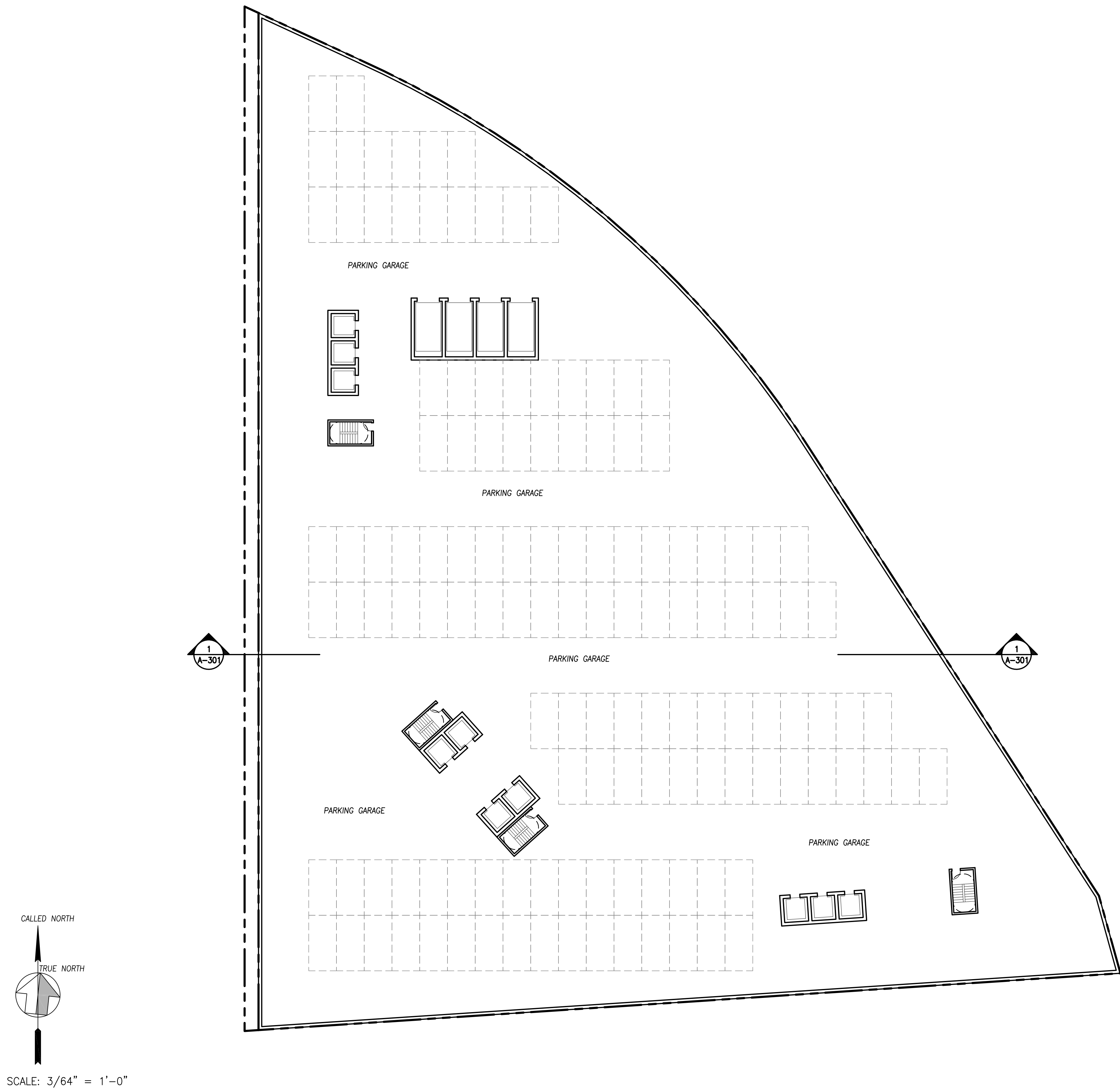
SHEET NAME

FLOOR PLAN -
SUBCELLAR 1

SHEET # OF

A-102

APPLICATION #



112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER

EASTERN EMERALD GROUP, LLC
136-20 38TH AVE, 10F, QUEENS, NY 11354
T 212-359-0801
F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
136-20 38TH AVE, 10F, QUEENS, NY 11354
T 212-359-0802
F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

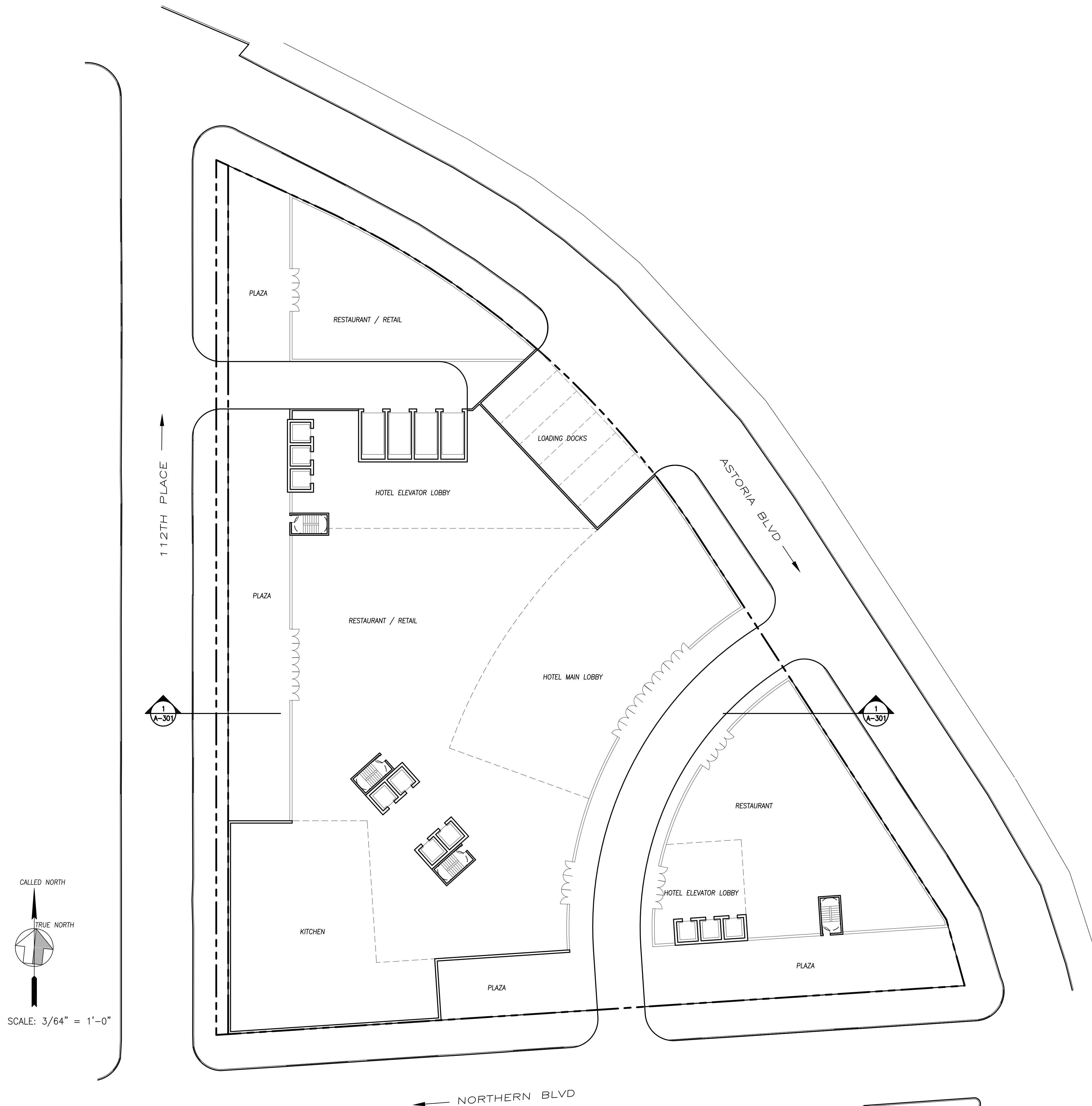
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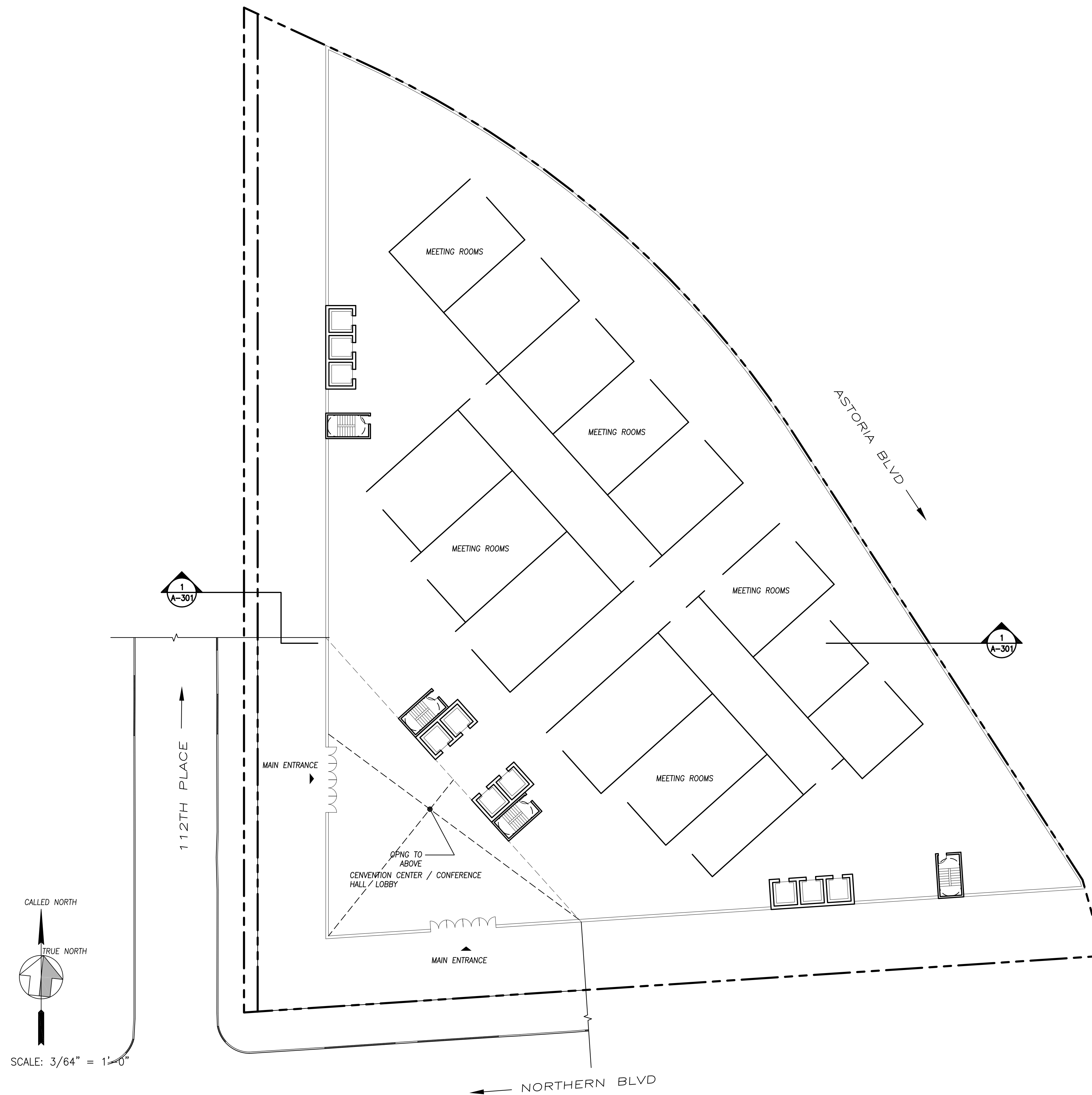
FLOOR PLAN -
CELLAR

SHEET # OF

A-103

APPLICATION #





PROJECT INFO	JOB #	1102
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112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER

EASTERN EMERALD GROUP, LLC
136-20 38TH AVE, 10F, QUEENS, NY 11354
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F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
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F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

SHEET NAME

FLOOR PLAN -
1ST FLOOR

SHEET # OF

A-111

APPLICATION #

112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 LOT: 8
ZONING MAP: 10b ZONE: PRIM. R6, C2-4 OVLY

OWNER

EASTERN EMERALD GROUP, LLC
136-20 38TH AVE, 10F, QUEENS, NY 11354
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F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
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CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

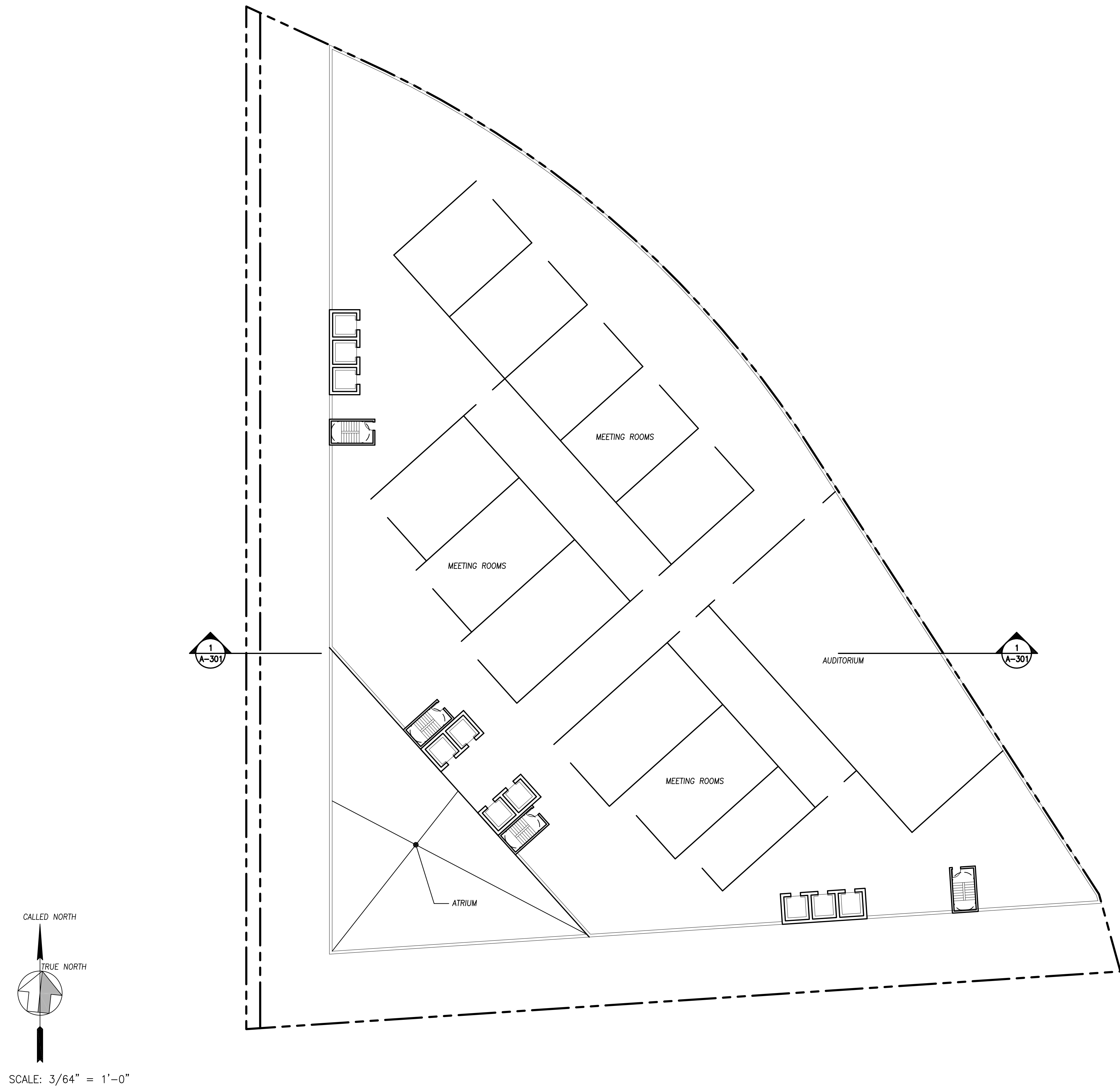
SHEET NAME

FLOOR PLAN -
2ND - 3RD FLOOR

SHEET # OF

A-112

APPLICATION #



112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER

EASTERN EMERALD GROUP, LLC
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F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
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F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

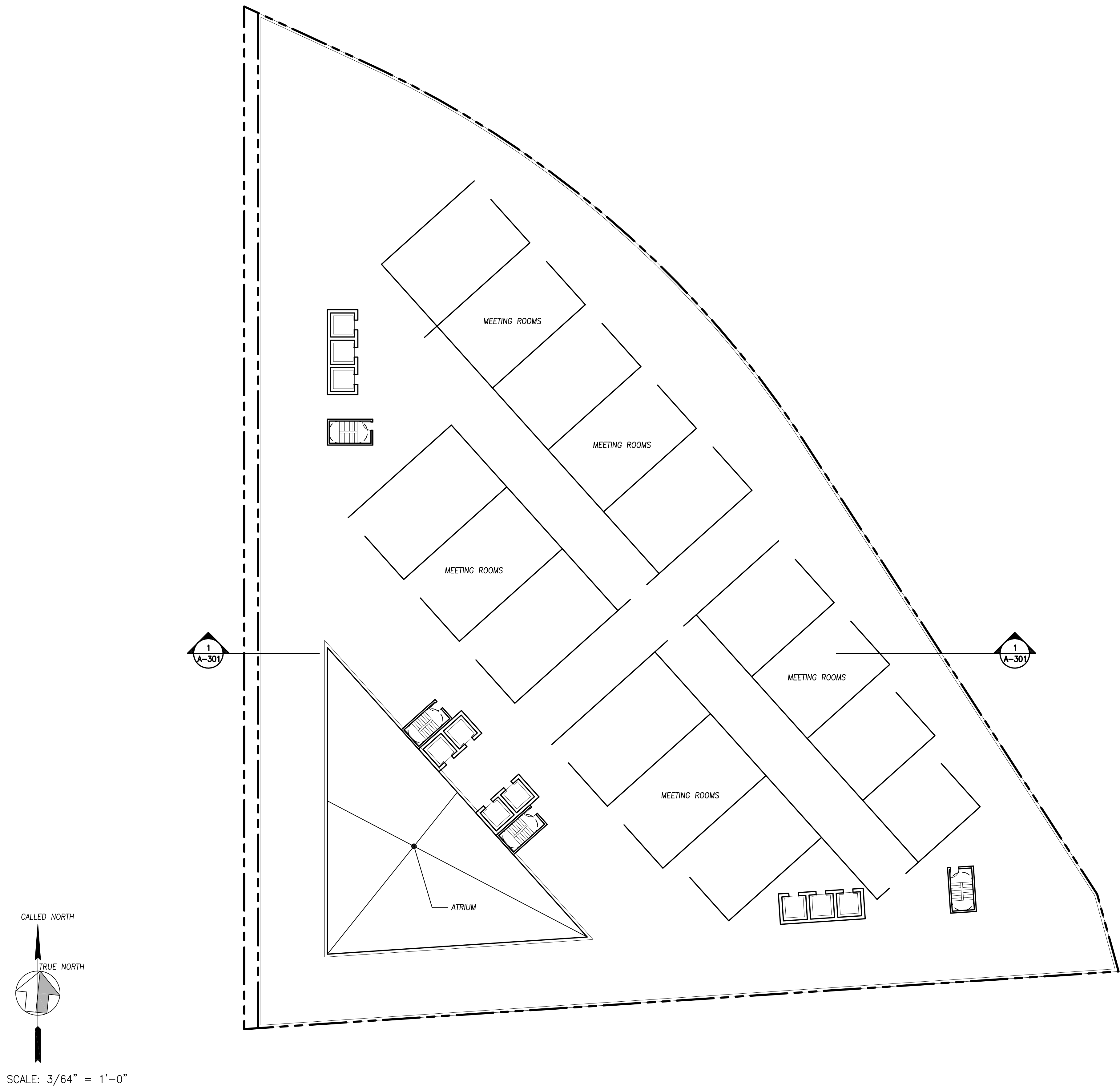
SHEET NAME

FLOOR PLAN -
4TH - 5TH FLOOR

SHEET # OF

A-113

APPLICATION #



PROJECT INFO	JOB #	1102
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112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER _____

EASTERN EMERALD GROUP, LLC
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F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
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F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

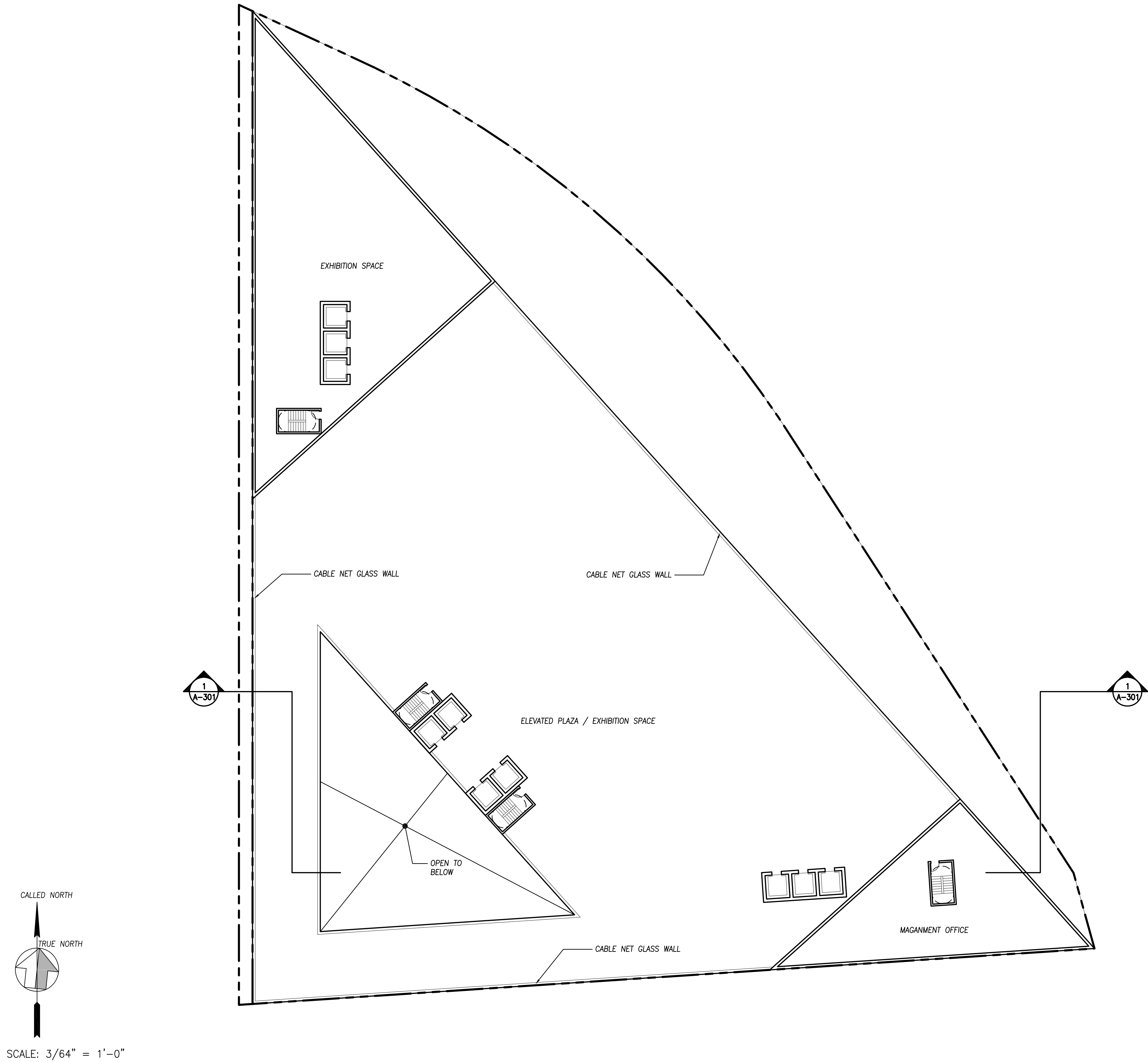
SHEET NAME

FLOOR PLAN -
6TH FLOOR

SHEET # OF

A-114

APPLICATION #



112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER

EASTERN EMERALD GROUP, LLC
136-20 38TH AVE, 10F, QUEENS, NY 11354
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F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
136-20 38TH AVE, 10F, QUEENS, NY 11354
T 212-359-0802
F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

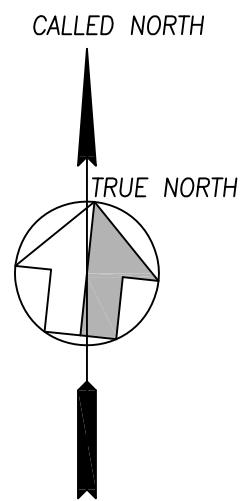
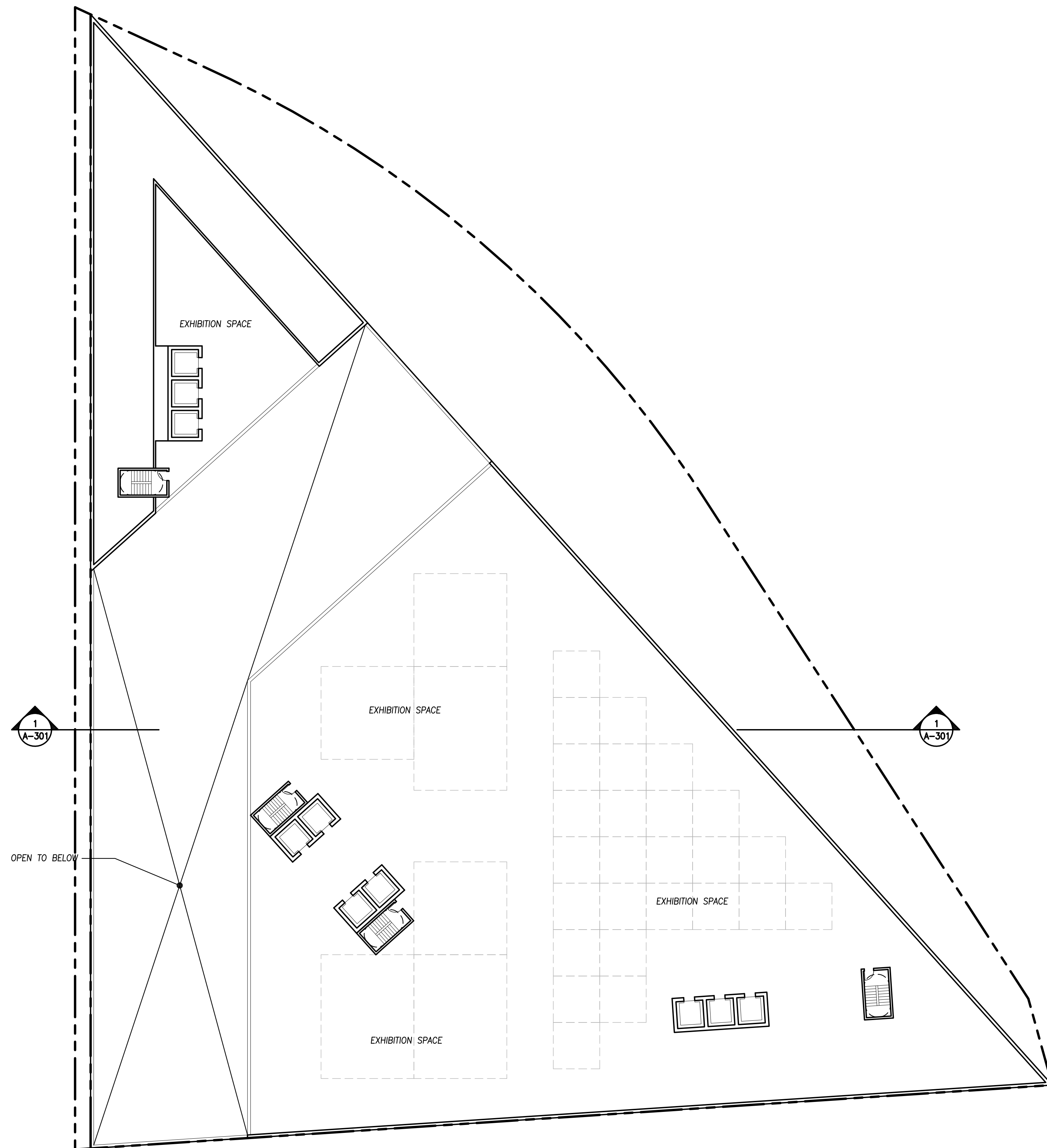
SHEET NAME

FLOOR PLAN -
7TH-11TH FLOOR

SHEET # OF

A-121

APPLICATION #



SCALE: 3/64" = 1'-0"

112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER

EASTERN EMERALD GROUP, LLC
136-20 38TH AVE, 10F, QUEENS, NY 11354
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F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
136-20 38TH AVE, 10F, QUEENS, NY 11354
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F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

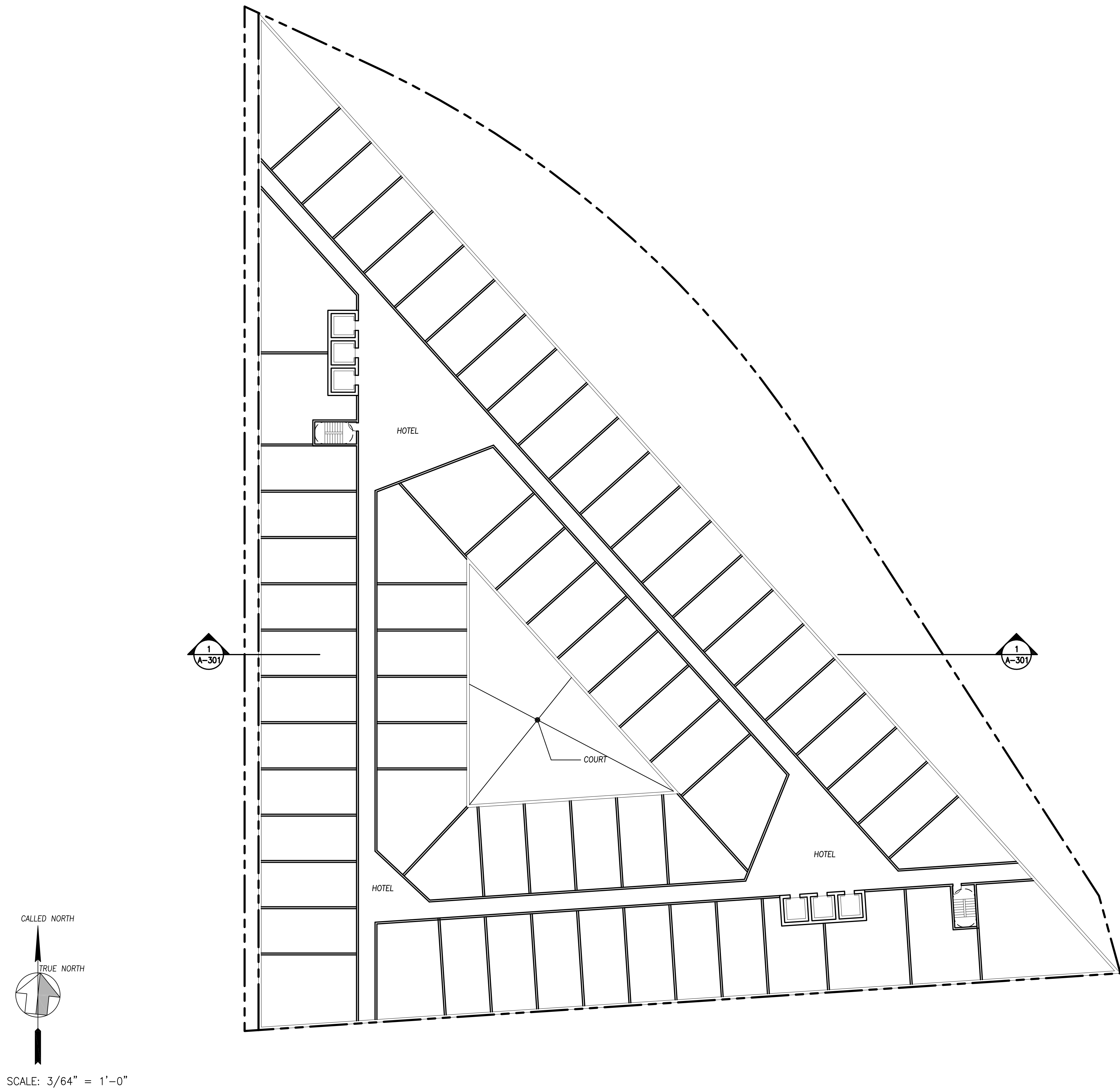
SHEET NAME

FLOOR PLAN –
12TH–22TH FLOOR

SHEET # OF

A-131

APPLICATION #



112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER

EASTERN EMERALD GROUP, LLC
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F 212-359-0803

ARCHITECT

FLEET ARCHITECTS, LLP
136-20 38TH AVE, 10F, QUEENS, NY 11354
T 212-359-0802
F 212-359-0803

CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

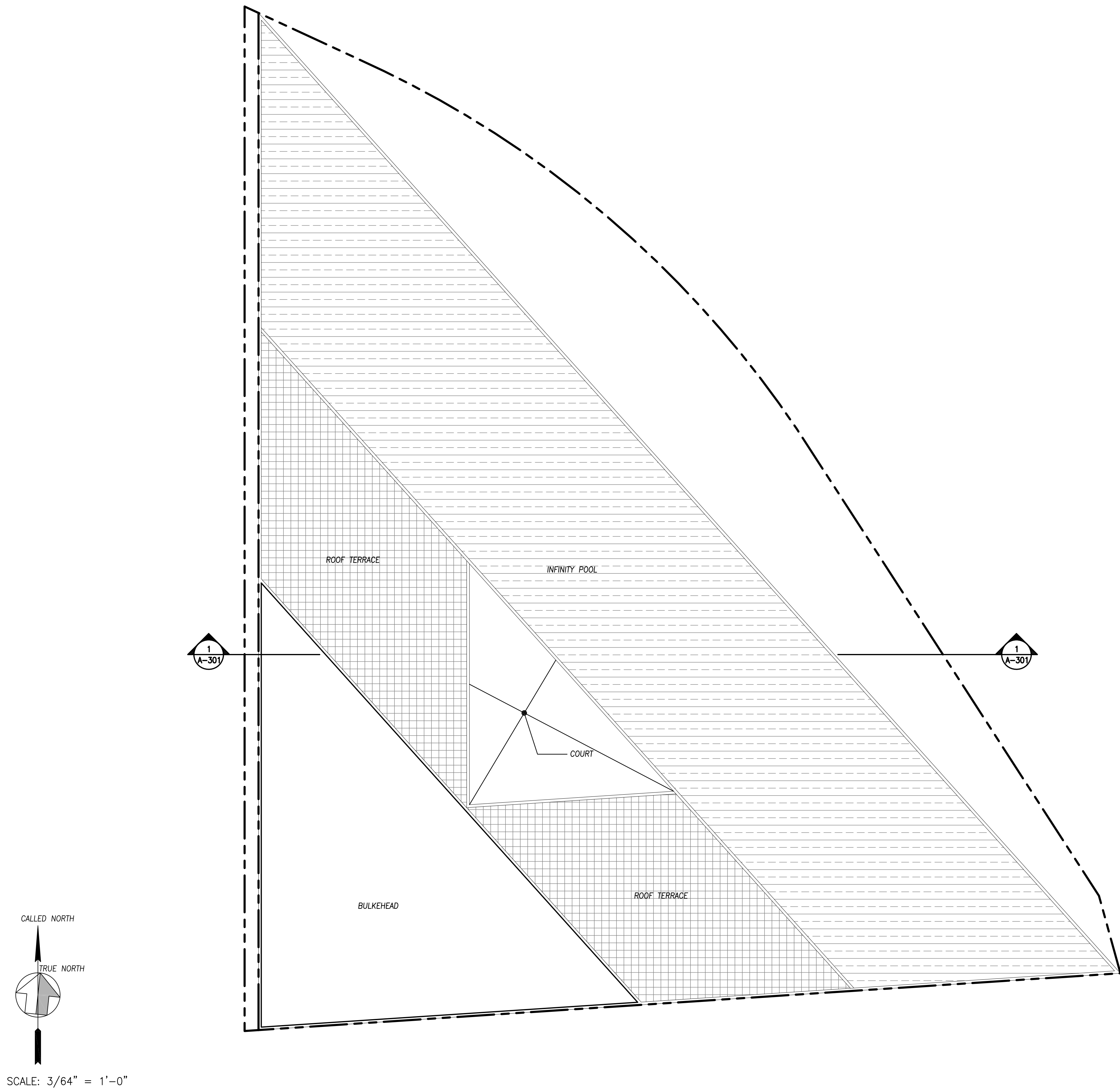
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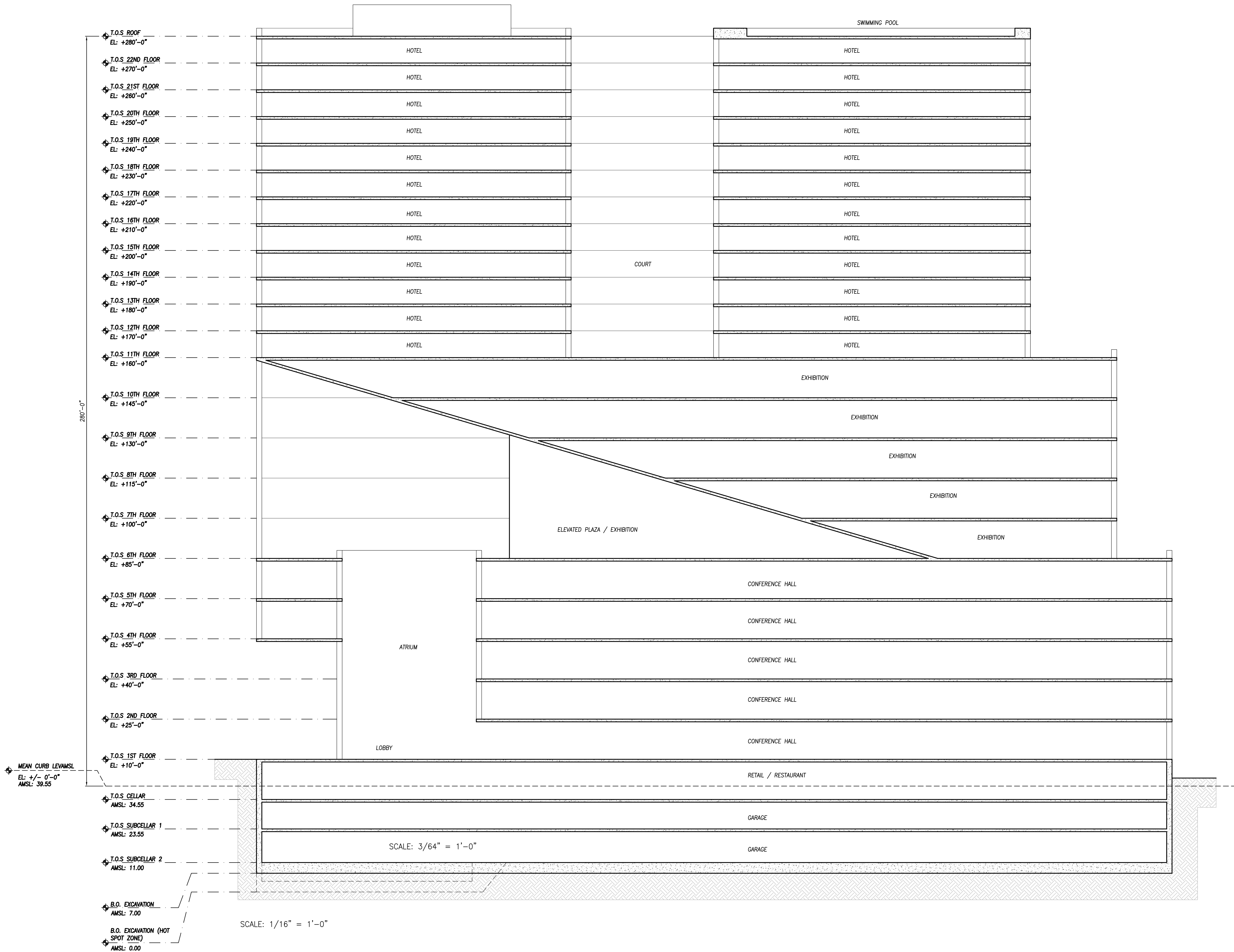
ROOF PLAN

SHEET # OF

A-141

APPLICATION #





PROJECT INFO	JOB # 1102
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112-51 NORTHERN BLVD

ADDRESS:
112-51 NORTHERN BLVD, QUEENS, NY 11368

BLOCK: 1707 **LOT: 8**
ZONING MAP: 10b **ZONE: PRIM. R6, C2-4 OVLY**

OWNER
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CONSTRUCTION MANAGER

GEOTECHNICAL CONSULTANT

STRUCTURAL CONSULTANT

MEP CONSULTANT

FACADE CONSULTANT

VERTICAL TRANSPORTATION CONSULTANT

INTERIOR CONSULTANT

[illegible]

SEAL & SIGNATURE

SHEET NAME
BUILDING SECTION

SHEET # **A-301** OF

APPLICATION #

Health and Safety Plan

November 11, 2014

HEALTH AND SAFETY PLAN

**112-21 Northern Boulevard
Corona, Queens, New York 11368**

Prepared for

**EASTERN EMERALD GROUP LLC
136-20 38th Avenue, Suite 10F
Flushing, New York 11354**

ROUX ASSOCIATES, INC.

Environmental Consulting & Management



209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

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2. Hospital Route Map
3. Health Clinic Route Map

ATTACHMENTS

1. Job Safety and Health (OSHA) Poster
2. Material Safety Data Sheets (MSDS)
3. Health and Safety Briefing/Tailgate Meeting Form
4. Medical Data Form
5. Community Air Monitoring Plan
6. Accident Report and Investigation Form
7. OSHA Log of Occupational Injuries and Illnesses

APPROVALS

By their signature, the undersigned certify that this Health and Safety Plan (HASP) is approved and will be utilized at the project site located at 112-21 Northern Boulevard in Queens, New York.

Viachaslau Miliuk
Project Executive
Racanelli Construction Company, Inc. (General Contractor)

Date

Eduard Grinfeld
Site Health and Safety Officer
Racanelli Construction Company, Inc. (General Contractor)

Date

1.0 INTRODUCTION

This Site-specific Health and Safety Plan (HASP) has been prepared by Roux Associates, Inc. (Roux Associates), on behalf of Racanelli Construction Company Inc. (General Contractor) in accordance with 29 CFR 1910.120 Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) and other OSHA requirements for job safety and health protection (Attachment 1). This HASP was developed to address potential environmental hazards that may be encountered during implementation of the remedial action construction and portions of the redevelopment construction activities at the properties located at 112-21 Northern Boulevard, Corona, Queens, New York, (Site). Earth disturbance activities are occurring and/or the potential for exposure to environmental contaminants in onsite soil, groundwater and soil vapor exists. The location of the Site is presented in Figure B1. Portions of the Site will be established in which the risk of exposure to impacted materials will be minimized by removal of the impacted material and/ or the installation of engineering controls, creating a “remediated zone” (RZ). The level of training for workers within the RZ may be less than that required in non-remediated areas or areas undergoing remediation, as discussed in Section 6. However, Site conditions will be monitored in the RZ to verify that workers are not being exposed to onsite and/or immediately adjacent offsite contaminants. All contractors and subcontractors working at the Site shall be aware that **no earth disturbance activities shall occur unless all provisions of this HASP are met.**

General construction hazards (i.e., excavation, support of excavation, heat stress, cold stress, etc.) are not included in this HASP, but will be addressed by the General Contractor in accordance with applicable regulations. The HASP will be implemented by the General Contractor’s Site Health and Safety Officer (SSO) during work at the Site or by a person designated by the SSO. As a note, throughout this HASP the SSO or their designated representative will be referred to as the SSO.

Roux Associates’ Field Manager will be onsite during the remediation and portions of the redevelopment. The Roux Associates Field Manager (and office/corporate technical and health and safety personnel, as needed) will assist and consult with the SSO regarding the identification and response to health and safety-related issues on an ongoing basis. Since Site conditions are dynamic and new hazards may appear at any time, personnel must remain alert to existing and potential hazards as Site conditions change and protect themselves accordingly.

Compliance with this HASP is required of all Site workers that will be involved with earth disturbance activities or work that result in the potential for exposure to environmental contaminants in onsite or immediately adjacent offsite soil, groundwater and soil vapor. The contents of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be reviewed and approved by the project executive, with the SSO implementing the changes to the HASP. In accordance with OSHA, each employer is responsible for the health and safety of their workers.

Upon entering the Site, all visitors are required to sign in. All visitors authorized to enter the Contamination Reduction Zone (CRZ) (defined in Section 8.1.2), the Contamination Reduction Corridor (CRC) (defined in Section 8.1.2), or the Exclusion Zone (EZ) (defined in Section 8.1.3) will be required to read and comply with the provisions of this HASP. In the event that a visitor does not adhere to the applicable provisions of this HASP, he or she will be required to leave the Site.

Compliance with this HASP is required of all persons and subcontractors who perform fieldwork or enter the Site. The contents of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the technical scope of work. Any changes proposed must be reviewed and approved by the Office Health and Safety Manager (OHSM), with the SSO implementing the changes to the HASP.

Prior to performing work each task should be evaluated to determine the appropriate procedures that need to be followed.

1.1 Scope of Work

The HASP Scope of Work activities occur during the implementation of the remedial action construction and portions of the redevelopment construction activities (where the potential for exposure to environmental contaminants in onsite or immediately adjacent offsite soil, groundwater and soil vapor exists).

The Scope of Work activities are as follows:

1. Implementation of remedial action consisting of excavation, remedial action injections, and portions of the redevelopment construction activities (where the potential for exposure to environmental contaminants in onsite or immediately adjacent offsite soil, groundwater and soil vapor exists). The point at which the provisions of the HASP no longer apply will be determined by the SSO, in consultation with Roux Associates based upon the potential for employee exposure, as described in Section 1.3.
2. Mobilization and demobilization.
3. Maintenance of good site housekeeping procedures at all times.
4. Construction of a decontamination pad with proper containment and collection system, if necessary.

Any change in scope will require a revision of this HASP to address any new hazards.

2.0 EMERGENCY INFORMATION AND NOTIFICATION

Multiple emergency services may be obtained by calling 911. More specific numbers for local services are listed below.

Emergency Medical Service	911
<u>Police</u> : New York City Police Department	911
Fire:	911
<u>Hospital</u> : Elmhurst Hospital Center	718-334-4000
National Response Center	800-424-8802
Poison Control Center	800-222-1222
CHEMTREC	800-262-8200
<u>Fire</u> : NYC Fire Department	911
Center for Disease Control	800-311-3435
USEPA (Region II)	212-637-5000
NYSDEC Emergency Spill Response	800-457-7362
Concentra Urgent Care	212-346-0077
(For non-emergency medical services)	

Directions and maps to the New York Foundling Hospital and the Clinic are provided in Figures B2 and B3, respectively.

2.1 Notification

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone: (Direct contact, no phone messages).

Title	Contact	Telephone/Cell
<u>General Contractor</u>		
Project Executive	Viachaslau Miliuk	646-932-0804
SSO	Eduard Grinfeld	516-791-6611
<u>Roux Associates</u>		
Project Principal	Nathan Epler	(631) 232-2600 Cell – (631) 921-5675
Project Manager	Chris Battista	(631) 232-2600 Cell – (516) 250-0382
Office Health and Safety Manager	Ray Fitzpatrick	(631) 232-2600 Cell – (631) 484-1168

Accident reporting guidelines are outlined in section 13.5 of this HASP.

3.0 HEALTH AND SAFETY PERSONNEL

This section briefly describes all Site personnel and their health and safety responsibilities for the RI work to be implemented at the Site. All personnel are responsible for ensuring compliance with the HASP.

3.1 General Contractor's Project Executive

- Has the overall responsibility for the health and safety of Site personnel.
- Ensures that adequate resources are provided to the field health and safety staff to carry out their responsibilities as outlined below.
- Discusses issues related to this HASP with the Roux Associates Field Manager and Roux Associates Project Principal, Field Manager and office/corporate health and safety staff, as necessary.

3.2 General Contractor's Site Safety and Health Officer (SSO)

In consultation with the Roux Associates Field Manager, office/corporate technical and health and safety staff, as needed, the SSO:

- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment.
- Conducts initial onsite specific information sessions prior to personnel and/or subcontractors commencing work.
- Conducts and documents periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Completes and maintains Accident Report and Investigation Forms.
- Notifies Project Executive and Roux Associates Field Manager of accident/incidents covered by this HASP.
- Change in level of personal protective equipment (PPE).
- Maintains contact with subcontractors.
- Determines upgrade or downgrade of personal protective equipment (PPE) based on Site conditions, consultation with Roux Field Manager, and/or real time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as manufacturers suggested instructions determine.

- Submits and maintains health and safety field log books, daily safety logs, training logs, air monitoring result reports.

3.3 Roux Associates Project Principal

- Consults with and advises the General Contractor personnel on health and safety issues related to this HASP.

3.4 Roux Associates Project Manager

- Communicates with the Project Principal and other Roux Associates office and corporate technical and health and safety staff (as needed), regarding Site activities and potential health and safety concerns related to this HASP in order to advise the General Contractor on recommended health and safety measures.
- Consults with and advises the SSO on health and safety issues related to this HASP.

3.5 Roux Associates Office Health and Safety Manager (OHSM)

- Performs or oversees or confirms site-specific training and approves revised or new safety protocols or field operations.
- Consults regarding the development of new task safety protocols and procedures and resolution of any outstanding safety issues which may arise during the site work.
- Assists General Contractor in reviewing and approving health and safety training and medical surveillance records for personnel and subcontractors.

3.6 Field Personnel and Subcontractors

- Report any unsafe or potentially hazardous conditions to the SSO.
- Additionally, Subcontractors are responsible for:
 - Adherence with this HASP.
 - Development of their own site-specific HASP.
 - Training their employees to meet regulatory requirements.
 - Timely and thoroughly investigating all incident involving their employees or areas of responsibility.
- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP.
- Comply with rules, regulations, and procedures as set forth in this HASP and any revisions, which are instituted.
- Prevent admittance to work Site by unauthorized personnel.

4.0 SITE LOCATION, DESCRIPTION, AND HISTORY

Descriptions of the Site and surrounding property usage are included in the following sections. The location of the Site is presented in Figure B1.

4.1 Property Location and Description

The Site is comprised Lot 8 on Block 1707 in a mixed commercial area of Corona, Queens, New York.

- According to the regulatory database report, one 3,000-gallon No. 2 fuel oil underground storage tank (UST) was operated at 112-21 Northern Boulevard (automobile showroom/office) from 1964 until 2008, when the tank was closed in place. This address was also identified on the Leaking Storage Tanks (LTANKS) database for a failed tank tightness test of this UST on April 10, 2008. According to information provided, the tank was closed in place, impacted soil was removed, and post-closure samples did not reveal evidence of residual impacts. The spill case was closed by the New York State Department of Environmental Conservation (NYSDEC) on June 2, 2009. No additional details were provided in the regulatory database report.
- According to the regulatory database report, the site and at least seven additional lots within Block 1707 are identified on the E-Designation database with current or former gasoline USTs. An E-Designation provides notice of the presence of an environmental requirement pertaining to potential hazardous materials contamination, high ambient noise levels or air emission concerns on a particular tax lot. No additional relevant details were provided in these database listings.
- According to Sanborn maps reviewed, the 112-21 Northern Boulevard portion of the site was utilized for auto sales from 1950 to 2006. According to city directories, this address has also been used for auto service from at least 1939 to 2012. A glass company also operated at this address in 1950.
- Based on historical resources, additional automobile repair facilities have been located on the southeastern and northwestern portions of the site at various times from 1931 until at least 2006.
- Based on Sanborn maps reviewed, the southeastern portion of the site (112-47 Northern Boulevard) operated as a filling station with multiple generations of gasoline tanks from at least 1931 until 1981. The filling station was no longer depicted on this portion of the site on the 1982 Sanborn map. Ten tanks were located on this portion of the site in 1931, and five tanks were located on this portion of the site in 1950. No listings associated with this former filling station were identified during a preliminary review of the regulatory database report. According to New York City Fire Department (FDNY) documentation and an affidavit from Martin Pump and Tank Corporation, it appears that a total of 13 550-gallon USTs (12 gasoline and one waste oil UST) were decommissioned, cleaned, and filled with concrete circa 1980.

5.0 WASTE DESCRIPTION/CHARACTERIZATION

5.1 General

The following information is presented in order to identify the types of materials that may be encountered at the Site. The detailed information on these materials was obtained from:

- Sax's Dangerous Properties of Industrial Materials – Lewis Eight Edition
- Chemical Hazards of the Workplace – Proctor/Hughes
- Condensed Chemical Dictionary – Hawley
- Rapid Guide to Hazardous Chemical in the Workplace – Lewis 1990
- NIOSH Pocket Guide to Chemical Hazards – 2005
- ACGIH TLV Values and Biological Exposure Indices
- OSHA 29 CFR 1910.1000

5.2 Chemical Data Sheets

Several chemicals that may potentially be present in soils, soil vapor and groundwater at the Site, based on previous soil, soil vapor and groundwater sampling results and historic operations conducted at the Site that have been identified. The Summary of Toxicological Data is found in Table 1 and is provided for review of chemicals that may be encountered. The Summary of Toxicological Data Sheets provides information such as the chemicals characteristics, health hazards, protection, and exposure limits. Material Safety Data Sheets (MSDSs) for products that have been identified at the Site are available for review by project personnel (Attachment 2).

5.2.1 Contaminants of Concern

Soil and groundwater contaminants that may be encountered during remediation activities include both organic and inorganic compounds. Prior investigations at the Site have indicated detection of Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAHs) in soil and groundwater. The toxicological, physical, and chemical properties of potential contaminants are presented in Table 1, and identified contaminants are presented in Attachment 2.

6.0 HAZARD ASSESSMENT

The potential to encounter chemical hazards is dependent upon the work activity performed (intrusive versus non-intrusive) and the duration and location of the work activity. Such hazards could include inhalation and/or skin contact with chemicals/gases that could cause: dermatitis, skin burns, being overcome by vapors or asphyxiation.

Physical hazards that may be encountered during Site work include heat and cold stress, being crushed, head injuries, punctures, cuts, falls, electrocution, bruises and other physical hazards due to motor vehicle operation, equipment use and power tools

Biological hazards may exist during Site activities. These hazards include exposure to insect bites/stings, animals and animal wastes, mold and blood borne pathogens.

6.1 Chemical Hazards

The potential for personnel and subcontractors to come in contact with chemical hazards may occur during the following tasks:

- Personnel and Heavy Equipment Decontamination Activities
- Installation of Support of Excavation
- Excavation
- Dewatering
- Installation of gravel bedding and mud slab below the foundation
- Waterproofing the foundation slab and garage level exterior walls
- Remedial Action Injections

For chronic and acute toxicity data, refer to Summary of Toxicological Data Sheets (Table 1) and MSDSs (Attachment 2) for further details on compound characteristics.

6.1.1 Exposure Pathways

Exposure to these compounds during ongoing activities may occur through inhalation of contaminated dust particles, inhalation of VOCs and SVOCs, dermal absorption, and accidental ingestion of the contaminant by either direct or indirect cross-contamination activities.

6.1.2 Operational Action Levels

A decision-making protocol for an upgrade in levels of protection and/or withdrawal of personnel from an area based on exposure levels is outlined in Table 2.

6.1.3 Additional Precautions

Dermal absorption or skin contact with chemical compounds is possible during intrusive activities at the Site. The use of PPE in accordance with Section 8.2 and strict adherence to proper decontamination procedures should significantly reduce the risk of skin contact.

The potential for accidental ingestion of potentially hazardous chemicals is expected to be remote, when good personal hygiene practices are used.

6.2 Hazard Assessment

Task	Hazards	Risk of Exposure
Heavy Equipment and Personnel Decontamination/	Inhalation/Skin Contact	Moderate
Drilling/Sampling/Waste Characterization/Remedial Action Injections	Accidental Ingestion	Low
Installation of Excavation Support /Excavation/Foundation Construction/Waterproofing/Vapor Barrier installation	Inhalation/Skin Contact Accidental Ingestion	Moderate/High Low

7.0 TRAINING

7.1 General Health and Safety Training

In accordance with 29 CFR 1910.120, the level of training provided for workers must be consistent with the worker's job functions and responsibilities, the toxicity of the materials to which they may be exposed, the levels of exposure and the potential for an emergency to develop. The General Contractor has the responsibility of ensuring that the personnel assigned to this project comply with these requirements. Written certification of completion of the required training will be provided to the General Contractor. Roux Associates will assist the General Contractor in reviewing the documentation provided and determining if all onsite personnel have adequate training.

7.1.1 Training for General Site Workers Who May Be Exposed to Hazardous Substances

All general Site workers (as defined in OSHA 1910.120 (e)(3)(i) that will be involved with earth disturbance activities or work that results in the potential for exposure to environmental contaminants in onsite or immediately adjacent offsite soil, groundwater and soil vapor, will have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations and meet the medical surveillance requirements found in Section 7.1. At a minimum, the training shall have consisted of instruction in the topics outlined in 29 CFR 1910.120. Personnel who have not met the requirements for initial training will not be allowed to work in any Site activities in which they may be exposed to hazards (chemical or physical). Completion of a 40-hour Health and Safety Training Course for Hazardous Waste Operations or an approved equivalent will fulfill the requirements of this section. In addition to the required initial training, each employee shall receive three days of directly supervised on-the-job training. This training will address the duties the employees are expected to perform.

7.1.2 Training for Occasional Site Workers

In accordance with OSHA 1910.120(e)(3)(ii), workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

7.1.3 Training for Workers within Remediated Zones of the Site

Based on the dynamic conditions that will be present at the Site, portions of the Site will be established in which the risk of exposure to impacted materials will be prevented by removal of the impacted material and/ or the installation of engineering controls, creating a RZ. Remediation activities may be occurring on other portions of the Site where the risk for exposure has not been mitigated (non-remediated zone). Forty-hour training will not be required for workers within the RZ, but air monitoring will be performed, as necessary, to assure that the workers in the RZ are not exposed to hazardous levels of material from onsite and/or immediately adjacent offsite sources. No ground disturbance work or work that will potentially expose workers to impacted groundwater or soil vapor will be performed within the RZ while workers without 40-hour training are present. A detailed description of the established procedures for the RZ is provided in Section 8.1.4.

7.2 Manager/ Supervisor Training

In accordance with 29 CFR 1910.120, onsite management and supervisors who will be directly responsible for, or who supervise employees engaged in hazardous waste operations shall receive training as required by Section 6.1 of the HASP and an additional eight hours of specialized training on managing such operation are required prior to job assignment.

7.3 Annual Eight-Hour Refresher Training

Annual 8-hour refresher training will be required of all hazardous waste site field personnel in order to maintain their qualifications for fieldwork. The following topics will be reviewed; toxicology, respiratory protection, including air purifying devices (including self-contained breathing apparatus [SCBA], if anticipated), medical surveillance, decontamination procedures, and personal protective clothing. In addition, topics deemed necessary by the party providing the training may be added to the above list.

7.4 Site-Specific Training

Site personnel will receive training that will specifically address the activities, procedures, monitoring, and equipment for Site operations. It will include Site and facility layout, hazards, work practices by which the employee can minimize risks from hazards, safe use of engineering controls and equipment on the site, first aid equipment locations and emergency services at the Site, and will highlight the provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities

regarding safety and operations for their particular activity. The SSO, with assistance from the Roux Associates' Field Manager, will provide or confirm the Site-specific training.

7.5 Onsite Safety Meetings

The SSO, with assistance from the Roux Associates Field Manager, will conduct daily safety meetings each morning to discuss potential safety concerns for the upcoming activities. A copy of completed safety meeting forms will be kept in the General Contractor's administrative trailer onsite.

7.6 First Aid and CPR

The SSO will identify those individuals having first aid and CPR training in order to ensure that emergency medical treatment is available during field activities. The training will be consistent with the requirements of the American Red Cross Association. Certification and appropriate training documentation will be kept with the Site personnel records.

7.7 Subcontractor Training

All subcontractor personnel that will be involved with earth disturbance activities or work that results in the potential for exposure to environmental contaminants in onsite or immediately adjacent offsite soil, groundwater and soil vapor shall have completed the 40-hour training requirement (with 8-hour annual refresher training as necessary) and meet the medical surveillance requirements found in Section 7.1. Subcontractor training shall be performed in accordance with 29 CFR 1910.120. In certain unique situations (e.g., mechanical failure of equipment), a non-trained individual performing emergency repairs may be allowed, at the discretion of the SSO, to perform repairs when no intrusive activities are being performed, and provisions have been made to mitigate potential exposure to environmental contaminants in onsite or immediately adjacent offsite soil, groundwater and soil vapor. Subcontractors are responsible for training of their workers and for providing the General Contractor with documentation of the training.

7.8 Visitors

Forty-hour training will not be required of visitors to the Site. Visitors to the site must be made aware of the hazards in a Site-specific safety briefing and sign a statement indicating they will comply with the applicable requirements of this HASP. Visitors will be escorted by a 40-hour trained person while onsite.

8.0 MEDICAL SURVEILLANCE PROCEDURES

8.1 General

A Medical Surveillance Program has been established as part of this plan. Roux Associates, the General Contractor and subcontractor personnel performing field work and with the potential to be exposed to contaminants above permissible exposure limits for more than 30 days at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f). A physician's medical release for work will be confirmed by the SSO, with assistance from Roux Associates, before an employee can begin Site activities. Such examinations shall include a statement as to the worker's present health status, the ability to work in a hazardous environment (including any required PPE, which may be used during temperature extremes), and the worker's ability to wear respiratory protection.

In the event of a medical emergency involving employees of the General Contractor or any subcontractor, where a medical provider must obtain personal medical information, each employer is responsible for providing medical information regarding its employees in accordance with their own policies. In the event of a medical emergency involving a Roux Associates employee, where a medical provider must obtain personal medical information, the medical provider should contact Roux Associates' Human Resources Director, Jennine Zezima, and Corporate Health and Safety Manager, Joseph Gentile, CHSM, who will coordinate obtaining the necessary information.

9.0 SITE CONTROL, PERSONAL PROTECTIVE EQUIPMENT, AND COMMUNICATIONS

9.1 Site Control

During remedial action and some of the redevelopment construction activities during which earth disturbance activities are occurring and/or the potential for exposure to environmental contaminants in onsite and/or immediately adjacent offsite soil, groundwater and soil vapor exists, the following five-zone approach will be used, in order to prevent the spread of contamination onsite. The SSO, in consultation with the Roux Associates Field Manager, will identify the various zones in the field.

The five zones include: the Exclusion Zone (EZ), the Contamination Reduction Zone (CRZ), Contamination Reduction Corridor (CRC), the Support Zone (SZ) and the Remediated Zone RZ. A stepped remedial approach will be managed, and the zones modified as the work progresses. Each of the areas will be defined through the use of control barricades and/or construction/hazard fencing. A clearly marked delineation between the SZ or the RZ and the remaining three zones, the CRZ and CRC and the EZ will be maintained. The preferred method will utilize high visibility orange fencing and hand driven metal posts, or orange cones. Signage will be posted to further identify and delineate these areas.

9.1.1 Support Zone

The Support Zone (SZ) is an uncontaminated area that will be the field support area for the Site operations. The SZ will contain the temporary project trailers and provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel or materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples. Meteorological conditions will be observed and noted from this zone.

9.1.2 Contamination Reduction Zone and Contamination Reduction Corridor

A Contamination Reduction Zone (CRZ) is established between the exclusion zone and the support zone. The CRZ contains the Contamination Reduction Corridor (CRC) and provides an area for decontamination of personnel and equipment. The CRZ will be used for general Site

entry and egress in addition to access for heavy equipment and emergency support services. Personnel are not allowed in the CRZ without:

- Appropriate PPE;
- Medical authorization;
- Training certification; and
- A need to be in the zone.

9.1.3 Exclusion Zone

The area where contamination exists is considered to be the Exclusion Zone (EZ). All areas where activities that involve ground disturbance and/or handling of contaminated materials take place or where the potential exists for exposure to contaminants in onsite and/or immediately adjacent offsite soil, groundwater or soil vapor are considered the EZ. This zone will be clearly delineated by orange high visibility fencing. Safety tape may be used as a secondary delineation within the EZ. The zone delineation markings may be opened in areas for varying lengths of time to accommodate equipment operation or specific construction activities. The SSO may establish more than one EZ where different levels of protection may be employed or where different hazards exist. Personnel are not allowed in the EZ without:

- Appropriate PPE;
- Medical authorization;
- Training certification; and
- A need to be in the zone.

9.1.4 Remediated Zone

A RZ is established in portions of the Site where activities that involve ground disturbance have been completed and potential exposure pathways from contaminants in onsite and/or immediately adjacent offsite soil, groundwater or soil vapor have been minimized to the extent practicable, and only general construction work remains to be performed. Setup of the RZ consists of implementing several measures designed to reduce the risk of workers' exposure and preventing workers without 40-hour training from entering the non-remediated zone. Workers without 40-hour training will work only in areas where the potential for exposure has been minimized by installing a 2-inch mud slab and a minimum 6 mil vapor barrier or waterproofing membrane over

any potentially impacted soils in the RZ. The RZ will then be separated from the non-remediated zone by installing and maintaining temporary plywood or other construction fences along the boundary between the two zones. If potentially impacted material is uncovered in the RZ, all workers with 40-hour training will upgrade their PP, as necessary, based on work zone monitoring results. Those without 40-hour training will be removed and the SSO, in consultation with the Roux Associates Field Manager, will assess the potential risks. If, at any other time the risk of exposure increases while workers without 40-hour training are present in the RZ, these workers will be removed. At all times, when workers without 40-hour training are present in the RZ, air monitoring for the presence of VOCs will be conducted in the RZ, as well as at the fence line of the non-remediated zone.

9.2 Personal Protective Equipment

The level of protection worn by field personnel will be enforced by the SSO. Levels of protection for general operations are provided below and are defined in this section. Levels of protection may be upgraded at the discretion of the SSO. All decisions on the level of protection will be based upon a conservative interpretation by the SSO of the information provided by air monitoring results, environmental results and other appropriate information. Any changes in the level of protection shall be recorded in the health and safety field logbook.

9.2.1 Personal Protective Equipment Specifications

The initial level of personal protective equipment is Level D. It is not anticipated that either Level B or Level C protection will be necessary.

The Minimum level of PPE for entry onto the Site is Level D PPE. The following equipment shall be used:

- Work uniform (long pants, sleeved shirt)
- Hard hat
- Steel toe work boots
- Safety glasses with attached side shields
- Boot covers (as needed)

- Hearing protection (as needed)
- High visibility clothing (shirt or vest)

Modified Level D PPE consists of the following:

- Regular Tyvek coveralls (Poly-coated Tyvek as required)
- Outer gloves: cut-resistant, leather, cotton (as required)
- Inner gloves: latex or nitrile (doubled) as required
- Chemical resistant boots over work boots (as required)
- Steel toe work boots
- Hard hat Safety glasses with attached side shields
- Hearing protection as needed

High visibility clothing (shirt or vest). Although not anticipated, any tasks requiring Level B personal protective equipment (PPE) will utilize the following equipment:

- Positive pressure, full facepiece, self-contained breathing apparatus (SCBA) or positive pressure, supplied air respirator with escape SCBA (NIOSH approved)
- Disposable coveralls (Tyvek, Poly-coated Tyvek, or Saranex)
- Gloves, inner: latex or nitrile
- Gloves, outer: cut-resistant
- Chemical resistant boots over the work boots
- Steel toe work boots
- Hard hat
- Hearing protection (as needed)
- Boot cover (as needed)

High visibility clothing (shirt or vest). For tasks requiring Level C PPE, the following equipment may be used in any combination:

- Full-face, air purifying, canister-equipped respirators (NIOSH approved) utilizing Organic Vapor/Acid Gas and P-100 filters (half-face if approved by SSO)

- Disposable coveralls (Tyvek) as required
- Gloves, inner: latex or nitrile as required
- Gloves, outer: cut-resistant
- Chemical resistant boots over the work boots as required
- Steel toe work boots
- Hard hat
- Hearing protection (as needed)
- Safety glasses with attached side shields (if half-mask is utilized)
- Boot covers (as needed)
- High visibility clothing (shirt or vest)

9.2.2 Site Specific Levels of Protection

Levels of protection for the proposed scope of work may be upgraded or downgraded depending on direct-reading instruments or personnel monitoring. The following are the initial levels of protection that shall be used for each planned field activity:

<u>Activity</u>	<u>Initial level of PPE</u>
Mobilization/Demobilization	D
Installation of Excavation Support	D/C/B (Based on Monitoring)
Soil Excavation	D/ C/B (Based on Monitoring)
Concrete Work	D/C/B (Based on Monitoring)
Waterproofing/Vapor Barrier Installation	D/C/B (Based on Monitoring)
Remedial Action Injections	D
Decontamination	D

9.3 Communications

If working in level C/B respiratory protection is required, personnel may find that communication becomes a more difficult task and process to accomplish. Distance and space further complicate this. In order to address this problem, electronic instruments, mechanical devices, or hand signals will be used as follows:

Telephones – Mobile telephones will be carried by designated personnel for communication with emergency support services/facilities.

Radios – Two-way radios will be utilized onsite for communications between field personnel in areas where visual contact cannot be maintained and where hand signals cannot be employed.

Hand Signals – This communication method will be employed by members of the field team along with use of the buddy system. Signals become especially important when in the vicinity of heavy moving equipment and when using Level B respiratory equipment. The signals shall become familiar to the entire field team before Site operations commence, and will be reinforced and reviewed during site-specific training.

Signal

Meaning

Hand gripping throat

Out of air; can't breathe

Grip partner's wrist

Leave area immediately; no debate

Hands on top of head

Need assistance

Thumbs up

OK; I'm all right; I understand

Thumbs down

No; unable to understand you, I'm not all right

10.0 MONITORING PROCEDURES

10.1 General

A Community Air Monitoring Plan (“CAMP”) will be implemented onsite, in which VOCs and particulates will be monitored at the perimeter of the work area during ground intrusive activities. The CAMP can be found in Attachment 2. VOCs and particulates will be monitored as a precautionary measure. The design of the CAMP is intended to provide a measure of protection for the onsite workers not directly involved with the subject work activities and for the offsite community from potential airborne contaminant releases as a direct result of remedial work activities.

Work zone monitoring will be performed to verify the adequacy of the Level D respiratory protection, to aid in Site layout, and to document monitoring results. If air monitoring in the work areas indicates the presence of potentially hazardous materials, control measures will be implemented. All monitoring instruments shall be operated by qualified personnel only and will be calibrated prior to use daily or more often, as necessary. The SSO, in consultation with the Roux Associates Field Manager, is responsible for ensuring that appropriate monitoring, levels of protection, and safety procedures are followed.

10.2 Instrumentation

The following monitoring instruments will be available for use during field operations as necessary. There will be a minimum of one of each piece of equipment on the Site at all times during intrusive activities:

- Photoionization Detector (PID) with 10.6 EV probe or Flame Ionization Detector (FID) or equivalent.
- Dust/Particulate Monitor (DM), MIE Miniram, or equivalent.

A PID shall be used to monitor VOCs in active work areas during ground disturbance activities and/or where the potential for exposure to environmental contaminants in onsite or immediately offsite soil, groundwater and soil vapor exists. A particulate monitor shall be used to measure concentrations of dust and particulate matter.

A particulate monitor shall be used to measure concentrations of dust and particulate matter.

When deemed necessary, a CGI/O₂/CO (or equivalent) meter shall be used to monitor for combustible gases, oxygen content and/ or carbon monoxide during confined space entry or when operating in areas with poor ventilation as the HSO deems necessary.

Calibration records shall be documented and recorded daily and included in the daily air monitoring report. This report will be specific to work area monitoring. All instruments shall be calibrated before and after each daily use in accordance with manufacturer's procedures.

10.3 Action Levels

Action levels for the upgrading of PPE requirements in the HASP will apply to all Site work during remediation activities at the Site and portions of the development work where the potential for exposure to environmental contaminants in onsite or immediately adjacent offsite soil, groundwater and soil vapor exists. Action levels are for known contaminants using direct reading instruments in the Breathing Zone (BZ) for VOCs and particulates. The BZ will be determined by the SSO, in consultation with the Roux Associates Field Manager, but is typically 4 to 5 feet above the work area surface or elevation. The action levels to be utilized for the Site are found in Table 2.

An air horn will be readily available in the General Contractors administrative trailer. An additional air horn will be located in the work area to alert Site workers to an emergency situation. In the event of an emergency or the need to upgrade the level of personal protection, sharp blasts of the air horn will be sounded.

11.0 SAFETY CONSIDERATIONS

11.1 General

In addition to the specific requirements of this HASP, common sense should be used at all times. The following general safety rules and practices will be in effect at the site.

- Ignition sources within 35 feet of potentially flammable or contaminated material are strictly prohibited.
- Movement of vehicles and equipment, and other activities will be planned and performed with consideration for the location, height, and relative position of aboveground utilities and fixtures, including signs; lights; canopies; buildings and other structures and construction; and natural features such as trees, boulders, bodies of water, and terrain.
- Approved and appropriate safety equipment (as specified in this HASP), such as eye protection, hard hats, hand protection (nitrile, leather and/or cut resistant gloves as necessary), foot protection, and respirators, must be worn in areas where required.
- No eating, chewing tobacco, gum chewing or drinking will be allowed outside the SZ.
- Contaminated tools and hands must be kept away from the face.
- Personnel must use personal hygiene safe guards (washing up via hand towelettes or potable water) at the end of the shift.
- Each sample must be treated and handled as though it were contaminated.
- Persons with long hair and/or loose-fitting clothing that could become entangled in equipment (e.g., pumps, etc.) must take adequate precautions.
- Horseplay is prohibited in the work area.
- Work while under the influence of intoxicants, narcotics, or controlled substances is strictly prohibited.

11.2 Sample Handling

Personnel responsible for handling of samples will wear the prescribed modified Level D protection. Samples are to be identified as to their hazard and packaged as to prevent spillage or breakage. Any unusual sample conditions shall be noted. Laboratory personnel and all field personnel shall be advised of sample hazard levels and the potential contaminants present. This can be accomplished by a phone call to the lab coordinator and/or including a written statement with the samples reviewing lab safety procedures in handling in order to assure that the practices are appropriate for the suspected contaminants in the sample.

12.0 DECONTAMINATION AND DISPOSAL PROCEDURES

12.1 Contamination Prevention

Contamination prevention should minimize worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

Personnel

- Do not walk through areas of obvious or known contamination.
- Do not directly handle or touch contaminated materials.
- Make sure that there are no cuts or tears on PPE.
- Fasten all closures in suits; cover with tape, if necessary.
- Particular care should be taken to protect any skin injuries.
- Stay upwind of airborne contaminants.
- Do not carry cigarettes, cosmetics, gum, etc., into contaminated areas.

Sampling/Monitoring

- When required by the SSO, cover instruments with clear plastic, leaving openings for sampling ports and air exhaust.

Heavy Equipment

- Care should be taken to limit the amount of contamination that comes in contact with heavy equipment (tires, contaminated augers).
- If contaminated tools are to be placed on non-contaminated equipment for transport to a decontamination area, plastic should be used to keep the equipment clean.
- Dust control measures including water misting will be used on driving surfaces and excavations inside the Site boundaries.

12.2 Personnel Decontamination

If an exclusion zone (EZ) is employed at the site, a field wash for equipment and PPE shall be set up and maintained for all persons exiting the EZ. The system will include a gross wash and rinse for all disposable clothing and boots worn in the EZ. As necessary, equipment and facilities will be available for personnel to wash their hands, arms, neck, and face.

12.3 Equipment Decontamination

All potentially contaminated equipment used at the Site will be decontaminated to prevent contaminants from leaving the Site. The decontamination area will provide for the containment of all wastewater from the decontamination process. Respirators and any other PPE that comes in contact with contaminated materials shall pass through a field wash in the decontamination area, and a thorough decontamination at the end of the day. All decontamination rinse water will be collected and managed in accordance with all applicable regulations.

12.4 Decontamination during Medical Emergencies

If emergency life-saving first aid and/or medical treatment are required, normal decontamination procedures may need to be abbreviated or omitted. The Site SSO or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances and/or medical personnel. Outer garments are then removed at the medical facility. Attempt to wash or rinse the victim if it is known that the individual has been contaminated with an extremely toxic or corrosive material, which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems (ambulatory) or injuries, the normal decontamination procedures will be followed. Note that heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing must be promptly removed. Less serious forms of heat stress also require prompt attention and removal of protective clothing immediately. Unless the victim is obviously contaminated, decontamination should be omitted or minimized, and treatment begun immediately.

12.5 Disposal Procedures

A system of segregating all waste including excavated soil, dewatering liquids and spent personal protective equipment will be developed, in accordance with the requirements of the Remedial Action Work Plan.

All discarded materials, waste materials, or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left onsite.

All encountered construction waters, storm water, and decontamination water will be collected and managed in accordance with the Remedial Action Work Plan.

13.0 EMERGENCY PLAN

Should an emergency situation occur, the emergency plan, outlined in this section, shall be known by all onsite personnel prior to the start of work. The emergency plan will be available for use at all times during Site work. The plan provides the phone numbers for the fire, police, ambulance, hospital, poison control centers, and directions to the hospital from the Site. This information is to be found in Section 2 of the HASP.

Various individual Site characteristics will determine preliminary actions taken to assure that this emergency plan is successfully implemented in the event of a Site emergency. Careful consideration must be given to the proximity of neighborhood housing or places of employment, and to the relative possibility of Site release of vapors, which could affect the surrounding community.

The emergency coordinator (SSO) shall initiate the emergency plan whenever conditions at the Site warrant such action. The SSO, with assistance from the Roux Associates Field Manager, will be responsible for coordination of the evacuation, emergency treatment and transport of Site personnel as necessary, and notification of emergency response units and the appropriate management staff.

The SSO during an emergency will perform air monitoring as needed, as well as lend assistance and provide health and safety information to responding emergency personnel.

Site Personnel will endeavor to keep non-essential personnel away from the incident until the appropriate emergency resources arrive. At that time the responders will take control of the Site. Site personnel may be asked to lend assistance to emergency personnel such as during evacuations, help with the injured, etc.

13.1 Evacuation

Evacuation procedures will be discussed prior to the start of work and periodically during safety meetings. In the event of an emergency situation, such as fire, or explosion, an air horn, automobile horn, or other appropriate device will be sounded for three (3) sharp blasts indicating the initiation of evacuation procedures. The emergency evacuation route shall be known by all site workers. Under no circumstances will incoming personnel or visitors be allowed to proceed

into the area once the emergency signal has been given. The SSO or project manager must ensure that access for emergency equipment is provided and that all combustion apparatuses have been shut down once the alarm has been sounded. All Site personnel will assemble in the designated nearest safe location. Once the safety of all personnel is established, the fire department and other emergency response groups will be notified by telephone of the emergency.

13.2 Personnel Injury

Emergency first aid shall be applied onsite as appropriate. For non-emergency situations, treatment should be sought, if needed, through the approved occupational health clinic. If necessary, the individual shall be decontaminated, if needed, and transported to the nearest hospital.

The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. However, since some situations may require transport of an injured party by other means, the injured person shall be escorted to the occupational health clinic or hospital. Maps to these facilities are shown in Figure B2.

13.3 Accident/Incident Reporting

As soon as first aid and/or emergency response needs have been met, the following parties are to be contacted by telephone: (Direct contact, no phone messages).

- | | <u>Office:</u> | <u>Cell:</u> |
|---|-----------------------|---------------------|
| 1. <u>General Contractor Project Executive:</u> Viachaslau Miliuk | | (646) 932-0804 |
| 2. <u>Project Principal:</u> Nathan Epler | (631) 232-2600 | (631) 921-5675 |
| 3. <u>The employer of any injured worker, if the worker is a subcontractor.</u> | | |

The Roux Associates Field Manager will make appropriate notifications in accordance with the Roux Associates HASP.

Written confirmations of verbal reports are to be submitted within 24 hours. The report form entitled "Accident Report and Investigation Form" (Attachment 6) is to be used for this purpose. All representatives contacted by telephone are to receive a copy of this report.

For reporting purposes, the term accident refers to fatalities, lost time injuries, spill or exposure to hazardous materials (radioactive materials, toxic materials, explosive or flammable materials), fire, explosion, property damage, or potential occurrence (i.e., near miss) of the above.

Any information released from the health care provider, which is not deemed confidential patient information, is to be attached to the appropriate form. Any medical information, which is released by patient consent, is to be filed in the individual's medical record and treated as confidential.

13.4 Personnel Exposure

Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination.

Inhalation: Move to fresh air and/or, if necessary, decontaminate/transport to hospital.

Ingestion: Decontamination and transport to emergency medical facility.

Puncture Wound or Laceration: Decontamination and transport to emergency medical facility.

13.5 Adverse Weather Conditions

In the event of adverse weather conditions, the SSO or project manager will determine if work can continue without sacrificing the health and safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related conditions.
- Limited visibility.
- Electrical storm potential.

Site activities will be limited to daylight hours and acceptable weather conditions. Inclement working conditions include heavy rain, fog, high winds, and lightning. Observe daily weather reports and evacuate if necessary in case of inclement weather conditions.

13.5.1 Electrical Storm Guidelines

In the event that lightning and/or thunder are observed while working onsite, all onsite activities shall stop and personnel shall seek proper shelter (e.g., substantial building, enclosed vehicle, etc.). Work shall not resume until the threat of lightning has subsided and no lightning or thunder has been observed for 30 minutes. If the possibility of lightning is forecast for the day, advise the onsite personnel of the risks and proper procedure at the pre-work safety briefing. Continuously monitor for changing weather conditions and allow enough time to properly stop work if lightning is forecast.

14.0 LOGS, REPORTS AND RECORD KEEPING

The following is a summary of required health and safety logs, reports, and record keeping for this project.

14.1 Medical and Training Records

Each employer keeps medical and training records for all of their staff. Each subcontractor employer must provide verification of training and medical qualifications to the SSO as required by the HASP. The SSO will keep a log of personnel meeting appropriate training and medical qualifications for Site work, with assistance from the Roux Associates Field Manager. The log will be kept in the project file. Each employer will maintain medical records in accordance with 29 CFR 1910.20.

14.2 Onsite Log

The SSO or project manager will keep a log of onsite personnel daily in the designated field book.

14.3 Exposure Records

Applicable personal monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be kept by each employer in accordance with 29 CFR 1910.20.

14.4 Accident/Incident Reports

For any injury (OSHA Recordable or not), including “FYI” injuries (injuries where pain was felt, but not even first aid treatment was needed), and illnesses, all work on the activity where the injury/illness occurred will be stopped. An accident/incident report must be completed following procedures given in Attachment 6. The originals will be sent to Roux Associates for maintenance. Copies will be distributed as stated. A copy of the forms will be kept in the project file.

14.5 OSHA Form 300

An OSHA Form 300 (Log of Occupational Injuries and Illnesses) (Attachment 7) will be kept at the Site. All reportable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to Roux Associates for maintenance.

14.6 Daily Health and Safety Briefing

The Daily Health and Safety Briefing form in Attachment 3 will be completed daily by the SSO and submitted to the project manager.

15.0 FIELD TEAM REVIEW

Each Roux Associates employee or subcontractor shall sign this section after site-specific training is completed and before being permitted to work at the Site.

I have read and had Roux Associates verbally review this Health and Safety Plan prepared for this Site with me. I understand and will comply with the provisions contained therein.

Site/Project: 112-21 Northern Boulevard
Corona, Queens, New York

[illegible]

SSO CERTIFICATION OF HOSPITAL DIRECTIONS

Name of General Contractor's SSO:

Date: _____

This is to certify that on _____, I personally drove the route to Elmhurst Hospital Center as listed in the HASP. The Map Routing and Directions were/were not as listed in the plan. Listed below were conditions that resulted in different directions.

Site Health and Safety Officer

TABLES

1. Toxicological, Physical and Chemical Properties of Compounds Potentially Present at the Site
2. Action Levels for Worker Breathing Zone

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,1,1-Trichloroethane	71-55-6	TWA 350 ppm STEL 440 ppm C 440 ppm	C 350 ppm (1900 mg/m ³) [15-minute]	TWA 350 ppm (1900 mg/m ³)	700 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eyes, skin, central nervous system, cardiovascular system, liver	Colorless liquid with a mild, chloroform-like odor. BP: 165°F UEL: 12.5% LEL: 7.5%
1,1,2-Trichloroethane	79-00-5	TWA 10 ppm	Ca TWA 10 ppm (45 mg/m ³) [skin]	TWA 10 ppm (45 mg/m ³) [skin]	Ca [100 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis; [potential occupational carcinogen]	Eyes, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, chloroform-like odor. BP: 237°F UEL: 15.5% LEL: 6%
1,1-Dichloroethane	75-34-3	TWA 100 ppm	TWA 100 ppm (400 mg/m ³)	TWA 100 ppm (400 mg/m ³)	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation skin; central nervous system depression; liver, kidney, lung damage	Skin, liver, kidneys, lungs, central nervous system	Colorless, oily liquid with a chloroform-like odor. BP: 135°F Fl.P: 2°F UEL: 11.4% LEL: 5.4%
1,1-Dichloroethene	75-35-4	TWA 5 ppm	Ca (lowest feasible concentration) TWA 1ppm		Ca [N.D.]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor. BP: 89°F Fl.P: -2°F UEL: 15.5% LEL: 6.5% Class IA Flammable Liquid
1,2,4-Trimethylbenzene	95-63-6	None established	TWA 25 ppm (125mg/m ³)	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 337°F FL.P: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable liquid
1,2,4-Trimethylbenzene	95-63-6	TWA 25 ppm (125 mg TWA 25 ppm (125 mg/m ³)		None established	N.D.	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 337°F Fl.P: 112°F UEL: 6.4% LEL: 0.9% Class II Flammable Liquid
1,2-Dichlorobenzene	95-50-1	TWA 25 ppm STEL 50 ppm	C 50 ppm (300 mg/m ³)	C 50 ppm (300 mg/m ³)	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; liver, kidney damage; skin blisters	Eyes, skin, respiratory system, liver, kidneys	Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide] BP: 357°F Fl.P: 151°F UEL: 9.2% LEL: 2.2% Class IIIA Combustible Liquid

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
1,2-Dichloroethane	107-06-2	TWA 10 ppm	Ca TWA 1 ppm (4 mg/m ³) STEL 2 ppm (8 mg/m ³)	TWA 50 ppm C 100 ppm 200 ppm [5-minute maximum peak in any 3 hours]	Ca [50 ppm]	inhalation, ingestion, skin absorption, skin and/or eye contact	Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]	Eyes, skin, kidneys, liver, central nervous system, cardiovascular system	Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.] BP: 182°F Fl.P: 56°F UEL: 16% LEL: 6.2% Class IB Flammable Liquid
1,2-Dichloroethene (total)	540-59-0	TWA 200 ppm (790 mTWA 200 ppm (790 mg/m ³)		TWA 200 ppm (790 mg/m ³)	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor BP: 118-140°F Fl.P: 36-39°F UEL: 12.8% LEL: 5.6% Class IB Flammable Liquid
1,3,5-Trimethylbenzene	108-67-8	None established	TWA 25 ppm (125mg/m ³)	None established	N.D.	Inhalation; ingestion; skin and/or eye contact	Eye, skin, nose, and throat, resp syst irritation; bronchitis; hypochromic anemia; headache, drowsiness, weakness, dizziness, nausea, incoordination, vomit, confusion; chemical pneumonitis	Eyes, skin, resp sys, CNS, blood	Clear, colorless liquid with a distinctive, aromatic odor BP: 329°F Fl.P: 122°F Class II Flammable liquid
1,3,5-Trimethylbenzene	108-67-8	TWA 25 ppm (125 mgTWA 25 ppm (125 mg/m ³)		None established	N.D	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system, blood	Clear, colorless liquid with a distinctive, aromatic odor. BP: 329°F Fl.P: 122°F Class II Flammable Liquid
1,4-Dichlorobenzene	106-46-7	TWA 10 ppm	Ca	TWA 75 ppm (450 mg/m ³)	Ca [150 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Liver, respiratory system, eyes, kidneys, skin	Colorless or white crystalline solid with a mothball-like odor. [insecticide] BP: 345°F Fl.P: 150°F LEL: 2.5% Combustible Solid
2,4-Dimethylphenol	105-67-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system, mouth, throat, stomach; dizziness, weakness, fatigue, nausea, headache; systemic damage; moderate to severe eye injury.	Skin, CVS, eyes, CNS	Clear, colorless liquid with a faint ether or chloroform-like odor BP: 178°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
2-Butanone (MEK)	78-93-3	TWA 200 ppm (590 mg/m ³) STEL 300 ppm (885 mg/m ³)	TWA 200 ppm (590 mg/m ³) STEL 300 ppm (885 mg/m ³)	TWA 200 ppm (590 mg/m ³)	3000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor. BP: 175°F FLP: 16°F UEL(200°F): 11.4% LEL(200°F): 1.4% Class IB Flammable Liquid
Acenaphthene	83-32-9	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory system	Eyes, skin, respiratory system	Brown solid
Acetone	67-64-1	TWA 500 ppm STEL 50 ppm	TWA 250 ppm (590 mg/m ³)	TWA 1000 ppm (2400 mg/m ³)	2500 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a fragrant, mint-like odor BP: 133°F FLP: 0°F UEL: 12.8% LEL: 2.5% Class IB Flammable Liquid
Anthracene	65996-93-2	TWA 0.2 mg/m ³	Ca TWA 0.1 mg/m ³ (cyclohexane-extractable fraction)	TWA 0.2 mg/m ³ (benzene-soluble fraction)	Ca [80 mg/m ³]	inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue. Combustible Solids
Antimony	7440-36-0	TWA 0.5 mg/m ³	TWA 0.5 mg/m ³	TWA 0.5 mg/m ³	50 mg/m ³ (as Sb)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Eyes, skin, respiratory system, cardiovascular system	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder. BP: 2975°F
Arsenic (inorganic)	7440-38-2 (metal)	TWA 0.01 mg/m ³	Ca C 0.002 mg/m ³ [15-min]	TWA 0.010 mg/m ³	Ca [5 mg/m ³ (as As)]	Inhalation; ingestion; skin absorption; skin and/or eye contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin, [potential occupational carcinogen]	Liver, kidneys, skin, lungs, lymphatic sys	Metal: sliver-gray or tin-white, brittle, odorless solid BP: sublimates
Asbestos	1332-21-4	TWA 0.1 f/cc	Ca 100,000 fibers/m ³	TWA 0.1 fiber/cm ³	Ca [IDLH value has not been determined]	Inhalation; ingestion; skin and/or eye contact	Asbestosis (chronic exposure), dyspnea, interstitial fibrosis, restricted pulmonary function, finger clubbing, irritation eyes, [potential occupational carcinogen]	Respiratory system, eyes,	White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite), fibrous, odorless solids. BP: decomposes
Asphalt fumes	8052-42-4	TWA 0.5 mg/m ³ (fumes)	Ca C 5 mg/m ³ [15 min]	None established	Ca [IDLH value has not been determined]	Skin absorption; inhalation; skin and/or eye contact	Irritation eyes, resp sys	Eyes, respiratory system	Black or dark brown cement-like substance Combustible solid
Barium	7440-39-3	TWA 0.5 mg/m ³	None established	TWA 0.5 mg/m ³	None established	Inhalation, ingestion, skin contact	Irritation skin, respiratory system, c	Skin, eyes, respiratory system	Yellow white powder BP: 1640 C

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Benzene	71-43-2	TWA 0.5 ppm STEL 2.5 ppm	Ca TWA 0.1 ppm STEL 1 ppm	TWA 1 ppm STEL 5 ppm	Ca [500 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]	Eyes, skin, respiratory system, blood, central nervous system, bone marrow	Colorless to light yellow liquid with an aromatic odor [Note: Solid below 42 °F] BP: 176°F Fl.Pt = 12°F LEL: 1.2% UEL: 7.8% Class B Flammable liquid
Benzo[a]anthracene	56-55-3	None established	None established	None established	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	Irritation eyes, skin, respiratory system, CNS	Skin	Pale Yellow crystal, solid BP: 438 C
Benzo[a]pyrene	50-32-8	None established	TWA 0.1 mg/m ³	TWA 0.2 mg/m ³	None established	Inhalation; ingestion; skin absorption; skin and/or eye contact	POISON. This material is an experimental carcinogen, mutagen, tumorigen, neoplastigen and teratogen. It is a probable carcinogen in humans and a known human mutagen. IARC Group 2A carcinogen. It is believed to cause bladder, skin and lung cancer. Exposure to it may damage the developing fetus. May cause reproductive damage. Skin, respiratory and eye irritant or burns.	Skin, eye, bladder, lung, reproductive	Yellow crystals or powder [found in cigarette smoke, coal tar, fuel exhaust gas and in many other sources] BP: 495 C
Benzo[b]fluoranthene	205-99-2	None established	TWA 0.1 mg/m ³	TWA 0.2 mg/m ³	None established	Inhalation; ingestion; skin and/or eye contact	No data were identified on the toxicity of benzo[b]fluoranthene to humans. Based on results of studies in animals, IARC concluded that benzo[b]fluoranthene is possibly carcinogenic to humans	Respiratory system, skin, bladder, kidneys	Off-white to tan powder
Benzo[k]fluoranthene	207-08-9	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, respiratory tract, gastrointestinal; fatal if swallowed, inhaled, absorbed through the skin; vomiting, nausea, diarrhea	Lungs, respiratory system	Yellow crystals BP: 480 C
Beryllium	7440-41-7 (metal)	TWA 0.002 mg/m ³	Ca C 0.0005 mg/m ³	TWA 0.002 mg/m ³ C 0.005 mg/m ³ (30 minutes) with a maximum peak of 0.025 mg/m ³	Ca [4 mg/m ³ (as Be)]	inhalation, skin and/or eye contact	Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen]	Eyes, skin, respiratory system	Metal: A hard, brittle, gray-white solid. BP: 4532°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Bis(2-ethylhexyl) phthalate	117-81-7	TWA 5 mg/m ³	TWA 5 mg/m ³ STEL 10 mg/m ³ (do not exceed during any 15-minute work period)	TWA 5 mg/m ³	None established	inhalation, skin and/or eye contact	Irritation eyes, skin, nose, throat; affect the nervous system and liver; damage to male reproductive glands	Eyes, skin, nose, respiratory system, nervous system, reproductive system, liver	Colorless to light colored, thick liquid with slight odor
Butane	106-97-8	TWA 1000 ppm	TWA 800 ppm (1900 mg/m ³)	None established	None established	inhalation, skin and/or eye contact (liquid)	Drowsiness, narcosis, asphyxia; liquid: frostbite	central nervous system	Colorless gas with a gasoline-like or natural gas odor. BP: 31°F UEL: 8.4% LEL: 1.6% Flammable Gas
Cadmium	7440-43-9 (metal)	TWA 0.01 mg/m ³	Ca	TWA 0.005 mg/m ³	Ca [9 mg/m ³ (as Cd)]	inhalation, ingestion	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	respiratory system, kidneys, prostate, blood	Metal: Silver-white, blue-tinged lustrous, odorless solid. BP: 1409°F
Carbon Disulfide	75-15-0	TWA 1 ppm	TWA 1 ppm (3 mg/m ³) STEL 10 ppm (30 mg/m ³) [skin]	TWA 20 ppm C 30 ppm 100 ppm (30-minute maximum peak)	500 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Dizziness, headache, poor sleep, lassitude (weakness, exhaustion), anxiety, anorexia, weight loss; psychosis; polyneuropathy; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects	central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system	Colorless to faint-yellow liquid with a sweet ether-like odor. BP: 116°F Fl.P: -22°F UEL: 50.0% LEL: 1.3% Class IB Flammable Liquid
Chlorobenzene	108-90-7	TWA 10 ppm	None established	TWA 75 ppm (350 mg/m ³)	1000 ppm	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eyes, skin, respiratory system, central nervous system, liver	Colorless liquid with an almond-like odor BP: 270°F Fl.P: 82°F UEL: 9.6% LEL: 1.3%
Chloroethane	75-00-3	TWA 100ppm	Handle with caution in the workplace	TWA 1000 ppm (2600 mg/m ³)	3800 ppm [10%LEL]	inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact	Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage	Liver, kidneys, respiratory system, cardiovascular system, central nervous system	Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. BP: 54°F Fl.P: NA (Gas) -58°F (Liquid) UEL: 15.4% LEL: 3.8%
Chloroform	67-66-3	TWA 10 ppm	Ca STEL 2 ppm (9.78 mg/m ³) [60-minute]	C 50 ppm (240 mg/m ³)	Ca [500 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Liver, kidneys, heart, eyes, skin, central nervous system	Colorless liquid with a pleasant odor BP: 143°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Chromium	7440-47-3	TWA 0.5 mg/m ³ (metal and Cr III compounds) TWA 0.05 mg/m ³ (water-soluble Cr IV compounds) TWA 0.01 mg/m ³ (insoluble Cr IV compounds)	TWA 0.5 mg/m ³	TWA 1 mg/m ³	250 mg/m ³ (as Cr)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin; lung fibrosis (histologic)	Eyes, skin, respiratory system	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid. BP: 4788°F
Chrysene; Phenanthrene; Pyrene; Coal tar pitch volatiles	65996-93-2	TWA 0.2 mg/m ³	Ca TWA 0.1 mg/m ³ (cyclohexane-extractable fraction)	TWA 0.2 mg/m ³ (benzene-soluble fraction)	Ca [80 mg/m ³]	Inhalation, skin and/or eye contact	Dermatitis, bronchitis, [potential occupational carcinogen]	Respiratory system, skin, bladder, kidneys	Black or dark-brown amorphous residue. Combustible Solids
cis-1,2-Dichloroethene	158-59-2	TWA 200 ppm	TWA 200 ppm	TWA 200 ppm	None established	inhalation, skin absorption, ingestion	Harmful if swallowed, inhaled, or absorbed through skin. Irritant. Narcotic. Suspected carcinogen	Skin	Colorless liquid BP: 60 C Fl.P: 4 C UEL: 12.8% LEL: 9.7 %
Copper	7440-50-8	TWA 0.2mg/m ³ (fume) 1 mg/m ³ (dusts and mists)	TWA 1 mg/m ³	TWA 1 mg/m ³	100 mg/m ³ (as Cu)	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing	Eyes, skin, respiratory system, liver, kidneys (increase(d) risk with Wilson's disease)	Noncombustible Solid in bulk form, but powdered form may ignite. BP: 4703°F
Dibenzo[a,h]anthracene	53-70-3	None established	None established	None established	None established	Inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin	Eyes, skin; skin photosensitization.	Colorless crystalline powder BP: 524°C
Diesel Fuel #2	68476-34-6	None established	None established	Designated as an OSHA Select Carcinogen	None established	ingestion, skin and/or eye contact	Kidney damage; potential lung damage; suspected carcinogen; irritation of eyes, skin, respiratory tract; dizziness, headache, nausea; chemical pneumonitis (from aspiration of liquid); dry, red skin; irritant contact dermatitis; eye redness, pain.	Eyes, skin, kidneys	Clear yellow brown combustible liquid; floats on water; distinct diesel petroleum hydrocarbon odor. BP: 356-716°F Fl.P: 154.4-165.2°F LEL: 0.6% UEL: 7.0%
Ethylbenzene	100-41-4	TWA 100 ppm STEL 125 ppm	TWA 100 ppm (435 mg/m ³) STEL 125 ppm (545 mg/m ³)	TWA 100 ppm (435 mg/m ³)	800 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with an aromatic odor. BP: 277°F Fl.P: 55°F UEL: 6.7% LEL: 0.8% Class IB Flammable Liquid
Fluoranthene	206-44-0	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible burns; heart and liver injury, pulmonary edema, respiratory arrest, gastrointestinal disturbances.	Heart, liver, lungs.	Yellow needles.
Fluorene	86-73-7	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Irritation skin, digestive tract	Skin	White crystals BP: 563°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Fuel Oil #2	68476-30-2	TWA 100mg/m ³ (aerosol and vapor, as total hydrocarbons)	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS effects; nausea, vomiting, headache, cramping, dizziness, weakness, loss of coordination,, drowsiness; kidney, liver damage	Eyes, skin, CNS	Clear or yellow to red oily liquid, kerosene-like odor BP: 347 - 689 °F UEL: 5-6% LEL: 0.7-1.0%
Gasoline	8006-61-9	TWA 300 ppm STEL 500 ppm	Carcinogen	None established	Ca [IDLH value has not been determined]	Skin absorption; inhalation; ingestion; skin and/or eye contact	Eyes and skin irritation, mucous membrane; dermatitis; headache; listlessness, blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis; possible liver, kidney damage [Potential occupational carcinogen]	Eyes, skin, respiratory system, CNS, Liver, Kidneys	Clear liquid with a characteristic odor, aromatic Fl.Pt = -45°F LEL = 1.4% UEL = 7.6% Class 1B Flammable Liquid
Hexachlorobutadiene	87-68-3	TWA 0.02 ppm	Ca TWA 0.02 ppm (0.24 mg/m ³) [skin]	None established	Ca [N.D.]	inhalation, skin absorption, ingestion, skin and/or eye contact	In animals: irritation eyes, skin, respiratory system; kidney damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, kidneys	Clear, colorless liquid with a mild, turpentine-like odor. BP: 419°F
Hydrogen Sulfide	7783-06-4	TWA (1 ppm) STEL (5 ppm) (adopted values for which changes are proposed in the NIC)	C 10 ppm (15 mg/m ³) [10-minute]	C 20 ppm 50 ppm [10-minute maximum peak]	100 ppm	inhalation, skin and/or eye contact	Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite	Eyes, respiratory system, central nervous system	Colorless gas with a strong odor of rotten eggs. BP: -77°F UEL: 44.0% LEL: 4.0% Flammable Gas
Indeno[1,2,3-cd]pyrene	193-39-5	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible human carcinogen (skin); weakness; affect liver, lung tissue, renal tissue; impairment of blood forming tissue	Skin	Fluorescent green-yellow crystalline solid BP: 536 C
Indeno[1,2,3-cd]pyrene	193-39-5	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; possible human carcinogen (skin); weakness; affect liver, lung tissue, renal tissue; impairment of blood forming tissue	Skin	Yellowish crystal solid BP: 536 C
Isopropylbenzene	98-82-8	TWA 50 ppm	TWA 50 ppm (245 mg/m ³) [skin]	TWA 50 ppm (245 mg/m ³) [skin]	900 ppm [10%LEL]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a sharp, penetrating, aromatic odor. BP: 306°F Fl.P: 96°F UEL: 6.5% LEL: 0.9%

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Kerosene	8008-20-6	TWA 200 mg/m ³	TWA 100 mg/m ³	None established	IDLH value has not been determined	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eyes, skin, respiratory system, central nervous system	Colorless to yellowish, oily liquid with a strong, characteristic odor. BP: 347-617°F FLP: 100-162°F UEL: 5% LEL: 0.7% Class II Combustible Liquid
Lead	7439-92-1	TWA 0.05 mg/m ³	TWA (8-hour) 0.050 mg/m ³	TWA 0.050 mg/m ³	100 mg/m ³ (as Pb)	inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension	Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue	A heavy, ductile, soft, gray solid. BP: 3164°F Noncombustible Solid in bulk form
Manganese	7439-96-5 (metal)	TWA 0.2 mg/m ³	TWA 1 mg/m ³ STEL 3 mg/m ³	C 5 mg/m ³	500 mg/m ³ (as Mn)	inhalation, ingestion	Manganism; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage	respiratory system, central nervous system, blood, kidneys	A lustrous, brittle, silvery solid. BP: 3564°F
Mercury (organo) alkyl compounds (as Hg)	7439-97-6	TWA 0.01 mg/m ³ STEL 0.03 mg/m ³ [skin]	TWA 0.01 mg/m ³ STEL 0.03 mg/m ³ [skin]	TWA 0.01 mg/m ³ C 0.04 mg/m ³	2 mg/m ³ (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	Paresthesia; ataxia, dysarthria; vision, hearing disturbance; spasticity, jerking limbs; dizziness; salivation; lacrimation (discharge of tears); nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance; kidney injury; possible teratogenic effects	Eyes, skin, central nervous system, peripheral nervous system, kidneys	Appearance and odor vary depending upon the specific (organo) alkyl mercury compound
Mercury compounds [except (organo) alkyls] (as Hg) Mercury	7439-97-6	TWA 0.025 mg/m ³ (elemental and inorganic forms)	Hg Vapor: TWA 0.05 mg/m ³ [skin] Other: C 0.1 mg/m ³ [skin]	TWA 0.1 mg/m ³	10 mg/m ³ (as Hg)	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eyes, skin, respiratory system, central nervous system, kidneys	Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.] BP: 674°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Methyl tert-butyl ether (MTBE)	1634-04-4	TWA 50 ppm	No established REL	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, mucous membrane, respiratory; dizziness, nausea, headache, intoxication	Eyes, skin, mucous membrane, respiratory system, central nervous system	Colorless liquid BP: 55.2 C
Methylene Chloride	75-09-2	TWA 50 ppm, A3 - suspected human carcinogen	Ca	TWA 25 ppm STEL 125 ppm	Ca [2300 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingle limbs; nausea; [potential occupational carcinogen]	Eyes, skin, cardiovascular system, central nervous system	Colorless liquid with a chloroform-like odor BP: 104°F UEL: 23% LEL: 13%
Naphtha (coal tar)	8030-30-6	None established	TWA 100 ppm (400 mg/m ³)	TWA 100 ppm (400 mg/m ³)	1000 ppm [10%LEL]	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose; dizziness, drowsiness; dermatitis; in animals: liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Reddish-brown, mobile liquid with an aromatic odor BP: 320-428°F F.L.P: 100-109°F Class II Combustible Liquid
Naphthalene	91-20-3	TWA 10 ppm STEL 15 ppm	TWA 10 ppm (50 mg/m ³) STEL 15 ppm (75 mg/m ³)	TWA 10 ppm (50 mg/m ³)	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage	Eyes, skin, blood, liver, kidneys, central nervous system	Colorless to brown solid with an odor of mothballs. BP: 424°F F.L.P: 174°F UEL: 5.9% LEL: 0.9%
n-Butylbenzene	104-51-8	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; CNS depression, lung damage; nausea, vomiting, headache, dizziness, weakness, loss of coordination, blurred vision, drowsiness, confusion, disorientation	Eyes, skin, respiratory system, central nervous system	Colorless liquid with a sweet odor BP: 183 C F.L.P: 59 C UEL: 5.8% LEL: 0.8%
Nickel	7440-02-0 (Metal)	TWA 1.5 mg/m ³ (elemental) TWA 0.1 mg/m ³ (soluble inorganic compounds) TWA 0.2 mg/m ³ (insoluble inorganic compounds) TWA 0.1 mg/m ³ (Nickel subsulfide)	Ca TWA 0.015 mg/m ³	TWA 1 mg/m ³	Ca [10 mg/m ³ (as Ni)]	inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Nasal cavities, lungs, skin	Metal: Lustrous, silvery, odorless solid. BP: 5139°F
Nitrobenzene	98-95-3	TWA 1 ppm	TWA 1 ppm (5 mg/m ³) [skin]	TWA 1 ppm (5 mg/m ³) [skin]	200 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; anoxia; dermatitis; anemia; methemoglobinemia; in animals: liver, kidney damage; testicular effects	Eyes, skin, blood, liver, kidneys, cardiovascular system, reproductive system	Yellow, oily liquid with a pungent odor like paste shoe polish. BP: 411°F F.L.P: 190°F LEL(200°F): 1.8%

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
n-Propylbenzene	103-65-1	None established	None established	None established	None established	inhalation, ingestion, skin and/or eye contact	Harmful if swallowed, Irritation eyes, skin, digestive tract, respiratory tract, central nervous system	Eyes, skin, central nervous system, respiratory system	colorless or light yellow liquid BP: 159 C Fl.P: 47 C UEL: 6% LEL: 0.8%
Petroleum hydrocarbons(Petroleum distillates)	8002-05-9	None established	TWA 350 mg/m ³ C 1800 mg/m ³ [15 min]	TWA 500 ppm (2000 mg/m ³)	1,100 [10% LEL]	Inhalation; ingestion; skin and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, drowsiness, headache, nausea; dried/cracked skin; chemical pneumonitis	CNS, eyes, respiratory system, skin	Colorless liquid with a gasoline or kerosene-like odor BP: 86-460°F Fl. Pt = -40 to -86°F UEL: 5.9% LEL: 1.1% Flammable liquid
Phenol	108-95-2	TWA 5 ppm	TWA 5 ppm (19 mg/m ³) C 15.6 ppm (60 mg/m ³) [15-minute] [skin]	TWA 5 ppm (19 mg/m ³) [skin]	250 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching	Eyes, skin, respiratory system, liver, kidneys	Colorless to light-pink, crystalline solid with a sweet, acrid odor. BP: 359°F UEL: 8.6% LEL: 1.8%
p-Isopropyltoluene	99-87-6	None established	None established	None established	None established	inhalation, skin absorption, eye contact	Irritation skin	CNS, skin	Colorless, clear liquid, sweetish aromatic odor BP: 350.8°F Class III Flammable liquid
sec-Butylbenzene	135-98-8	None established	None established	None established	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, upper airway; central nervous system, headache, dizziness; gastrointestinal disturbance	Respiratory system, central nervous system, eyes, skin;	Colorless liquid BP: 344°F Fl.P: 126 °F UEL: 6.9% LEL: 0.8% Combustible liquid
Selenium	7782-49-2	TWA 0.2 mg/m ³	TWA 0.2 mg/m ³	TWA 0.2 mg/m ³	1 mg/m ³ (as Se)	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eyes, skin, respiratory system, liver, kidneys, blood, spleen	Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.] BP: 1265°F
Silver	7440-22-4 (metal)	TWA 0.1 mg/m ³ (metal, dust, fumes) TWA 0.01 mg/m ³ (Soluble compounds, as Ag)	TWA 0.01 mg/m ³	TWA 0.01 mg/m ³	10 mg/m ³ (as Ag)	inhalation, ingestion, skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Nasal septum, skin, eyes	Metal: White, lustrous solid BP: 3632°F
Slop Oil	69029-75-0	None established	None established	None established	None established	Inhalation; ingestion	Irritation eyes, skin, gastrointestinal tract	Eyes, skin, gastrointestinal tract	Clear light to dark amber liquid, with mild hydrocarbon odor. BP: >500°F Fl.P : 250°F

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Sulfuric Acid	7664-93-9	TWA 0.2 mg/m ³	TWA 1 mg/m ³	TWA 1 mg/m ³	15 mg/m ³	inhalation, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis	Eyes, skin, respiratory system, teeth	Colorless to dark-brown, oily, odorless liquid. BP: 554°F Noncombustible Liquid
tert-Butylbenzene	98-06-6	None established	None established	None established	None established	inhalation, skin absorption, ingestion,	Eye and respiratory irritant; CNS depression; liver or kidney damage	Respiratory system, central nervous system, eyes, liver, kidney	Colorless liquid with an aromatic odor BP: 168 - 169 C Fl.P: 34 C UEL:5.6 % LEL: 0.8 %
Tetrachloroethene	127-18-4	TWA 25 ppm STEL 100 ppm (STEL) listed as A3, animal carcinogen	Ca Minimize workplace exposure concentrations	TWA 100 ppm C 200 ppm (for 5 minutes in any 3-hour period), with a maximum peak of 300 ppm	Ca [150 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Colorless liquid with a mild, chloroform-like odor. BP: 250°F Noncombustible Liquid
Toluene	108-88-3	TWA 20 ppm	TWA 100 ppm (375 mg/m ³) STEL 150 ppm (560 mg/m ³)	TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)	500 ppm	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidneys	Colorless liquid with a sweet, pungent, benzene-like odor. BP: 232°F Fl.P: 40°F UEL: 7.1% LEL: 1.1% Class IB Flammable Liquid
trans-1,2-Dichloroethene	156-60-5	TWA 200 ppm	None established	TWA 200 ppm STEL 250 ppm (skin)	None established	inhalation, skin absorption, ingestion, skin and/or eye contact	Narcotic. Irritation eyes, skin, respiratory tract, mucous membrane; CNS depression.	Respiratory tract, mucous membrane, eyes, skin, CNS	Colorless liquid with a fruity pleasant odor BP: 48°C Fl.P 6C UEL: 12.8% LEL: 9.7%
Trichloroethene	79-01-6	TWA 10 ppm STEL 25 ppm	Ca	TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)	Ca [1000 ppm]	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Colorless liquid (unless dyed blue) with a chloroform-like odor. BP: 189°F UEL(77°F): 10.5% LEL(77°F): 8%
Vinyl Chloride	75-01-4	TWA 1 ppm	Carcinogen	TWA 1 ppm C 5 ppm [15-minute]	Ca [IDLH value has not been determined]	inhalation, skin, and/or eye contact (liquid)	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Liver, central nervous system, blood, respiratory system, lymphatic system	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. BP: 7°F UEL: 33.0% LEL: 3.6% Flammable Gas

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

Compound	CAS #	ACGIH TLV	NIOSH REL	OSHA PEL	IDLH	Routes of Exposure	Toxic Properties	Target Organs	Physical/Chemical Properties
Xylene (m, o & p isomers)	108-38-3, 95-47-6, 106-42-3	TWA 100 ppm (435 mg/m ³) STEL 150 ppm	TWA 100 ppm (435 mg/m ³)	TWA 100 ppm (435 mg/m ³)	900 ppm	Skin absorption, inhalation, ingestion, skin, and/or eye contact	Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys	Colorless liquid with an aromatic odor BP: 282°F, 292°F, 281°F Fl. Pt. 82°F, 90°F, 81°F LEL: 1.1%, 0.9%, 1.1% UEL: 7.0%, 6.7%, 7.0% Class C Flammable Liquid
Zinc	7440-66-6	TWA 10 mg/m3 (Inhalable fraction)	None established	TWA 10 mg/m3 (for zinc oxide fume)	None established	skin and/or eye contact, inhalation, ingestion	Irritation eyes, skin, respiratory tract; gastrointestinal disturbances	Eyes, skin, respiratory system	Bluish gray solid BP: 1664.6°F Flammable

Table 1. Toxicological, Physical, and Chemical Properties of Compounds Potentially Present at 112-21 Northern Boulevard, Corona, Queens, New York

References
U.S. Department of Labor. 1990. OSHA Regulated Hazardous Substances, industrial Exposure and Control Technologies Government Institutes, Inc.
Hawley's Condensed Chemical Dictionary, Sax, N. Van Nostrand and Reinhold Company, 11th Edition, 1987.
Proctor, N.H., J.P. Hughes and M.L. Fischman, 1989. Chemical Hazards of the Workplace. Van Nostrand Reinhold. New York.
Sax, N.I. and R.J. Lewis. 1989. Dangerous Properties of Industrial Materials. 7th Edition. Van Nostrand Reinhold. New York.
Guide to Occupational Exposure Values. 2008. American Conference of Governmental Industrial Hygienists (ACGIH).
NIOSH Pocket Guide to Chemical Hazards. 2005. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health

Abbreviations:
ACGIH – American Conference of Governmental Industrial Hygienists.
BP – boiling point at 1 atmosphere, °F
C – Ceiling, is a concentration that should not be exceeded during and part of the working exposure.
Ca - considered by NIOSH to be a potential occupational carcinogen
CAS# Chemical Abstracts Service registry number which is unique for each chemical.
Fl. Pt. – Flash point
IDLH - Immediately Dangerous to Life and Health concentrations represent the maximum concentration from which, in the event of respirator failure, one could escape within 30 minutes without a respirator and without experiencing any escape-impairing or irreversible health effects.
LEL – Lower explosive (flammable) limit in air, % by volume (at room temperature)
mg/m³ – Milligrams of substance per cubic meter of air
NIOSH -National Institute for Occupational Safety and Health.
OSHA – Occupational Safety and Health Administration
PEL - OSHA Permissible Exposure Limit (usually) a time weighted average concentration that must not be exceeded during any 8 hour work shift of a 40 hr work week.
ppm – parts per million
REL – NIOSH Recommended Limit indicated a time weighted average concentration that must not be exceeded during any 10 hour work shift of a 40 hr work week
STEL – Short-term exposure limit
TLV -ACGIH Threshold Limit Values (usually 8 hour time weighted average concentrations).
TWA – 8-hour, time-weighted average
UEL – Upper explosive (flammable) limit in air, % by volume (at room temperature)

TABLE 2
ACTION LEVELS FOR WORKER BREATHING ZONE

Instrument	Action Level *	Level of Respiratory Protection/Action
PID	0 to <5 ppm (one minute sustained)	Level D *
PID	>5 to <50 ppm (one minute sustained)	Utilize APR (Level C)
PID	>50 to <100 ppm (one minute sustained)	Level B
PID	>100 ppm	Stop work** (ventilate, apply foam)
CGI/H2S Meter	<5 ppm	Level D
CGI/H2S Meter	>5% to <25 ppm	Level B
CGI/H2S Meter	>25 ppm	Stop work**
CGI/CO Meter	>25 ppm	Level B
CGI/CO Meter	>50 ppm	Stop work** (ventilate area)
CGI/O2 Meter	<10% LEL, in excavation	Level D
	19.5% oxygen – 23.5%	Level D
CGI/O2 Meter	>10% LEL, in excavation	Allow to vent, apply foam**
	<19.5% or >23.5% oxygen	Stop work, Oxygen Deficient or Enriched ATM**
CGI/CO Meter	>25 to <35 ppm (five minutes sustained)	Allow to vent **
	>35 ppm	(five minutes sustained) Stop work **

Note:

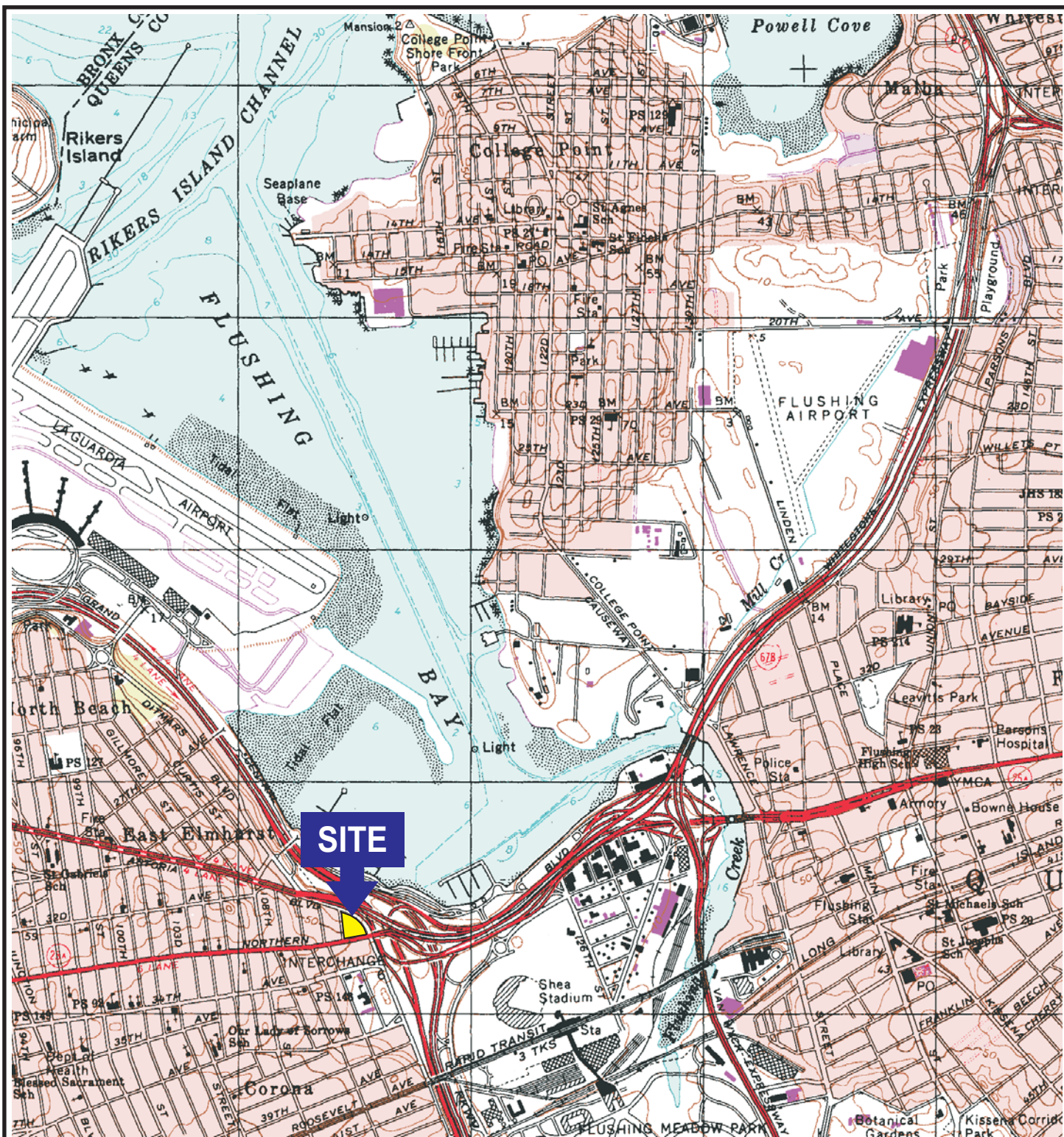
Action levels are based on above background levels.

* Instrument readings will be taken in the breathing zone of the workers, unless otherwise indicated.

** Suspend work in immediate area. Conduct air monitoring periodically to determine when work can continue. Implement mitigative measures.

FIGURES

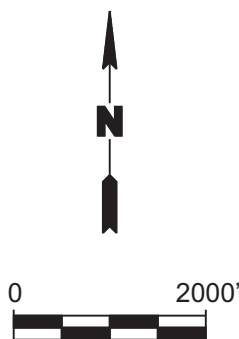
1. Site Location Map
2. Hospital Route Map
3. Health Clinic Route Map



QUADRANGLE LOCATION



SOURCE:
USGS; 1995, FLUSHING, NY
7.5 Minute Topographic Quadrangle



Title:

SITE LOCATION MAP

112-21 NORTHERN BOULEVARD
CORONA, NEW YORK

Prepared for:

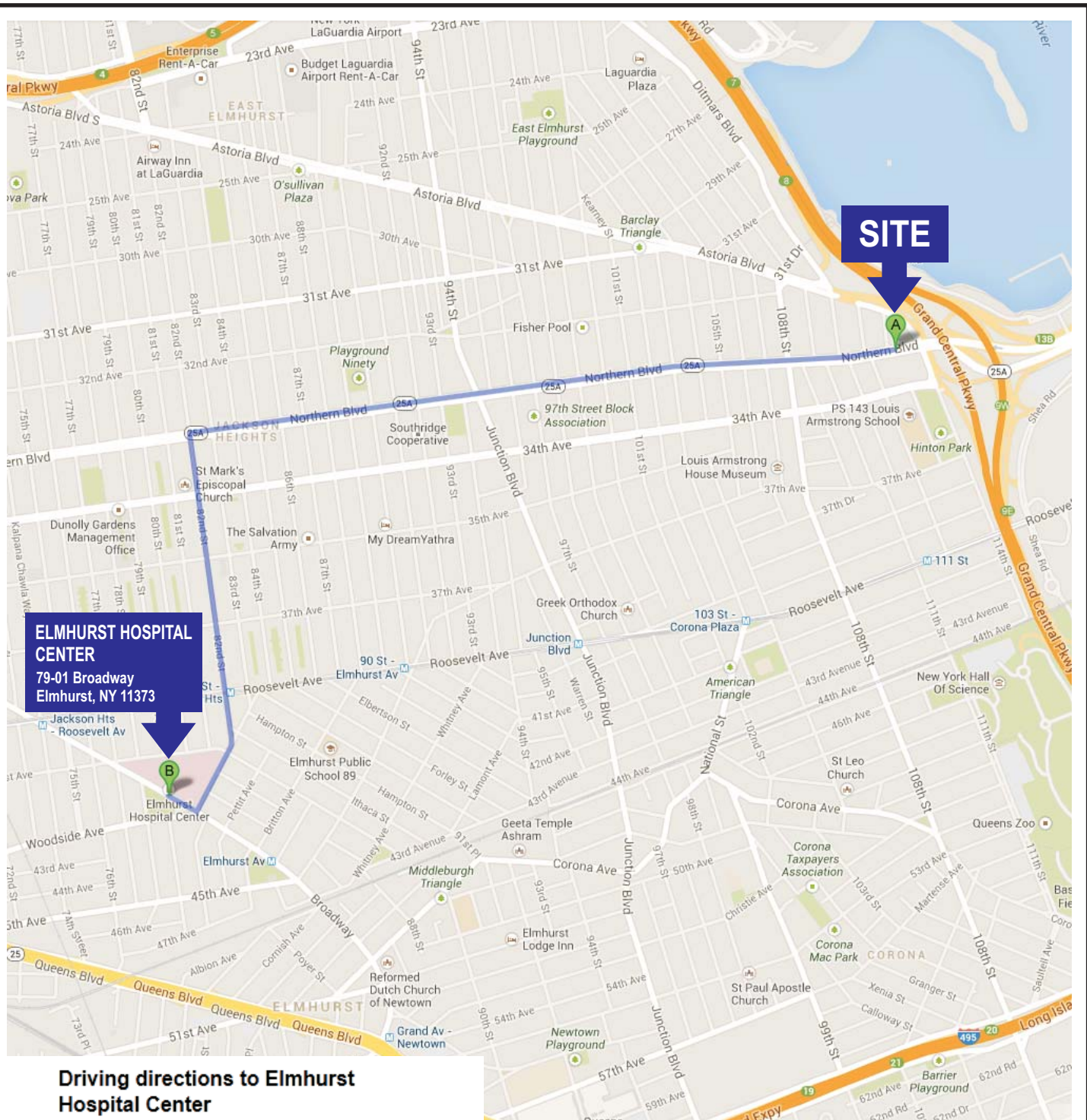
EASTERN EMERALD GROUP LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: J.W.	Date: 23DEC13
Prepared by: B.H.C.	Scale: AS SHOWN
Project Mgr.: C.B.	Project No.: 2364.0001Y000
File: 2364.0001Y100.01.CDR	

FIGURE

1



112-21 Northern Blvd
Queens, NY 11368

1. Head west on Northern Blvd toward 112th PI

1.5 mi



2. Turn left onto 82nd St

0.7 mi

3. Continue onto Baxter Ave

0.2 mi



4. Turn right onto Broadway

Destination will be on the right

361 ft



Elmhurst Hospital Center
79-01 Broadway
Elmhurst, NY 11373



Title:

HOSPITAL ROUTE MAP

112-21 NORTHERN BOULEVARD
CORONA, NEW YORK

Prepared for:

EASTERN EMERALD GROUP LLC

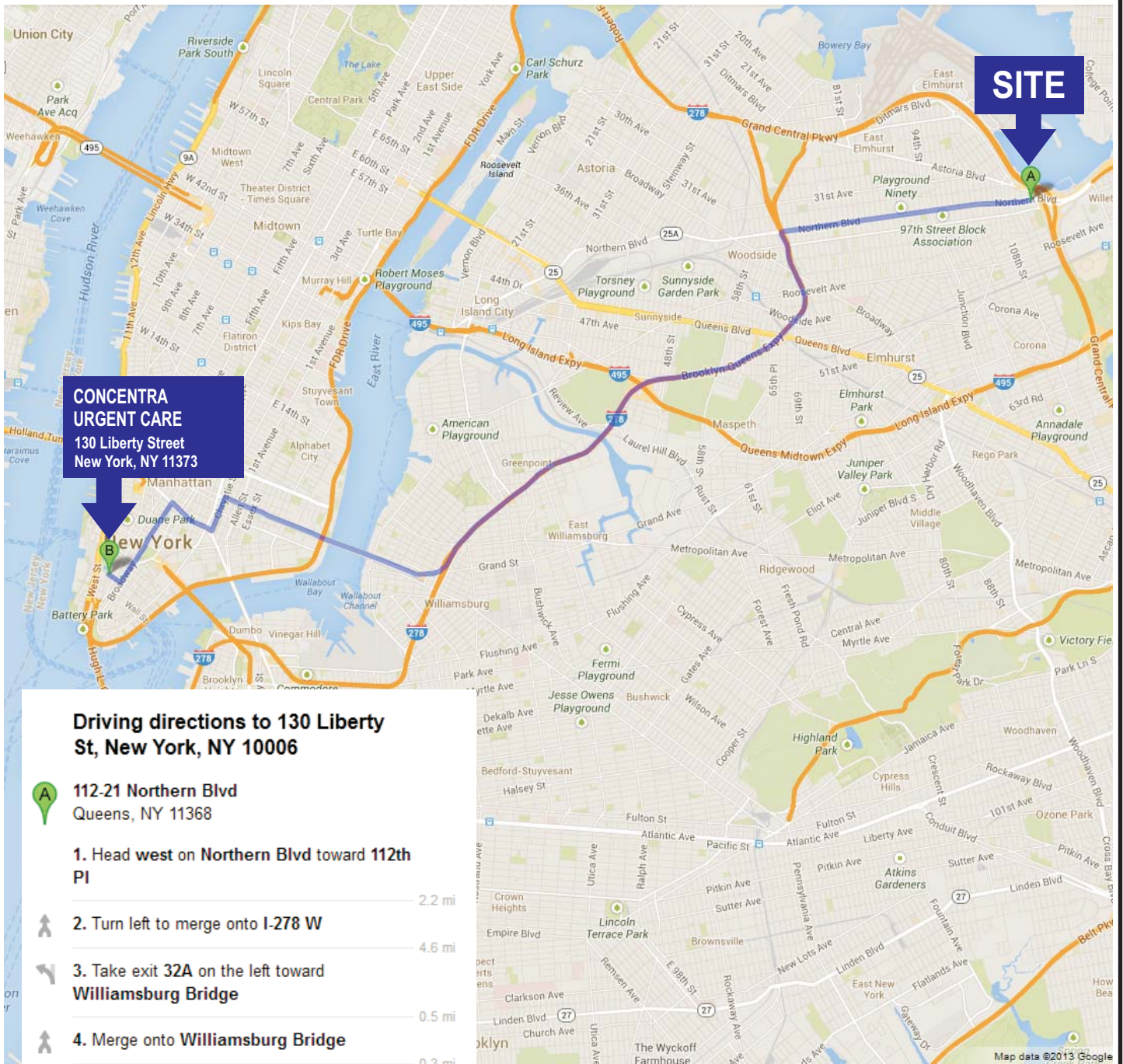


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Project Mgr.: C.B.	Project No.: 2364.0001Y000
File: 2364.0001Y100.01.CDR	

FIGURE

2



Driving directions to 130 Liberty St, New York, NY 10006



112-21 Northern Blvd
Queens, NY 11368

1. Head west on Northern Blvd toward 112th Pl

2.2 mi



2. Turn left to merge onto I-278 W

4.6 mi



3. Take exit 32A on the left toward Williamsburg Bridge

0.5 mi



4. Merge onto Williamsburg Bridge

0.3 mi



5. Slight left to stay on Williamsburg Bridge

1.1 mi

6. Continue onto Delancey St

0.4 mi



7. Turn left onto Chrystie St

0.3 mi



8. Turn right onto Canal St

0.4 mi



9. Turn left onto Broadway

0.8 mi



10. Turn right onto Liberty St
Destination will be on the left

0.1 mi



130 Liberty St
New York, NY 10006



Title:

HEALTH CLINIC ROUTE MAP

112-21 NORTHERN BOULEVARD
CORONA, NEW YORK

Prepared for:

EASTERN EMERALD GROUP LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

Compiled by: J.W.	Date: 23DEC13
Prepared by: B.H.C.	Scale: AS SHOWN
Project Mgr.: C.B.	Project No.: 2364.0001Y000
File: 2364.0001Y100.01.CDR	

FIGURE

3

ATTACHMENTS

1. Job Safety and Health (OSHA) Poster
2. Material Safety Data Sheets (MSDS)
3. Health and Safety Briefing/Tailgate Meeting Form
4. Medical Data Form
5. Community Air Monitoring Plan
6. Accident Report and Investigation Form
7. OSHA Log of Occupational Injuries and Illnesses

Job Safety and Health (OSHA) Poster

Job Safety and Health

It's the law!

OSHA
Occupational Safety
and Health Administration
U.S. Department of Labor

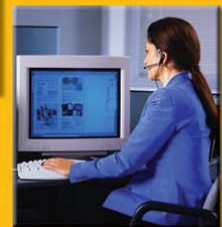
EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

**This free poster available from OSHA –
The Best Resource for Safety and Health**

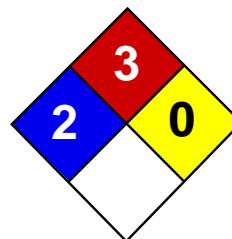


Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA
www.osha.gov

OSHA 3165-12-06R

Material Safety Data Sheets (MSDS)



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C₆H₆

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:

Aromatic. Gasoline-like, rather pleasant. (Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:

Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

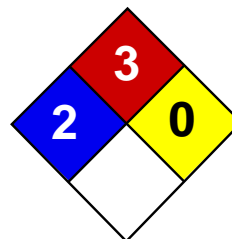
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 11/06/2008 12:00 PM

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Ethylbenzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethylbenzene

Catalog Codes: SLE2044

CAS#: 100-41-4

RTECS: DA0700000

TSCA: TSCA 8(b) inventory: Ethylbenzene

CI#: Not available.

Synonym: Ethyl Benzene; Ethylbenzol; Phenylethane

Chemical Name: Ethylbenzene

Chemical Formula: C₈H₁₀

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

Toxicological Data on Ingredients: Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 432°C (809.6°F)

Flash Points:

CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

Flammable Limits: LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances: Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Vapors may form explosive mixtures in air.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m³) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish. Gasoline-like. Aromatic.

Taste: Not available.

Molecular Weight: 106.16 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 136°C (276.8°F)

Melting Point: -94.9 (-138.8°F)

Critical Temperature: 617.15°C (1142.9°F)

Specific Gravity: 0.867 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.66 (Air = 1)

Volatility: 100% (v/v).

Odor Threshold: 140 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 3.1$

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility:

Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials, light

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:

Can react vigorously with oxidizing materials. Sensitive to light.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation.

Toxicity to Animals: Acute oral toxicity (LD50): 3500 mg/kg [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals:

Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm, it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and consciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastrointestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through). 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Ethylbenzene UNNA: 1175 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information**References:**

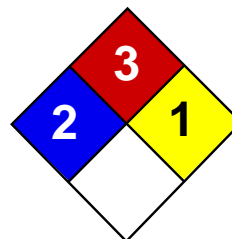
-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

Other Special Considerations: Not available.

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Cumene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cumene

Catalog Codes: SLC3052

CAS#: 98-82-8

RTECS: GR8575000

TSCA: TSCA 8(b) inventory: Cumene

CI#: Not available.

Synonym: Isopropyl benzene; Cumol; 2-Phenyl propane; (1-Methylethyl)benzene

Chemical Name: Isopropylbenzene

Chemical Formula: C₆H₅CH(CH₃)₂

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cumene	98-82-8	100

Toxicological Data on Ingredients: Cumene: ORAL (LD50): Acute: 1400 mg/kg [Rat]. 12750 mg/kg [Mouse]. DERMAL (LD50): Acute: 12300 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Very hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 424°C (795.2°F)

Flash Points: CLOSED CUP: 36°C (96.8°F). OPEN CUP: 44°C (111.2°F).

Flammable Limits: LOWER: 0.9% UPPER: 6.5%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 50 CEIL: 75 (ppm) TWA: 245 CEIL: 365 (mg/m³) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 120.2 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 152.4°C (306.3°F)

Melting Point: -96°C (-140.8°F)

Critical Temperature: Not available.

Specific Gravity: 0.862 (Water = 1)

Vapor Pressure: 8 mm of Hg (@ 20°C)

Vapor Density: 4.14 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.2 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.7

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

Acute oral toxicity (LD50): 1400 mg/kg [Rat]. Acute dermal toxicity (LD50): 12300 mg/kg [Rabbit].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans: Very hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Isopropylbenzene : UN1918 PG: III

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Cumene Massachusetts RTK: Cumene TSCA 8(b) inventory: Cumene SARA 313 toxic chemical notification and release reporting: Cumene CERCLA: Hazardous substances.: Cumene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).

DSCL (EEC):

R10- Flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 1

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

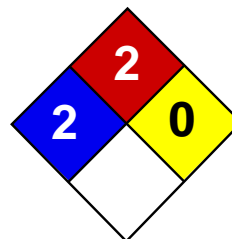
References: Not available.

Other Special Considerations: Not available.

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Health	2
Fire	2
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Naphthalene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Naphthalene

Catalog Codes: SLN1789, SLN2401

CAS#: 91-20-3

RTECS: QJ0525000

TSCA: TSCA 8(b) inventory: Naphthalene

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: C₁₀H₈

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Naphthalene	91-20-3	100

Toxicological Data on Ingredients: Naphthalene: ORAL (LD50): Acute: 490 mg/kg [Rat]. 533 mg/kg [Mouse]. 1200 mg/kg [Guinea pig]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit]. VAPOR (LC50): Acute: 170 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant, permeator). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 567°C (1052.6°F)

Flash Points: CLOSED CUP: 88°C (190.4°F). OPEN CUP: 79°C (174.2°F).

Flammable Limits: LOWER: 0.9% UPPER: 5.9%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Flammable solid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Israel: TWA: 10 (ppm) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [1995] TWA: 52 STEL: 79 (mg/m³) from ACGIH [1995]
Australia: STEL: 15 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline solid.)

Odor: Aromatic.

Taste: Not available.

Molecular Weight: 128.19 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 218°C (424.4°F)

Melting Point: 80.2°C (176.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.162 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 4.4 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.038 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:

Partially dispersed in hot water, methanol, n-octanol. Very slightly dispersed in cold water. See solubility in methanol, n-octanol.

Solubility:

Partially soluble in methanol, n-octanol. Very slightly soluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Highly reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: May attack some forms of rubber and plastic

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 490 mg/kg [Rat]. Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 170 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to blood, kidneys, the nervous system, the reproductive system, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of ingestion. Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 305.2 ppm 96 hour(s) [Trout].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Naphthalene, refined : UN1334 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Naphthalene Pennsylvania RTK: Naphthalene Florida: Naphthalene Minnesota: Naphthalene Massachusetts RTK: Naphthalene TSCA 8(b) inventory: Naphthalene TSCA 8(a) PAIR: Naphthalene TSCA 8(d) H and S data reporting: Naphthalene: 06/01/87 SARA 313 toxic chemical notification and release reporting: Naphthalene: 1% CERCLA: Hazardous substances.: Naphthalene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-4: Flammable solid. CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R36- Irritating to eyes. R40- Possible risks of irreversible effects. R48/22- Harmful: danger of serious damage to health by prolonged exposure if swallowed. R48/23- Toxic: danger of serious damage to health by prolonged exposure through inhalation. R63- Possible risk of harm to the unborn child.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 2

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: BUTYL BENZENE

TRADE NAMES/SYNONYMS:

MTG MSDS 139; BUTYLBENZENE; 1-PHENYLBUTANE; N-BUTYLBENZENE; UN 2709;
MAT03530; RTECS CY9070000

CHEMICAL FAMILY: hydrocarbons, aromatic

CREATION DATE: Jan 24 1989

REVISION DATE: Dec 11 2008

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: BUTYL BENZENE

CAS NUMBER: 104-51-8

PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=2 REACTIVITY=0



EMERGENCY OVERVIEW:

COLOR: colorless

PHYSICAL FORM: liquid

ODOR: odorless

MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression

PHYSICAL HAZARDS: Combustible liquid and vapor.

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: irritation, vomiting, headache, symptoms of drunkenness, coma

LONG TERM EXPOSURE: lung damage

SKIN CONTACT:

SHORT TERM EXPOSURE: irritation, headache, symptoms of drunkenness

LONG TERM EXPOSURE: same as effects reported in short term exposure

EYE CONTACT:

SHORT TERM EXPOSURE: irritation, tearing

LONG TERM EXPOSURE: same as effects reported in short term exposure

INGESTION:

SHORT TERM EXPOSURE: vomiting, headache, symptoms of drunkenness, coma

LONG TERM EXPOSURE: lung damage

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: DO NOT induce vomiting. Never make an unconscious person vomit or drink fluids. If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. For ingestion, consider gastric lavage, catharsis and activated charcoal slurry.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny

entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

FLASH POINT: 160 F (71 C) (OC)

LOWER FLAMMABLE LIMIT: 0.8%

UPPER FLAMMABLE LIMIT: 5.8%

AUTOIGNITION: 770 F (410 C)

FLAMMABILITY CLASS (OSHA): IIIA

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

BUTYL BENZENE:

No occupational exposure limits established.

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before

use.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid

COLOR: colorless

ODOR: odorless

MOLECULAR WEIGHT: 134.21

MOLECULAR FORMULA: C₁₀-H₁₄

BOILING POINT: 356 F (180 C)

FREEZING POINT: -116 F (-82 C)

VAPOR PRESSURE: 1 mmHg @ 23 C

VAPOR DENSITY (air=1): 4.6

SPECIFIC GRAVITY (water=1): 0.9

WATER SOLUBILITY: insoluble

PH: Not available

VOLATILITY: Not available

ODOR THRESHOLD: Not available

EVAPORATION RATE: Not available

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:

Miscible: alcohol, ether, benzene

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: oxidizing materials

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: miscellaneous decomposition products

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

BUTYL BENZENE:

LOCAL EFFECTS:

Irritant: inhalation, skin, eye

TARGET ORGANS: central nervous system

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

INVERTEBRATE TOXICITY: 340 ug/L 48 hour(s) EC50 (Immobilization) Water flea (Daphnia magna)

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Butyl benzenes

ID NUMBER: UN2709

HAZARD CLASS OR DIVISION: 3

PACKING GROUP: III

LABELING REQUIREMENTS: 3

MARINE POLLUTANT: BUTYL BENZENE



CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME: Butylbenzenes

UN NUMBER: UN2709

CLASS: 3

PACKING GROUP/CATEGORY: III

15. REGULATORY INFORMATION

U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B

and C):

ACUTE: Yes

CHRONIC: No

FIRE: Yes

REACTIVE: No

SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

STATE REGULATIONS:

California Proposition 65: Not regulated.

CANADIAN REGULATIONS:

WHMIS CLASSIFICATION: Not determined.

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.





CANADA INVENTORY (DSL/NDL): Not determined.

16. OTHER INFORMATION

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Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	Combustible material; avoid heat and sources of ignition. The health risks of this compound have not been fully determined. Exposure may cause irritation of the skin, eyes, and respiratory system.	   

Section I. Chemical Product and Company Identification

Chemical Name	n-Propylbenzene		
Catalog Number	P0523	Supplier	TCI America 9211 N. Harborside St. Portland OR 1-800-423-8616
Synonym	1-Phenylpropane		
Chemical Formula	CH ₃ CH ₂ CH ₂ C ₆ H ₅		
CAS Number	103-65-1	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
n-Propylbenzene	103-65-1	Min. 99.0 (GC)	Not available.	Rat LD ₅₀ (inhalation) 65000ppm/2H Rat LD ₅₀ (oral) 6040mg/kg

Section III. Hazards Identification

Acute Health Effects	No specific information is available in our data base regarding the toxic effects of this material for humans. However, exposure to any chemical should be kept to a minimum. Skin and eye contact may result in irritation. May be harmful if inhaled or ingested. Always follow safe industrial hygiene practices and wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Flush eyes with running water for a minimum of 15 minutes, occasionally lifting the upper eyelids. Seek medical attention. Treat symptomatically and supportively.
Skin Contact	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. Seek medical attention. Treat symptomatically and supportively. Wash any contaminated clothing before reusing.
Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. WARNING: It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention and, if possible, show the chemical label. Treat symptomatically and supportively.
Ingestion	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt, or waistband. If the victim is not breathing, administer artificial respiration. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Seek immediate medical attention and, if possible, show the chemical label. Treat symptomatically and supportively.

Section V. Fire and Explosion Data

Flammability	Combustible.	Auto-Ignition	Not available.
Flash Points	47.8°C (118°F).	Flammable Limits	Not available.
Combustion Products	These products are toxic carbon oxides (CO, CO ₂).		
Fire Hazards	No specific information is available regarding the flammability of this compound in the presence of various materials.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No additional information is available regarding the risks of explosion.		

Continued on Next Page

Emergency phone number (800) 424-9300

Fire Fighting Media
and Instructions

SMALL FIRE: Use DRY chemicals, CO₂, alcohol foam or water spray.
LARGE FIRE: Use alcohol foam, water spray or fog.

Section VI. Accidental Release MeasuresSpill Cleanup
Instructions

Combustible liquid.
Keep away from heat and sources of ignition. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and StorageHandling and Storage
Information

COMBUSTIBLE. Handle with caution and minimize exposure. DO NOT ingest. Do not breathe gas, fumes, vapor or spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Treat symptomatically and supportively.
Always store away from incompatible compounds such as oxidizing agents.

Section VIII. Exposure Controls/Personal Protection

Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.

Personal Protection

Splash goggles. Lab coat. Dust respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.



Exposure Limits

Not available.

Section IX. Physical and Chemical Properties

Physical state @ 20°C

Liquid.

Solubility

Very slightly soluble in water.
Soluble in alcohol, ether, all proportions in acetone, benzene, and petroleum ether.

Specific Gravity

0.86

Molecular Weight

120.19

Partition Coefficient

Not available.

Boiling Point

159°C (318.2°F)

Vapor Pressure

Not available.

Melting Point

-99°C (-146.2°F)

Vapor Density

Not available.

Refractive Index

1.4920 @ 20°C

Volatility

Not available.

Critical Temperature

Not available.

Odor

Not available.

Viscosity

Not available.

Taste

Not available.

Section X. Stability and Reactivity Data

Stability

This material is stable if stored under proper conditions. (See Section VII for instructions)

Conditions of Instability

Avoid excessive heat and light.

Incompatibilities

Reactive with strong oxidizing agents.

Section XI. Toxicological Information

RTECS Number

DA8750000

Routes of Exposure

Eye contact. Ingestion. Inhalation.

Toxicity Data

Rat LD₅₀ (inhalation) 65000ppm/2H
Rat LD₅₀ (oral) 6040mg/kg

Chronic Toxic Effects

CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Not available.
DEVELOPMENTAL TOXICITY : Not available.
Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Acute Toxic Effects

No specific information is available in our data base regarding the toxic effects of this material for humans. However, exposure to any chemical should be kept to a minimum. Skin and eye contact may result in irritation. May be harmful if inhaled or ingested. Always follow safe industrial hygiene practices and wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity Not available.

Environmental Fate Not available.

Section XIII. Disposal Considerations

Waste Disposal Recycle to process, if possible. Consult your local or regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state, and local regulations when disposing of the substance.

Section XIV. Transport Information

DOT Classification DOT CLASS 3: Flammable liquid.

PIN Number UN2364

Proper Shipping Name n-Propylbenzene

Packing Group (PG) III

DOT Pictograms

**Section XV. Other Regulatory Information and Pictograms**

TSCA Chemical Inventory (EPA) This compound is **ON** the EPA Toxic Substances Control Act (TSCA) inventory list.

WHMIS Classification (Canada) WHMIS CLASS B-3: Combustible liquid with a flash point between 35°C (100°F) and 93.3°C (200°F).

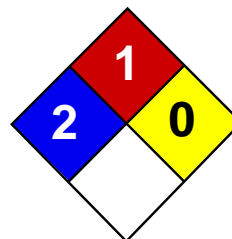
EINECS Number (EEC) 203-132-9

EEC Risk Statements
R10- Flammable.
R18- In use, may form flammable/explosive vapor-air mixture.

Japanese Regulatory Data Not available.

Section XVI. Other Information**Version 1.0****Validated on 10/26/1998.****Printed 3/18/2005.****Notice to Reader**

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Phenanthrene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Phenanthrene

Catalog Codes: SLP1318

CAS#: 85-01-8

RTECS: SF7175000

TSCA: TSCA 8(b) inventory: Phenanthrene

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: C₁₄H₁₀

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Phenanthrene	85-01-8	100

Toxicological Data on Ingredients: Phenanthrene: ORAL (LD50): Acute: 700 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: OPEN CUP: 171°C (339.8°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In

case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 178.22 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 340°C (644°F)

Melting Point: 101°C (213.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.179 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: 6.14 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 700 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant, sensitizer), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Phenanthrene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

R36/38- Irritating to eyes and skin. R43- May cause sensitization by skin contact.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 11:16 AM

Last Updated: 11/06/2008 12:00 PM

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Material Safety Data Sheet

sec-Butylbenzene, 99+%

MSDS# 73785

Section 1 - Chemical Product and Company Identification

MSDS Name: sec-Butylbenzene, 99+%

Catalog Numbers: AC107860000, AC107860050, AC107860500, AC107861000, AC107862500, AC107865000

AC107865000

Synonyms: 2-Phenylbutane; Benzene, (1-methylpropyl)-; (1-Methylpropyl)benzene; Benzene, sec-butyl-

Company Identification:

Acros Organics BVBA
Janssen Pharmaceuticaaan 3a
2440 Geel, Belgium

Company Identification: (USA)

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

For information in the US, call:

800-ACROS-01

For information in Europe, call:

+32 14 57 52 11

Emergency Number, Europe:

+32 14 57 52 99

Emergency Number US:

201-796-7100

CHEMTREC Phone Number, US:

800-424-9300

CHEMTREC Phone Number, Europe:

703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#: 135-98-8
Chemical Name: sec-Butylbenzene
%: 99+
EINECS#: 205-227-0

Hazard Symbols: XI



Risk Phrases: 10 36/37/38

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Flammable liquid and vapor. May cause central nervous system depression. Causes eye, skin, and respiratory tract irritation. Target Organs: Central nervous system.

Potential Health Effects

Eye: Causes eye irritation.

Skin: Causes skin irritation.

Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Ingestion of large amounts may cause CNS depression.

Inhalation: Causes respiratory tract irritation.

Chronic: Prolonged or repeated skin contact may cause dermatitis.

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:	Do not induce vomiting. 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.
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. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Flammable liquid and vapor.
Extinguishing Media:	For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Use water spray to cool fire-exposed containers. Water may be ineffective. Use agent most appropriate to extinguish fire. Do NOT use straight streams of water.
Autoignition Temperature:	415 deg C (779.00 deg F)
Flash Point:	45 deg C (113.00 deg F)
Explosion Limits: Lower:	0.80 vol %
Explosion Limits: Upper:	6.90 vol %
NFPA Rating:	health: 2; flammability: 2; instability: 0;

Section 6 - Accidental Release Measures

General Information:	Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:	Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling:	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage:	Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
sec-Butylbenzene	none listed	none listed	none listed

OSHA Vacated PELs: sec-Butylbenzene: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.

Exposure Limits

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

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: Liquid

Color: clear colorless

Odor: None reported.

pH: Not available

Vapor Pressure: 4 mm Hg @ 37.7 deg C

Vapor Density: 4.62

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: 173 - 174 deg C @ 760 mm Hg

Freezing/Melting Point: -75 deg C (-103.00°F)

Decomposition Temperature: Not available

Solubility in water: 0.015 g/L water

Specific Gravity/Density: 0.8630 g/cm³

Molecular Formula: C₁₀H₁₄

Molecular Weight: 134.22

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Ignition sources, excess heat.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 135-98-8: CY9100000

RTECS:

CAS# 135-98-8: Draize test, rabbit, eye: 500 mg/24H Mild;

Draize test, rabbit, skin: 100 mg/24H Moderate;

LD50/LC50: Oral, mouse: LD50 = 8700 mg/kg;

Oral, rat: LD50 = 2240 uL/kg;

Oral, rat: LD50 = 6300 mg/kg;

Skin, rabbit: LD50 = >16 mL/kg;

.

Carcinogenicity: sec-Butylbenzene - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Not available

Section 13 - Disposal Considerations

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

Section 14 - Transport Information

US DOT

Shipping Name: BUTYL BENZENES

Hazard Class: 3

UN Number: UN2709

Packing Group: III

Canada TDG

Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XI

Risk Phrases:

R 10 Flammable.

R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:

S 9 Keep container in a well-ventilated place.

S 16 Keep away from sources of ignition - No smoking.

S 33 Take precautionary measures against static discharges.

WGK (Water Danger/Protection)

CAS# 135-98-8: 1

Canada

CAS# 135-98-8 is listed on Canada's DSL List

Canadian WHMIS Classifications: B3, D2B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 135-98-8 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

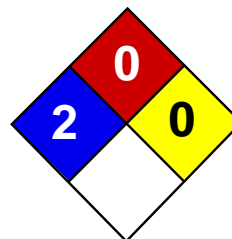
CAS# 135-98-8 is listed on the TSCA
Inventory.

Section 16 - Other Information

MSDS Creation Date: 9/02/1997

Revision #9 Date 7/20/2009

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 event 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.



Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolve; Tetrachloroethene; Tetraleno; Tetralen; Tetralex; Tetravec; Tetraguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C₂-Cl₄

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD₅₀): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC₅₀): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC₅₀): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from OSHA (PEL) [United States] TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States] TWA: 170 (mg/m3) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Miscible with alcohol, ether, chloroform, benzene, hexane. It dissolves in most of the fixed and volatile oils. Solubility in water: 0.015 g/100 ml @ 25 deg. C It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Oxidized by strong oxidizing agents. Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium, barium. Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2629 mg/kg [Rat]. Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc: LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg LDL [Dog] - Route: Oral; Dose: 4000 mg/kg LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic). May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation with possible dermal blistering or burns. Symptoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts. Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain. Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorientation, seizures, emotional instability, stupor, coma). It may cause pulmonary edema. Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation. Ingestion/Inhalation: Chronic exposure can affect the liver (hepatitis, fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremities, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fathead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene Connecticut hazardous material survey.: Tetrachloroethylene Illinois toxic substances disclosure to employee act: Tetrachloroethylene Illinois chemical safety act: Tetrachloroethylene New York release reporting list: Tetrachloroethylene Rhode Island RTK hazardous substances: Tetrachloroethylene Pennsylvania RTK: Tetrachloroethylene Minnesota: Tetrachloroethylene Michigan critical material: Tetrachloroethylene Massachusetts RTK: Tetrachloroethylene Massachusetts spill list: Tetrachloroethylene New Jersey: Tetrachloroethylene New Jersey spill list: Tetrachloroethylene Louisiana spill reporting: Tetrachloroethylene California Director's List of Hazardous Substances: Tetrachloroethylene TSCA 8(b) inventory: Tetrachloroethylene TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97 SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:**WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

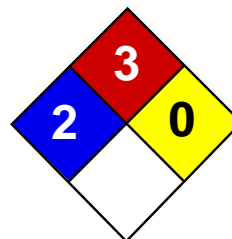
R40- Possible risks of irreversible effects. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S23- Do not breathe gas/fumes/vapour/spray S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):**Health Hazard:** 2**Fire Hazard:** 0**Reactivity:** 0**Personal Protection:** g**National Fire Protection Association (U.S.A.):****Health:** 2**Flammability:** 0**Reactivity:** 0**Specific hazard:****Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information**References:** Not available.**Other Special Considerations:** Not available.**Created:** 10/10/2005 08:29 PM**Last Updated:** 11/06/2008 12:00 PM

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C₆H₅-CH₃ or C₇H₈

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:

Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N₂O₄; AgClO₄; BrF₃; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m³) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:

Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Causes mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abrasions. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophosphatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:30 PM

Last Updated: 11/06/2008 12:00 PM

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MATERIAL SAFETY DATA SHEET

Section 1 - Chemical Product and Company Identification

MSDS Name: 1,2,4-Trimethylbenzene
Catalog Numbers: AC140090000, AC140090010, AC140090025, AC140095000
Synonyms: Pseudocumene.
Company Identification: Acros Organics BVBA
 Janssen Pharmaceuticaaan 3a
 2440 Geel, Belgium
Company Identification: (USA) Acros Organics
 One Reagent Lane
 Fair Lawn, NJ 07410
For information in the US, call: 800-ACROS-01
For information in Europe, call: +32 14 57 52 11
Emergency Number, Europe: +32 14 57 52 99
Emergency Number US: 201-796-7100
CHEMTREC Phone Number, US: 800-424-9300
CHEMTREC Phone Number, Europe: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#: 95-63-6
Chemical Name: 1,2,4-Trimethylbenzene
%: 98
EINECS#: 202-436-9

Hazard Symbols:

XN N



Risk Phrases:

10 20 36/37/38 51/53

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Flammable liquid and vapor. Harmful if inhaled. Causes eye, skin, and respiratory tract irritation. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Target Organs: Blood, central nervous system, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation. Causes redness and pain.
Skin: Causes skin irritation. Causes redness and pain. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May be harmful if swallowed. May cause central nervous system depression.
Inhalation: Harmful if inhaled. Causes respiratory tract irritation. May cause drowsiness, unconsciousness, and central nervous system depression.
Chronic: Prolonged or repeated skin contact may cause dermatitis. May cause anemia and other blood cell abnormalities. Prolonged exposure may produce a narcotic effect. Prolonged or repeated exposure may cause nausea, dizziness, and headache.

Section 4 - First Aid Measures

- Eyes:** Immediately 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. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Ingestion:** Do not induce vomiting. Possible aspiration hazard. Get medical aid immediately. Call a poison control center.
- Inhalation:** Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Possible aspiration hazard. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Notes to Physician:

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. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire. Flammable liquid and vapor.
- Extinguishing Media:** Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.
- Autoignition Temperature:** 500 deg C (932.00 deg F)
- Flash Point:** 48 deg C (118.40 deg F)
- Explosion Limits: Lower:** 0.9 vol %
- Explosion Limits: Upper:** 6.4 vol %
- NFPA Rating:** health: 2; flammability: 2; instability: 0;

Section 6 - Accidental Release Measures

- General Information:** Use proper personal protective equipment as indicated in Section 8.
- Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

- Handling:** Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale. Use only in a chemical fume hood. Keep away from heat, sparks and flame.
- Storage:** Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,2,4-Trimethylbenzene	25 ppm TWA (listed under Trimethyl benzene).	25 ppm TWA; 125 mg/m3 TWA	none listed

OSHA Vacated PELs: 1,2,4-Trimethylbenzene: 25 ppm TWA; 125 mg/m3 TWA (listed under Trimethyl benzene)

Engineering Controls:

Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.

Exposure Limits

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: Clear liquid

Color: colorless

Odor: aromatic odor

pH: Not available

Vapor Pressure: 7 mm Hg @ 44.4 deg C

Vapor Density: 4.15 (air=1)

Evaporation Rate: Not available

Viscosity: Not available

Boiling Point: 168 deg C @ 760 mmHg (334.40°F)

Freezing/Melting Point: -44 deg C (-47.20°F)

Decomposition Temperature: Not available

Solubility in water: Insoluble

Specific Gravity/Density: 0.880 g/cm3

Molecular Formula: C9H12

Molecular Weight: 120.19

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, ignition sources, excess heat.

Incompatibilities with Other Materials Strong oxidizing agents.

Hazardous Decomposition Products Carbon monoxide, carbon dioxide.

Hazardous Polymerization Will not occur.

Section 11 - Toxicological Information

RTECS#: CAS# 95-63-6: DC3325000

LD50/LC50: RTECS:
CAS# 95-63-6: Inhalation, rat: LC50 = 18000 mg/m3/4H;
Oral, mouse: LD50 = 6900 mg/kg;
Oral, rat: LD50 = 5 gm/kg;

Carcinogenicity: 1,2,4-Trimethylbenzene - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 77.2 mg/L; 96 Hr; Flow-through at 25 C (pH 7.24)

Other: Do not empty into drains.

Section 13 - Disposal Considerations

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

Section 14 - Transport Information

US DOT
Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (1,2,4-Trimethylbenzene)
Hazard Class: 3
UN Number: UN1993
Packing Group: III
Canada TDG

Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN N

Risk Phrases:

R 10 Flammable.

R 20 Harmful by inhalation.

R 36/37/38 Irritating to eyes, respiratory system and skin.

R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 61 Avoid release to the environment. Refer to special instructions/safety data sheets.

WGK (Water Danger/Protection)

CAS# 95-63-6: 3

Canada

CAS# 95-63-6 is listed on Canada's DSL List

Canadian WHMIS Classifications: B3, D1B, D2B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 95-63-6 is listed on Canada's Ingredient Disclosure List

US Federal

TSCA

CAS# 95-63-6 is listed on the TSCA
Inventory.

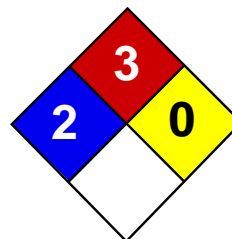
Section 16 - Other Information

MSDS Creation Date: 5/19/1999

Revision #5 Date 8/30/2007

Revisions were made in Sections: 3, 4, 5, 6, 7, 8, 9, 10, 11, 1

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 event 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.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Xylenes MSDS

Section 1: Chemical Product and Company Identification

Product Name: Xylenes

Catalog Codes: SLX1075, SLX1129, SLX1042, SLX1096

CAS#: 1330-20-7

RTECS: ZE2100000

TSCA: TSCA 8(b) inventory: Xylenes

CI#: Not available.

Synonym: Xylenes; Dimethylbenzene; xylol; methyltoluene

Chemical Name: Xylenes (o-, m-, p- isomers)

Chemical Formula: C₆H₄(CH₃)₂

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Xylenes	1330-20-7	100

Toxicological Data on Ingredients: Xylenes: ORAL (LD50): Acute: 4300 mg/kg [Rat]. 2119 mg/kg [Mouse]. DERMAL (LD50): Acute: >1700 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 464°C (867.2°F)

Flash Points: CLOSED CUP: 24°C (75.2°F). (Tagliabue.) OPEN CUP: 37.8°C (100°F).

Flammable Limits: LOWER: 1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Vapors may travel to source of ignition and flash back.

Special Remarks on Explosion Hazards:

Vapors may form explosive mixtures with air. Containers may explode when heated. May polymerize explosively when heated. An attempt to chlorinate xylene with 1,3-Dichloro-5,5-dimethyl-2,4-imidazolidindione (dichlorohydrantoin) caused a violent explosion

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined

areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 100 (ppm) [Canada] TWA: 435 (mg/m³) [Canada] TWA: 434 STEL: 651 (mg/m³) from ACGIH (TLV) [United States]
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweetish.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless. Clear

pH (1% soln/water): Not available.

Boiling Point: 138.5°C (281.3°F)

Melting Point: -47.4°C (-53.3°F)

Critical Temperature: Not available.

Specific Gravity: 0.864 (Water = 1)

Vapor Pressure: 0.9 kPa (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 1 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 3.1$

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water. Miscible with absolute alcohol, ether, and many other organic liquids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Store away from acetic acid, nitric acid, chlorine, bromine, and fluorine.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2119 mg/kg [Mouse]. Acute dermal toxicity (LD50): >1700 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5000 4 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, mucous membranes, bone marrow, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant, permeator), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:

Lowest Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Man] - Route: Oral; Dose: 10000 ppm/6H

Special Remarks on Chronic Effects on Humans:

Detected in maternal milk in human. Passes through the placental barrier in animal. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects (male and female fertility (spontaneous abortion and fetotoxicity)) and birth defects based animal data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation. Can be absorbed through skin. Eyes: Causes eye irritation. Inhalation: Vapor causes respiratory tract and mucous membrane irritation. May affect central nervous system and behavior (General anesthetic/CNS depressant with effects including headache, weakness, memory loss, irritability, dizziness, giddiness, loss of coordination and judgement, respiratory depression/arrest or difficulty breathing, loss of appetite, nausea, vomiting, shivering, and possible coma and death). May also affects blood, sense organs, liver, and peripheral nerves. Ingestion: May cause gastrointestinal irritation including abdominal pain, vomiting, and nausea. May also affect liver and urinary system/kidneys. May cause effects similar to those of acute inhalation. Chronic Potential Health Effects: Chronic inhalation may affect the urinary system (kidneys) blood (anemia), bone marrow (hyperplasia of bone marrow) brain/behavior/Central Nervous system. Chronic inhalation may also cause mucosal bleeding. Chronic ingestion may affect the liver and metabolism (loss of appetite) and may affect urinary system (kidney damage)

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification : Xylenes UNNA: 1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Xylenes Illinois chemical safety act: Xylenes New York acutely hazardous substances: Xylenes Rhode Island RTK hazardous substances: Xylenes Pennsylvania RTK: Xylenes Minnesota: Xylenes Michigan critical material: Xylenes Massachusetts RTK: Xylenes Massachusetts spill list: Xylenes New Jersey: Xylenes New Jersey spill list: Xylenes Louisiana spill reporting: Xylenes California Director's List of Hazardous Substances: Xylenes TSCA 8(b) inventory: Xylenes SARA 302/304/311/312 hazardous chemicals: Xylenes SARA 313 toxic chemical notification and release reporting: Xylenes CERCLA: Hazardous substances.: Xylenes: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R10- Flammable. R21- Harmful in contact with skin. R36/38- Irritating to eyes and skin. S2- Keep out of the reach of children. S36/37- Wear suitable protective clothing and gloves. S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 12:54 PM

Last Updated: 11/06/2008 12:00 PM

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Health and Safety Briefing/
Tailgate Meeting Form

HEALTH & SAFETY BRIEFING / TAILGATE MEETING FORM

Site Name / Location _____

Date: _____ Weather Forecast: _____

Names of Personnel Attending Briefing

_____	_____	_____
_____	_____	_____
_____	_____	_____

Planned Work _____

Items Discussed _____

Work Permit Type and Applicable Restrictions:

Signatures of Attending Personnel

_____	_____	_____
_____	_____	_____
_____	_____	_____

Medical Data Form



(Patient Must Present Photo ID at Time of Service)

Authorization for Examination or Treatment

Patient Name: _____ Social Security Number: _____

Employer: _____ Date of Birth: _____

Street Address: _____ Location Number: _____

Temporary Staffing Agency: _____

Work Related

☐ Injury ☐ Illness

Date of Injury _____

Substance Abuse Testing[★] (check all that apply)

☐ Regulated drug screen ☐ Breath alcohol

☐ Collection only ☐ Hair collect

☐ Non-regulated drug screen ☐ Rapid drug screen

☐ Other _____

Type of Substance Abuse Testing

☐ Preplacement ☐ Reasonable cause

☐ Post-accident ☐ Random

☐ Follow-up

Special instructions/comments: _____

Authorized by: _____

Please print

Phone: (_____) _____

Physical Examination

☐ Preplacement ☐ Baseline ☐ Annual ☐ Exit

DOT Physical Examination

☐ Preplacement ☐ Recertification

Special Examination

☐ Asbestos ☐ Respirator ☐ Audiogram

☐ Human Performance Evaluation[★]

☐ HAZMAT ☐ Medical Surveillance

☐ Other _____

Billing (check if applicable)

☐ Employee to pay charges

★ Due to the nature of these specific services, only the patient and staff are allowed in the testing/treatment area. Please alert your employee so that they can make arrangements for children or others that might otherwise be accompanying them to the medical center.

Title: _____

Date

Concentra now offers urgent care services for non-work related illness and injury. We accept many insurance plans.

(Copies of this form are available at www.concentra.com)

Patient Information

Concentra[®]
treated right



Thank you for trusting us with your care today.

Last name: _____ First name: _____ M.I.: _____
Patient SS #: _____ Date of Birth (MM/DD/YYYY): _____ ☐ Married
Home phone: _____ Cell phone: _____ ☐ Single
Reason for visit: _____ ☐ Male ☐ Female
Patient e-mail address: _____
Address: _____ Apt # _____ City: _____ ST: _____ ZIP: _____
Primary care physician name: _____ Phone: _____
Employer name: _____
Employer address: _____ City: _____ ST: _____ ZIP: _____
Emergency Contact Name: _____ Emergency Contact Phone: _____

How did you learn
about Concentra?
(Check one, please.)

☐ Billboard ☐ Direct mail ☐ Doctor referral ☐ Driving by ☐ Employer ☐ Existing patient ☐ Friend/relative
☐ Insurance company ☐ Internet ☐ Movie theater ☐ Newspaper ☐ Phone book ☐ Radio ☐ Pharmacy
☐ School ☐ Apartment Complex

Today's Payment

How will you
be paying for
today's bill?

Payment made today will be paid by:

☐ Patient Pay—I will be paying today using: ☐ Cash ☐ Check ☐ VISA ☐ MasterCard ☐ Discover ☐ Debit card
☐ My company—I am participating in a program that is company-paid.
☐ Insurance—I will present my insurance card and an approved form of ID. (Please complete next two sections.)

Insurance Information

If you're using
insurance to
pay today's bill,
please provide this
information...

Employer of insured person: _____
Insurance carrier: _____
Member ID: _____ Group #: _____
Claims address: _____ City: _____ ST: _____ ZIP: _____
Do you have insurance with more than one health plan? ☐ Yes ☐ No
If yes, name of other insurance carrier: _____
⇒ (Please present both ID cards at check-in.)

Account Information

If you're using
insurance, this is
information about the
person carrying the
insurance...

Last name: _____ First name: _____ M.I.: _____
Account SS #: _____ Date of birth (MM/DD/YYYY): _____
Home phone: _____ Cell phone: _____
Address: _____ City: _____ ST: _____ ZIP: _____

Relationship to patient: (Check one, please.) ☐ Self ☐ Spouse ☐ Parent/Guardian ☐ Other: _____

I certify that the information provided is correct to the best of my knowledge. I will not hold Concentra, its health providers, or its employees responsible for any errors or omissions that I may have made in completing the information on this form.

You may be contacted by Westgate Research, acting on behalf of Concentra to participate in a satisfaction survey about this visit. We rely on your feedback to help us improve.

Signature: _____ Date: _____

Información Paciente

Concentra[®]
treated right



Gracias por confiarnos sus cuidados de hoy.

Apellido: _____ Nombre: _____ Inicial Segundo Nombre: _____
#SS del paciente: _____ Fecha de nacimiento (MM/DD/AAAA): _____ ☐ Casado(a)
Teléfono en casa: _____ Teléfono celular: _____ ☐ Soltero(a)
Motivo de la consulta: _____ ☐ Hombre ☐ Mujer
Correo electrónico del paciente: _____
Dirección: _____ Apt # _____ Ciudad: _____ Estado: _____ Cód. Postal: _____
Nombre del médico de atención primaria: _____ Teléfono: _____
Nombre del empleador: _____
Dirección del empleador: _____ Ciudad: _____ Estado: _____ Cód. Postal: _____
Contacto de Emergencia: _____ Teléfono de Contacto de Emergencia: _____

**Cómo se enteró
de Concentra?**
(Por favor marque una)

☐ Valla ☐ Correo Directo ☐ Remitido por un doctor ☐ Pasábamos por aquí ☐ Empleador ☐ Paciente existente
☐ Amigo/pariente ☐ Compañía de seguro ☐ Internet ☐ Teatro de cine ☐ Periódico ☐ Radio ☐ Farmacia ☐ Escuela
☐ Complejo de Apartamentos

Pago de hoy
**Cómo va a pagar
la cuenta de hoy?**

El pago de hoy lo va a hacer:

☐ El paciente — Yo pagaré la cuenta total usando: ☐ Efectivo ☐ Cheque ☐ VISA ☐ MasterCard ☐ Discover ☐ Tarjeta Débito
☐ La Compañía paga - Estoy participando en un programa que es pagado por la Compañía
☐ El seguro — Yo presentaré mi tarjeta de seguro y una forma de identificación aprobada
(Por favor complete las siguientes dos secciones).

**Información
del seguro**
Si usted está usando
seguro para pagar
la cuenta de hoy,
por favor provéanos
con la siguiente
información...

Empleador de la persona asegurada: _____
Compañía de seguro: _____
Identificación del Miembro: _____ # de Grupo: _____
Dirección de reclamos: _____ Ciudad: _____ Estado: _____ Cód. Postal: _____
Tiene seguro con más de un plan de salud? ☐ Si ☐ No
Si sí, nombre el otro seguro: _____
➔ (Por favor presente ambas tarjetas de identificación al registrarse)

**Información de
la cuenta**
Si usted está usando
seguro, esta es
información acerca de
la persona que tiene
el seguro...

Apellido: _____ Nombre: _____ Inicial Seg. Nombre: _____
de SS en la Cuenta: _____ Fecha de Nacimiento: (MM/DD/AAAA) _____
Teléfono en casa: _____ Teléfono celular: _____
Dirección: _____ Ciudad: _____ Estado: _____ Cód. Postal: _____
Relación con el paciente: ☐ Usted mismo ☐ Cónyuge ☐ Padre/Guardián ☐ Otro: _____
(Por favor marque una)

Yo certifico que la información provista es correcta hasta donde yo sé. Yo no haré responsable a Concentra, sus proveedores de la salud, o sus empleados por cualquier error u omisión que yo haya hecho al llenar la información en este formulario.

Firma: _____ Fecha: _____

The Reason for Today's Visit

- ☐ Physical exam
 ☐ Drug Screen
 ☐ Physical and Drug Screen
 ☐ Injury
☐ DOT (CDL) certification
 ☐ Other: _____

Patient


Last name: _____ First name: _____ M.I.: _____
 Social Security #: _____ Date of birth (MM/DD/YYYY): _____
 Address: _____ Apt. # _____ City: _____ ST: _____ ZIP: _____
 Contact phone (home or cell): _____ Work phone: _____ ☐ Female ☐ Male
 Occupation: _____ ☐ Single ☐ Married

Employer

Employer Requesting Services

Name: _____ Location/store number: _____
 Contact name: _____ Contact phone: _____
 Address: _____ City: _____ ST: _____ ZIP: _____
 Is your employment arranged through a temporary hire agency? ☐ Yes ☐ No Name of agency: _____ Agency phone: _____


The information provided is correct to the best of my knowledge. I will not hold Concentra, its health providers, or its employees responsible for any errors or omissions that I may have made in completing the information on this form. You may contact my employer to verify the purpose of my visit, if necessary.

 Signature: _____ Date: _____

Notice of Privacy Practices

Your name and signature below indicate that you have received a copy of Concentra's Notice of Privacy Practices on the date and time indicated. If you have any questions regarding the information in Concentra's Notice of Privacy Practices, contact Concentra's Privacy Office at 800-819-5571 or PrivacyOffice@concentra.com.

Name (please print): _____

 Signature: _____

Date and time Notice received: _____

If you are here for an **injury**, please complete the section below.

Injury date: _____ Injury time: _____

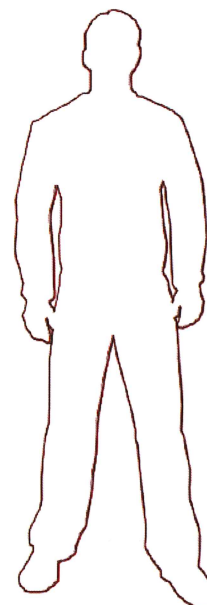
Where were you when the injury occurred?: _____

How did the injury happen? _____

What part of your body is injured? _____

Please check which side of your body is injured. ☐ Right ☐ Left ☐ Both

Using the figure at right, please circle the areas where you are injured. ➔



You may be contacted by Westgate Research, acting on behalf of Concentra, to participate in a satisfaction survey about this visit. We rely on your feedback to help us improve.

Mejorando la salud de los Estados Unidos, un paciente a la vez.

La razón para la consulta de hoy


- ☐ Examen físico ☐ Chequeo de drogas ☐ Examen físico y chequeo de drogas ☐ Lesión
☐ Certificación DOT (CDL) ☐ Otro: _____

Paciente
 Apellido: _____ Nombre: _____ Inicial Seg. Nombre: _____
 # Seguro Social: _____ Fecha de Nacimiento (MM/DD/AAAA): _____
 Dirección: _____ Apt. # _____ Ciudad: _____ Estado _____ Cód. Postal: _____
 Teléfono de contacto (casa o celular): _____ Teléfono trabajo: _____ ☐ Mujer ☐ Hombre
 Ocupación: _____ ☐ Soltero(a) ☐ Casado(a)

Empleador Solicitando los Servicios

Empleador
 Nombre: _____ Ubicación/Tienda Número: _____
 Nombre del Contacto: _____ Teléfono del Contacto: _____
 Dirección: _____ Apt. # _____ Ciudad: _____ Estado _____ Cód. Postal: _____
 ¿Su empleo está contratado a través de una agencia de empleos temporales? ☐ Sí ☐ No
 Nombre de la agencia: _____ Teléfono de la agencia: _____

La información provista es correcta hasta donde yo sé. Yo no haré responsable a Concentra, sus proveedores de la salud, o sus empleados por cualquier error u omisión que yo haya hecho al llenar la información en este formulario. Si es necesario, usted puede contactar a mi empleador para verificar el propósito de mi consulta.

 **Firma:** _____ **Fecha:** _____

Aviso de las Políticas de Privacidad

Su nombre y firma abajo indican que usted ha recibido una copia de la Notificación de Políticas de Privacidad de Concentra en la fecha y hora indicados. Si usted tiene cualquier pregunta en relación con la Notificación de Prácticas de Privacidad de Concentra, por favor contacte al Oficial de Privacidad y Seguridad de Concentra al 800-819-5571 o PrivacyOffice@concentra.com.

Nombre (letra imprenta por favor) _____

 **Firma:** _____

Fecha y hora de recibida la notificación: _____

Si usted está aquí por una **lesión**, por favor llenela sección de abajo.

Fecha de la lesión: _____ Hora de la lesión: _____

¿Dónde estaba cuando ocurrió la lesión? _____

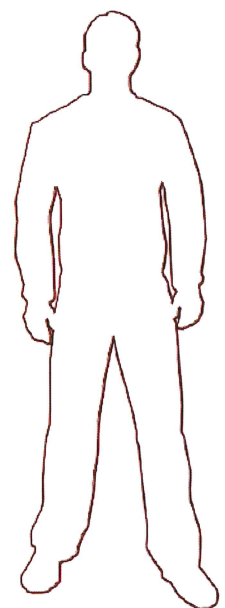
¿Cómo ocurrió la lesión? _____

¿Qué parte de su cuerpo está lesionada? _____

Por favor indique cuál lado de su cuerpo está lesionado ☐ Derecho ☐ Izquierdo ☐ Ambos

Utilizando el dibujo a la derecha, por favor marque con un círculo las áreas que están lesionadas ➡

Puede que lo contacte de Westgate Research, en representación de Concentra para que participe en una encuesta de satisfacción acerca de su consulta. Nosotros contamos con esta información, la cual nos ayuda a mejorar.



Community Air Monitoring Plan

ATTACHMENT 5

New York State Department of Health Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing

monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. 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.
2. 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.
3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring

particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.
3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Accident Report and Investigation Form

ACCIDENT REPORT

Joe Gentile, Corporate Health and Safety Manager

Cell: (610) 844-6911; Office: (856) 423-8800; Office FAX: (856) 423-3220; Home: (484) 373-0953

PART 1: ADMINISTRATIVE INFORMATION

Project #: _____ Project Name: _____ Project Location (street address/city/state): _____ _____ Client Corporate Name / Contact / Address / Phone #: _____ _____ _____ _____ _____		Immediate Verbal Notifications Given To: Corporate Health & Safety <input type="checkbox"/> Yes <input type="checkbox"/> No Office Health & Safety <input type="checkbox"/> Yes <input type="checkbox"/> No Office Manager <input type="checkbox"/> Yes <input type="checkbox"/> No Project Principal <input type="checkbox"/> Yes <input type="checkbox"/> No Project Manager <input type="checkbox"/> Yes <input type="checkbox"/> No Client Contact <input type="checkbox"/> Yes <input type="checkbox"/> No REPORT TYPE: <input type="checkbox"/> Loss <input type="checkbox"/> Near Loss Estimated Costs: \$ _____	REPORT STATUS (time due): <input type="checkbox"/> Initial (24 hr) <input type="checkbox"/> Final (5-10 days) Date: _____ Date: _____ Accident Report Delivered To: Corporate Health & Safety <input type="checkbox"/> Yes <input type="checkbox"/> No Office Health & Safety <input type="checkbox"/> Yes <input type="checkbox"/> No Office Manager <input type="checkbox"/> Yes <input type="checkbox"/> No Project Principal <input type="checkbox"/> Yes <input type="checkbox"/> No Project Manager <input type="checkbox"/> Yes <input type="checkbox"/> No		
OSHA CASE # Assigned by Corporate Health & Safety if Applicable: _____		Corporate Health & Safety Confirmed Final Accident Report <input type="checkbox"/> Yes <input type="checkbox"/> No			
DATE OF INCIDENT: _____	TIME INCIDENT OCCURRED: _____ <input type="checkbox"/> AM <input type="checkbox"/> PM	INCIDENT LOCATION – City, State, and Country (If outside U.S.A.) _____			
INCIDENT TYPES: (Select most appropriate if Loss occurred.) From lists below, please select the option that best categories the incident. When selecting an injury or illness, also indicate the severity level.					
<div style="display: flex; justify-content: space-between;"><div style="width: 30%;"><input type="checkbox"/> INJURY -----Severity Level----- <input type="checkbox"/> Fatality <input type="checkbox"/> First Aid <input type="checkbox"/> Medical <input type="checkbox"/> Restricted Work <input type="checkbox"/> Lost Time Treatment</div><div style="width: 35%;">OTHER INCIDENT TYPES <input type="checkbox"/> Spill / Release Material involved: _____ Quantity (U.S. Gallons): _____</div><div style="width: 30%;"><input type="checkbox"/> Misdirected Waste <input type="checkbox"/> Consent Order <input type="checkbox"/> NOV <input type="checkbox"/> Property Damage <input type="checkbox"/> Exceedance <input type="checkbox"/> Motor Vehicle <input type="checkbox"/> Fine / Penalty</div></div>					
<div style="display: flex; justify-content: space-between;"><div style="width: 30%;">ACTIVITY TYPE (Check most appropriate one.) <input type="checkbox"/> Decommissioning <input type="checkbox"/> Geoprobe <input type="checkbox"/> Sampling <input type="checkbox"/> Demolition <input type="checkbox"/> Motor Vehicle <input type="checkbox"/> System Start-up <input type="checkbox"/> Dewatering <input type="checkbox"/> Operations/ <input type="checkbox"/> Trenching <input type="checkbox"/> Drilling Maintenance <input type="checkbox"/> AST/UST Removal <input type="checkbox"/> Excavation <input type="checkbox"/> Pump/Pilot Test <input type="checkbox"/> Other _____ <input type="checkbox"/> Gauging <input type="checkbox"/> Rigging/Lifting</div><div style="width: 35%;">INJURY TYPE (Check all applicable.) <input type="checkbox"/> Abrasion <input type="checkbox"/> Occupational Illness <input type="checkbox"/> Amputation <input type="checkbox"/> Puncture <input type="checkbox"/> Burn <input type="checkbox"/> Rash <input type="checkbox"/> Cold/Heat Stress <input type="checkbox"/> Repetitive Motion <input type="checkbox"/> Inflammation <input type="checkbox"/> Sprain/Strain <input type="checkbox"/> Laceration <input type="checkbox"/> Other _____</div><div style="width: 30%;">BODY PART AFFECTED (Check all applicable.) <input type="checkbox"/> Respiratory <input type="checkbox"/> Shoulder <input type="checkbox"/> Face <input type="checkbox"/> Neck <input type="checkbox"/> Arm <input type="checkbox"/> Leg <input type="checkbox"/> Chest <input type="checkbox"/> Wrist <input type="checkbox"/> Knee <input type="checkbox"/> Abdomen <input type="checkbox"/> Hand/Fingers <input type="checkbox"/> Ankle <input type="checkbox"/> Groin <input type="checkbox"/> Eye <input type="checkbox"/> Foot/Toes <input type="checkbox"/> Back <input type="checkbox"/> Head <input type="checkbox"/> Other _____</div></div>					
I. PERSON(S) DIRECTLY / INDIRECTLY INVOLVED IN INCIDENT (Attach additional information as necessary/applicable.)					
Name/Phone # of Each Person Directly/Indirectly Involved in Incident:	Designate: Roux/Remedial Employee Roux/Remedial Subcontractor Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:	
1)					
2)					
II. PERSONS INJURED IN INCIDENT (Attach additional information as necessary/applicable.)					
Name/Phone # of Each Person Injured in Incident:	Designate: Roux/Remedial Employee Roux/Remedial Subcontractor Client Employee Client Contractor Third Party	As applicable, Current Occupation; Yrs in Current Occupation; Current Position; and Yrs in Current Position:	As applicable, Employer Name; Address; and Phone #:	As applicable, Supervisor Name; and Phone #:	Description of Injury:
1)					
2)					
III. PROPERTY DAMAGED IN INCIDENT (Attach additional information as necessary/applicable.)					
Property Damaged:	Property Location:	Owner Name, Address & Phone #:	Description of Damage:	Estimated Cost:	
1)				\$	

Accident Report – Page 2

2)				\$
----	--	--	--	----

IV. WITNESSES TO INCIDENT (Attach additional information as necessary/applicable.)

Witness Name:	Address:	Phone #:
1)		
2)		

PART 2: WHAT HAPPENED AND INCIDENT DETAILS

PROVIDE FACTUAL DESCRIPTION OF INCIDENT (e.g., describe loss/near loss, injury, response / treatment).

I. AUTHORITIES/GOVERNMENTAL AGENCIES NOTIFIED (Attach additional information as necessary/applicable.)

Authority/Agency Notified:	Name/Phone #/Fax # of Person Notified:	Address of Person Notified:	Date & Time of Notification:	Exact Information Reported/Provided:

II. PUBLIC RESPONSES TO INCIDENT (if applicable)

Response/Inquiry By: (check one)	Entity Name:	Name/Phone # of Respondent/ Inquirer:	Address of Entity/Person:	Date & Time of Response/Inquiry:
<input type="checkbox"/> Newspaper <input type="checkbox"/> Television <input type="checkbox"/> Community Group <input type="checkbox"/> Neighbors <input type="checkbox"/> Other				

Describe Response/Inquiry:

Roux/Remedial Response:

(Check all that apply.) (Attach photos, drawings, etc. to help illustrate the incident.)

ATTACHED INFORMATION:
☐ Photo
 ☐ Sketches
 ☐ Vehicle Acord Form
 ☐ Police Report
 ☐ Other

Name(s) of person(s) who prepared Initial and Final Report:	Title(s):	Phone number(s):
---	-----------	------------------

PART 3: INVESTIGATION TEAM ANALYSIS

CONCLUSION: WHY IT HAPPENED (LIST CAUSAL FACTORS AND CORRESPONDING ROOT CAUSES)

(Root Causes: Lack of knowledge or skill, Doing the task according to procedures or acceptable practices takes more time or effort, Short-cuts or not following acceptable practices is reinforced or tolerated, Not following procedures or acceptable practices did not result in an accident, Lack of or inadequate procedures, Inadequate communications of expectations regarding procedures or acceptable practices, Inadequate tools or equipment, External Factors)

ROOT CAUSE(S) AND SOLUTION(S): HOW TO PREVENT INCIDENT FROM RECURRING

CAUSAL FACTOR	ROOT CAUSE		SOLUTION(S) [Must Match Root Cause(s)]	PERSON RESPONSIBLE	AGREED DUE DATE	ACTUAL COMPLETION DATE
			# Solution(s)			
			1			
			2			
			3			

INVESTIGATION TEAM:

PRINT NAME	JOB POSITION	DATE	SIGNATURE

No One Gets Hurt!

OSHA Log of Occupational Injuries and Illnesses

Log of Work-Related Injuries and Illnesses

Year _____

U.S. Department of Labor
Occupational Safety and Health Administration

The logo of the U.S. Department of Labor, featuring a stylized diamond shape composed of concentric lines, with a five-pointed star in the center.

Form approved OMB no. 1218-0176

City _____ State _____

[illegible]

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Page 1 of 1

Injury	
(1)	
(2)	Skin Disorder
(3)	Respiratory Condition
(4)	Poisoning
(5)	Hearing Loss
(6)	All other illnesses

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases			
Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days	
Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types			
Total number of... (M)			
(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 50 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave. NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name _____

Street _____

City _____ State _____ Zip _____

Industry description (e.g., Manufacture of motor truck trailers) _____

Standard Industrial Classification (SIC), if known (e.g., SIC 3715) _____

OR North American Industrial Classification (NAICS), if known (e.g., 336212) _____

Employment information

Annual average number of employees _____

Total hours worked by all employees last year _____

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Company executive

Phone

Title

Date

OSHA's Form 301

Injuries and Illnesses Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.



U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____
Title _____
Phone _____ Date _____

Information about the employee

- 1) Full Name _____
- 2) Street _____
- City _____ State _____ Zip _____
- 3) Date of birth _____
- 4) Date hired _____
- 5) ☐ Male
☐ Female

Information about the physician or other health care professional

- 6) Name of physician or other health care professional _____
- 7) If treatment was given away from the worksite, where was it given?
- Facility _____
- Street _____
- City _____ State _____ Zip _____
- 8) Was employee treated in an emergency room?
☐ Yes
☐ No
- 9) Was employee hospitalized overnight as an in-patient?
☐ Yes
☐ No

Information about the case

- 10) Case number from the Log _____ (Transfer the case number from the Log after you record the case.)
- 11) Date of injury or illness _____
- 12) Time employee began work _____ AM/PM
- 13) Time of event _____ AM/PM ☐ Check if time cannot be determined
- 14) **What was the employee doing just before the incident occurred?** Describe the activity, as well as the tools, equipment or material the employee was using. Be specific. Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."
- 15) **What happened?** Tell us how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."
- 16) **What was the injury or illness?** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt", "pain", or "sore." Examples: "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."
- 17) **What object or substance directly harmed the employee?** Examples: "concrete floor"; "chlorine"; "radial arm saw." If this question does not apply to the incident, leave it blank.
- 18) **If the employee died, when did death occur?** Date of death _____

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

Quality Assurance Project Plan

November 11, 2014

QUALITY ASSURANCE PROJECT PLAN

**112-21 Northern Boulevard
Corona, Queens, New York 11368
BCP Site No. C241157**

Prepared for

**Eastern Emerald Group LLC
136-20 38th Avenue, Suite 10F
Flushing, New York 11354**

ROUX ASSOCIATES, INC.

Environmental Consulting & Management



209 Shafter Street, Islandia, New York 11749 ♦ 631-232-2600

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TABLE

1. Field and Laboratory QC Summary

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared to describe the measures that will be taken to ensure that the data generated during performance of the remedial action at 112-21 Northern Boulevard located in Corona, Queens, New York (Site) are of quality sufficient to meet project-specific data quality objectives (DQOs). The QAPP was prepared in accordance with the guidance provided in New York State Department of Environmental Conservation (NYSDEC) Technical Guidance DER-10 (Technical Guidance for Site Investigation and Remediation), the Brownfield Cleanup Program Guide and the United States Environmental Protection Agency's (USEPA's) Guidance for the Data Quality Objectives Process (EPA QA/G-4).

2.0 BACKGROUND, OBJECTIVES, AND SCOPE

In order to assure the objectives of the selected remedy for the Site have been met, Roux Associates has developed a scope of work that includes sampling of soil and groundwater. A brief overview of each element of the remedial action end-point soil sampling and groundwater performance monitoring is provided below.

2.1 Soil

Soil samples will be collected and analyzed at a frequency of one sample per 2500 square feet of excavation bottom for the following analytes:

- Target Compound List (TCL) volatile organic compounds (VOCs) via United States Environmental Protection Agency (USEPA) Method 8260;
- TCL semivolatile organic compounds (SVOCs) via USEPA Method 8270;
- Target Analyte List (TAL) and Toxicity Characteristic Leaching Procedure (TCLP) metals via USEPA Method 6010;
- Hexavalent chromium via USEPA Method 7196A;
- Pesticides via USEPA Method 8081 and;
- Polychlorinated biphenyls (PCBs) via USEPA Method 8082.

2.2 Groundwater

Groundwater samples will be collected the 10 existing Site monitoring wells installed by Roux Associates during the Remedial Investigation (RI). After gauging for depth to water and potential separate-phase petroleum product, each well will be sampled for the following analytes:

- Target Compound List (TCL) volatile organic compounds (VOCs) via United States Environmental Protection Agency (USEPA) Method 8260;
- TCL semivolatile organic compounds (SVOCs) via USEPA Method 8270;
- Target Analyte List (TAL) metals via USEPA Method 6010;
- Hexavalent chromium via ESEPA Method 7196A;
- Pesticides via USEPA Method 8081 and;
- Polychlorinated biphenyls (PCBs) via USEPA Method 8082.

Field parameters, including temperature, pH, conductivity, redox potential, dissolved oxygen, and turbidity will also be measured.

3.0 PROJECT ORGANIZATION

The overall management structure and a general summary of the responsibilities of project team members are presented below.

Remedial Engineer

Brian P. Morrissey, P.E. of Remedial Engineering, P.C. will serve as the Remedial Engineer for the project. The Remedial Engineer is responsible for developing the remedial design, overseeing the remediation of the Site and certifying the completion of the remediation efforts in the Final Engineering Report.

Project Principal

Nathan Epler, Ph.D, of Roux Associates will serve as Project Principal. The Project Principal is responsible for defining project objectives and bears ultimate responsibility for the successful completion of the investigation.

Project Manager

Christopher Battista of Roux Associates will serve as Project Manager. The Project Manager will provide overall management for the implementation of the scope of work and will coordinate all field activities. The Project Manager is also responsible for data review/interpretation and report preparation. Activities of the Project Manager are supported by the Project Quality Assurance Coordinator.

Field Team Leader

A Roux Associates scientist or engineer will serve as the Field Team Leader. The Field Team Leader bears the responsibility for the successful execution of the field program, as scoped in the Remedial Action Work Plan (RAWP). The Field Team Leader will direct the activities of all technical staff in the field as well all subcontractors. The Field Team Leader will also assist in the interpretation of data and in report preparation. The Field Team Leader reports to the Project Manager.

Laboratory Project Manager

Alpha Analytical, Inc. will be the analytical laboratory for the project. The analytical laboratory will be responsible for sample container preparation, sample custody in the laboratory, and completion of the required analysis through oversight of the laboratory staff. The Laboratory Project Manager will ensure that quality assurance procedures are followed and that an acceptable laboratory report is prepared and submitted. The Laboratory Project Manager reports to the Field Team Leader.

Quality Assurance Officer

Yixian Zhang, Ph.D., of Roux Associates will serve as the Quality Assurance Officer (QAO) for this project. The QAO is responsible for conducting reviews, inspections, and audits to ensure that the data collection is conducted in accordance with the Field Sampling Plan (FSP) and QAPP. The QAO's responsibilities range from ensuring effective field equipment decontamination procedures and proper sample collection to the review of all laboratory analytical data for completeness and usefulness. The QAO reports to the Project Manager and makes independent recommendations to the Field Team Leader.

4.0 SAMPLING PROCEDURES

Detailed discussions of sampling, decontamination, and sample handling procedures are provided in the FSP (Appendix B of the Remedial Investigation Work Plan).

5.0 QUALITY ASSURANCE/QUALITY CONTROL

The primary intended use for the remedial action data is to confirm the effectiveness of the remediation efforts implemented at the Site. The primary data quality objective (DQO) of the soil and groundwater sampling programs, therefore, is that data be accurate and precise, and hence representative of the actual Site conditions. DQOs can be qualitative and/or quantitative statements that are used in an effort to guide field work during investigation and remedial activities. Meeting the DQOs is anticipated to maximize the likelihood that the data are collected, analyzed, and documented without compromising data integrity. DQOs can be used for the following purposes:

- Define the most appropriate type and quantity of data to collect;
- Determine the most appropriate conditions and locations from which to collect the data; and
- Determine the most appropriate way to present and report the data.

In addition to the qualitative DQOs presented in the RAWP, there are specific quantitative and qualitative DQOs that relate to the field and laboratory data generated during the investigation. These DQOs, also referred to as Measurement Performance Criteria, relate to the parameters of precision, accuracy, representativeness, completeness, sensitivity and comparability. These parameters can provide a quantitative and qualitative indication of data quality. These parameters will be evaluated, as required by the analytical laboratory, in accordance with the specific Analytical Services Protocol (ASP) methods, as well as during the preparation of independent Data Usability Summary Reports (DUSRs) as per the requirements of DER-10. DUSRs will be prepared for each phase of investigation activities completed at the Site. The Measurement Performance Criteria are discussed in detail in the remainder of this section. Compliance with these criteria will be evaluated by the laboratory in accordance with their QAPP and any non-conformities identified shall be addressed in the lab reports. These criteria will also be used in an effort to evaluate sample results during data verification and validation.

5.1 Precision

Precision is defined as a measure of the reproducibility of individual measurements under a given set of conditions. Precision is a measure of the variability of a group of data compared to

their average value. Precision is monitored through duplicate (replicate) samples and it is assessed for each sample media.

Precision can be expressed in terms of relative percent difference (RPD) and is dependent upon the sampling technique and implementation of the analytical method. RPD can be calculated using the following equation:

$$\text{RPD} = [(C1-C2) / ((C1+C2)/2)] \times 100$$

When: C1 = The larger of the two concentrations.

C2 = The smaller of the two concentrations.

5.2 Accuracy

Accuracy is a measure of the bias in a measurement system, (i.e., the ability to obtain a true value), which may result from sampling and/or analytical error. Accuracy is monitored through the use of field and method blanks, spikes, and standards, and compared to federal and state regulations and guidelines.

Accuracy may be expressed as a percent difference (%D) calculated using the following equation:

$$\%D = (V_t - V_m) / V_t \times 100$$

When: V_t = The true or real value expected.

V_m = The measured or observed value.

The objective for measuring accuracy with laboratory data is in an attempt to demonstrate that the analytical instruments provide consistent measurements within the accuracy criteria. Documentation of accuracy can be provided by the laboratory upon request.

Accuracy is also measured in regards to collection of field data. The objective for measuring accuracy in the field is an attempt to successfully calibrate the associated field equipment to the manufacturer's specifications, and to verify the deviation from calibrated values.

5.3 Sensitivity

Sensitivity is the ability of a laboratory instrument or measurement technique to detect an analyte at certain levels of interest. Method detection limits (MDLs) depend on instrument sensitivity and matrix effects. Monitoring of instrument sensitivity is performed through the analysis of reagent blanks, near detection limit standards, and response factors. Documentation of laboratory instrument sensitivity can be provided by the laboratory upon request.

Sensitivity is expressed in quantitation limits. The limits of quantitation are based on the guidelines presented below:

- The limit of quantitation shall be based upon the variability of the blank response for the complete analytical procedure, or the variability for the signal-to-background response in a processed sample when there is not a detectable blank response. The detection limit will be established as 3.5 times (3.5X) the MDL and is equal to or greater than the lowest calibration standard, adjusted for the amount of sample typically extracted and the final extract volume of the method (i.e., all dilutions and sample weight variables must be included in the calculation).
- Best professional judgment shall be used in an effort to adjust the limit of detection upward in cases where the transient occurrence of high instrument precision (i.e., low variability) results in a calculated limit of detection less than the absolute sensitivity of the analytical instrument. When no significant blank response is detectable, the limit of detection shall be estimated based upon the standard deviation of low-level standard (concentrations at or near the expected instrument detection limit) responses.

Sample matrix cleanup (in laboratory) must occur when chemical interferences may be causing elevated reporting limits or inadequate contaminant identification or quantitation. Sample matrix cleanup must conform to the procedures specified in the applicable NYSDEC ASP method.

5.4 Representativeness

Representativeness is a qualitative parameter, which is dependent upon the proper design of the sampling program and proper laboratory protocol. Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. The sampling locations of the RI are designed in an attempt to provide data representative of Site conditions. During development of the sampling locations, consideration is given to the existing analytical data and the physical conditions of the Site. The rationale for the sampling locations is discussed

in detail in the RI Work Plan. Representativeness will be satisfied by verifying that the work plan is followed, proper sampling techniques are used, proper analytical procedures are followed, and holding times of the samples are not exceeded in the laboratory. Representativeness will also be assessed in part by the analysis of field duplicate samples.

5.5 Completeness

Completeness is a quantitative measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Valid data is data that meets the specific DQOs as defined in this QAPP. Following completion of the laboratory analytical testing and data validation (if performed), the percent completeness will be calculated by the following equation:

$$\text{Completeness (percent)} = \frac{(\text{Valid Data Obtained})}{(\text{Total Data Planned})} \times 100$$

It is expected that the laboratory will provide data meeting QC acceptance criteria for 90 percent or more for all samples tested using the USEPA approved methods (40 CFR Part 136).

5.6 Comparability

Comparability is a qualitative objective, which expresses the confidence with which one data set can be compared with another. The objective for comparability is an attempt to ensure that results of analyses for the Site can be compared with analyses produced by other laboratories and other projects. The extent to which analytical data will be comparable depends on the similarity of sampling and analytical methods. The comparability criteria for the Site will be achieved by:

- Sampling and analytical procedures consistent with the Roux Associates SOPs and the laboratory QAPP;
- Consistent units and reporting methods for results from similar media; and
- Application of appropriate QA/QC procedures in accordance with this QAPP and the laboratory QAPP.

It is expected that the sampling and monitoring will be conducted in accordance with the SOPs, and, therefore, the procedures used in an effort to obtain the analytical data are expected to provide comparable data.

Table 1 lists the field and laboratory QC samples that will be analyzed to assess data accuracy and precision, as well as to determine if equipment sensitivity has been compromised. All RI “assessment” analyses (i.e., TCL VOCs, SVOCs, pesticides/PCBs; and TAL metals) will be performed in accordance with the NYSDEC Analytical Services Protocol (ASP), using USEPA SW-846 methods. The laboratory selected to analyze the field samples collected during the RI shall maintain a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) Contract Laboratory Protocol (CLP) certification for each of the “assessment” analyses listed in Section 2.0.

All laboratory data are to be reported in NYSDEC ASP Category B deliverables and will be delivered to NYSDEC in electronic data deliverable (EDD) format as described on NYSDEC’s website (<http://www.dec.ny.gov/chemical/62440.html>). A Data Usability Report will be prepared meeting the requirements in Section 2.2(a)1.ii and Appendix 2B of DER-10 for all data packages generated for the RI.

- Air Permeability; native-state – API Method RP40;
- Air Permeability; Slip-Corrected (equivalent liquid) – ASTM Method D4525;
- Air Permeability; Partially Saturated Soils – ASTM Method D6539;
- USCS Soil Classification; Engineering – ASTM Method D2487;
- USCS Soil Classification; Visual/Manual – ASTM Method D2488;
- Grain Size Distribution: Laser Method – ASTM Method D4464; and
- Grain Size Distribution: Sieve Method – ASTM Method D422.

6.0 PROPOSED ANALYTICAL LABORATORIES

The proposed analytical laboratory to conduct the chemical analyses of water, soil and air samples will be Alpha Analytical, Inc. All work performed by the analytical laboratory will meet the requirements of this QAPP, the Primary Laboratory QAPP, and any other requirements for performing analyses to meet the required DQOs.

7.0 QUALITY CONTROL CHECKS

Quality control requirements include both field and laboratory check samples and procedures designed in an effort to ensure and document the overall quality of data. Quality control (QC) check samples are controlled samples, introduced into the analytical system at specific points. The results of the QC checks are used during data validation in an effort to evaluate the precision, accuracy, sensitivity and representativeness of the overall sampling and analytical program. The following sections describe the QC checks that will be applied to the RI and their definition and purpose.

7.1 Sampling Quality Control

Sampling quality control will be monitored through field QC checks. Field-generated QC checks are samples sent to the laboratory from the field by either the field sampling team (internal) or by a third party (external). These types of samples serve as checks on both the sampling and measurement systems and assist in determining the overall data quality. The number and type of field QC samples submitted varies with the intended data use. The frequencies of field QC samples are specified in Table 1.

7.1.1 Trip Blanks

Trip blanks are used in an effort to determine if any cross-contamination between sample containers occurs from the proximity of sample containers to one another during transport or storage. They generally pertain to VOC aqueous samples only. Trip blanks consist of sample containers filled with analyte-free water that are preserved with hydrochloric acid (HCL) and prepared by the laboratory prior to the sampling event. The trip blanks are then transported to the field along with the containers used for sample collection and are kept with the samples throughout the sampling event. Once sampling is complete, the trip blanks are then packaged for shipment with the other samples and sent for analysis. The trip blank sample containers are not opened before they reach the laboratory to be analyzed. There should be at least one trip blank included in each shipping container that contains samples for VOC analysis.

7.1.2 Field Blanks

Field blanks (also called decontamination rinsate blanks) are defined as samples that are obtained by running analyte-free water through the field-cleaned sampling device (bailer, pump, auger,

etc.), and placing it in the appropriate sample containers for analysis. These samples are used in an effort to determine if decontamination procedures are adequate.

Field blanks must be analyzed for the same parameters as the associated samples. Associated samples are defined as up to 20 samples of the same matrix collected by the same procedure. During the RI, field blanks will be prepared at a minimum frequency of one per day.

7.1.3 Field Duplicates

Field duplicates (also called replicates or collocates) are individual portions of the same (replicates) or essentially the same (collocated) field sample. Collocates are independent samples collected in close proximity to one another such that they are essentially an equal representation of the parameter(s) of interest at a given point in space and time. Examples of collocated samples include, but are not limited to: samples from two air quality analyzers sampling from a common sample manifold, two water samples collected at essentially the same time and place from the same source, and side-by-side soil core samples.

Collocated samples, when collected, processed, and analyzed by the same organization, provide inter-laboratory precision information for the entire measurement system including, but not limited to, sample acquisition, homogeneity, handling, shipping, storage, preparation, and analysis. Collocated samples, when collected, processed, and analyzed by different organizations, provide intra-laboratory precision information for the entire measurement system.

Replicate samples are samples from the same sampling point that have been divided into two or more portions at some step in the measurement process after sample collection. An example of a field replicate sample would be a soil core sample that has been collected, split, and placed into two or more individual sample containers.

Duplicate samples can be used in an effort to estimate the overall precision of a data collection activity. Sampling error can be estimated by the comparison of collocated and replicated results from the same sample. During the RI, duplicate samples will be collected at a minimum frequency of one per twenty samples.

7.1.4 Temperature Blanks

Temperature blanks ensure that samples arrive to the laboratory at the correct preservation temperature. A temperature blank will be included in each cooler when it is shipped to the laboratory. The laboratory sample custodian will record the temperature of the blank upon receiving the samples.

7.2 Laboratory Analytical Quality Control

Laboratory QC check samples are generated by laboratory personnel from the same (internal) or different (external) laboratory. These types of samples serve as checks on the laboratory sampling and measurement systems and assist in determining the data quality with regard to laboratory accuracy and precision. The number and type of laboratory QC check samples varies with the intended data use.

Laboratory QC check samples may measure either method and/or instrument performance. Method (preparation) performance check samples collectively measure the entire laboratory analytical data generation process, from sample allocation in the laboratory through the analysis and data reduction. Instrument (analysis) check samples measure the laboratory performance from the point where analysis begins, generally excluding any preparation/extraction effects, through the analysis and data reduction.

Laboratory analytical QC will be monitored through internal laboratory QC checks such as the analysis of blanks, matrix spikes, matrix spike duplicates, surrogate spike, laboratory control samples, and initial and continuing calibration checks. The frequency, acceptance criteria, and corrective action for these laboratory QC checks per analysis will be in accordance with method requirements and the Primary Laboratory QAPP.

7.2.1 Method and Analytical Blanks

Method blanks (also called preparation blanks) are generated within the laboratory during the processing of the field samples. These blanks are processed using the sample reagents and procedures at the same time as the samples being analyzed. Contamination found in the method blank (MB) would indicate that similar contamination found in associated samples may have been introduced in the laboratory, and not actually be present in the samples.

Analytical blanks, such as initial calibration blanks and continuing calibration blanks, are required by inorganic test methods. These blanks are laboratory reagent-grade water and acid solutions to match sample digestates analyzed at the beginning, intervals during, and the end of an analytical sequence in an effort to assess contamination and instrument drift. The initial calibration blank is analyzed at the beginning of the analytical run following the calibration and initial calibration verification. The continuing calibration blank is analyzed prior to sample analyses, every ten samples thereafter, throughout the analytical run and at the end of the analytical sequence, or as stipulated in each analytical method.

7.2.2 Matrix Spikes and Matrix Spike Duplicates

Additional sample volumes for Matrix Spike (MS) and Matrix Spike Duplicate (MSD) QC samples will be collected in the field at a minimum frequency of one per twenty samples. MS and MSD samples will be listed on the COC for the analytical laboratory.

The MS samples are prepared by placing a known quantity of analytes into a field sample. The MS is then processed in a manner identical to the other samples. Percent recovery of each of the spiked compounds or analytes reflects the ability of the laboratory and method to accurately determine the quantity of the analyte in that particular sample (i.e., is a measure of accuracy in the specific sample matrix). Note that it does not reflect the ability to determine the analyte in other, even similar samples. If a quantity of the spiked analyte exists in the sample prior to addition of the spike, this quantity is subtracted from the matrix spike result in an effort to determine the quantity of the spike that has been "recovered".

The MSD samples prepared as QC checks on the precision of organic analyses are identical to MS samples. A second aliquot of the same field sample used for the MS is fortified with the same quantity of the spiking compounds and is processed in an identical manner. The results for the MS/MSD pair provide a measure of the precision of the determinations by assuring the availability of positive results for comparison.

7.2.3 Laboratory Duplicates

For inorganic analyses, a duplicate sample is prepared and analyzed by the laboratory in an effort to provide a measure of precision by comparing the RPD between the primary sample result and

the duplicate sample result. Laboratory duplicates will be analyzed at the frequency of one set per 20 samples (minimum five percent frequency).

7.2.4 Surrogates Spikes

Surrogates are similar to matrix spikes and generally apply only to organic parameters. Surrogate compounds are added to the samples before extraction. The recovery of these surrogates aids the analysts in determining matrix effects on recovery of compounds in each sample and is a measure of accuracy. Surrogate spikes generally do not affect the routine sample results because the surrogate compounds are isotopically labeled.

7.2.5 Internal Standards

Internal standards are similar to analysis spikes and generally apply only to organic parameters and inorganic analyses by inductively coupled plasma. Internal standards are added to all samples (after preparation/extraction) and are used in an effort to determine the amount of variance in a measurement system due to transport, spectral, and other effects. Since the internal standard is a known quantity of analyte(s) generally not found in the environment, the results of the other analytes may be corrected for measurement system effects based upon the percent recovery of the internal standard.

7.2.6 Laboratory Control Samples

Laboratory control samples fall into two basic categories: samples run through the entire sample allocation, preparation, and analysis method (method or matrix controls) and samples run through only the analysis method (analysis or instrument controls). In either case, control samples are samples of known or certified concentration that are introduced at either the pre-preparation or post-preparation step of the method and carried from that point on through the rest of the method as a routine sample. Control samples are used in an effort to define either method (preparation plus instrument) or instrument accuracy. Examples of laboratory control samples are standard reference materials (SRMs), performance evaluation (PE) samples, laboratory control samples (LCS), and method control samples (MCS).

7.2.7 Analytical Batch

An analytical batch is a group of field and associated QC samples that are prepared (and preferably analyzed) within the same time period using the exact same method, techniques, materials, reagents, labware, etc. Generally, a laboratory analytical batch is defined as 20 or fewer field samples of the same matrix prepared and processed within the same time period. All associated quality control samples should be also prepared and analyzed within the same time period, and in addition to, the 20 or fewer field samples.

7.2.8 Standards and Reagents Preparation and Calibration Checks

Calibration standards are prepared in the laboratory by dissolving or mixing a known amount of nominally pure analyte in the appropriate matrix using volumetric containers. Calibration standards must be prepared from a standard source that is traceable to a certified primary reference material (National Bureau of Standards or other certifying agency). All calibration standards must be prepared so that the types and concentration of the reagents used in the standard preparation are equivalent to the types and concentration of the reagents used in preparing the samples to be analyzed. Calibration curves are then generated in an effort to quantify the field sample results by comparison of the field sample response against the calibration standard response.

Initial calibration and continuing calibration verification checks will be performed in an effort to determine that the instrument is capable of producing acceptable qualitative and quantitative data for the particular method being analyzed. Initial calibration is performed in an effort to demonstrate acceptable performance at the beginning of the analytical run and to verify the linearity of the instrument response within a specific concentration range. The continuing calibration is performed in an effort to ensure that the initial calibration is still valid for the instrument.

8.0 DOCUMENT RECORDS AND DATA MANAGEMENT

This section describes how project information will be managed, organized, and maintained in order to be used efficiently by project personnel. Procedures in this section outline data management from the point of generation to ultimate storage.

8.1 Field Data Records

Measurements and other information collected during various field activities will be recorded in the field logbook or on the appropriate field forms. The types of information that will be recorded may include, but are not limited to, the following:

- Sampling notes for all media;
- Soil classification;
- VOC field screening readings;
- Air monitoring readings;
- Groundwater quality field screening measurements;
- Field equipment calibration logs; and
- Monitoring well installation and boring logs.

All measurement data recorded in field logbooks or field forms will be reviewed by the Project Manager, or his/her designee, for completeness and clarity. Any discrepancies noted shall be resolved by the QAO and/or Project Manager. All calculation equations shall also be verified by the QAO and/or Project Manager and individual calculations shall be verified at a minimum frequency of ten percent (10%) by the QAO. Data package deliverables are not required for field data records.

8.2 Laboratory Data Package Deliverables

The laboratory will report analytical data results in the New York Analytical Services Protocol (ASP) Category B deliverable format for all samples collected as part of the remedial action. All other samples analyzed for the Site, including, but not limited to, samples collected waste characterization, will be reported in New York ASP Category A deliverable format or format acceptable to the potential disposal facilities and/or State where they may be located.

The information provided in the two types of deliverables is summarized below:

Category A Data Deliverable as described in the most current New York ASP includes:

- a Sample Delivery Group Narrative;
- contract Lab Sample Information sheets;
- NYSDEC Data Package Summary Forms;
- CoC forms; and
- test analyses results (including TICs for analysis of VOCs and SVOCs).

Category B Data Deliverable includes the information provided for the Category A Data Deliverable outlined above, plus related QA/QC information and documentation consisting of:

- calibration standards;
- surrogate recoveries;
- blank results;
- spike recoveries;
- duplicate results;
- confirmation (lab check/QC) samples;
- internal standard area and retention time summary;
- chromatograms;
- raw data files; and
- other specific information described in the most recent NYSDEC ASP.

Note that a NYSDEC Category B Data Deliverable is required for the development of a DUSR.

8.3 Data Reporting Formats

The data reporting will include appropriate flags based upon the data validation functional guidelines. The data flags will include such items as: 1) concentration below required detection limit, 2) estimated concentration due to poor recovery below required detection limit, 3) estimated concentration due to poor spike recovery, and 4) concentration of any chemicals found in the laboratory blank. Selected data reviewer comments will also become part of the

database to indicate whether the data are usable as a quantitative concentration, usable with caution as an estimated concentration, or unusable due to out-of-control QC results.

All data generated will be computerized in a database format organized in an effort to facilitate data review and evaluation. The data set(s) will be available for controlled access by the Project Manager, database coordinators and other authorized personnel.

8.4 Data Handling and Management

A central project file will be created and maintained at Roux Associates. Roux Associates will store and archive essential project documents in hard copy and/or electronically, as appropriate. Key project documentation will be organized and categorized in an effort to facilitate ease of project file use. Long-term storage will be arranged after project completion and will comply with standard retention policies.

Data management and handling procedures, internal to the Primary Laboratory, will be detailed in the Primary Laboratory QAPP, which will include an outline of the flow of sample and data management from the time of receipt of samples at the laboratory to data reporting. The Primary Laboratory QAPP will also outline the data handling and management procedures completed upon receipt of laboratory data.

9.0 DATA VALIDATION

This section will describe the methods that will be applied for data validation and addresses methods for both field data and laboratory data. Additionally, this section will discuss the schedule for performance of data validation.

9.1 Field Data Validation

Field data validation will be accomplished by the efforts of the QAO and/or Project Manager. Field data validation includes ensuring that data was properly collected and handled according to the sampling procedures described in Section 4.0 of this QAPP to repeat data collection may be made by the Project Manager, if necessary, based upon the extent of the deficiencies and their importance in the overall context of the investigation.

9.2 Laboratory Data Validation

Validation of laboratory data will be performed by an independent third-party. Paper and/or electronic copies of the analytical data package will be submitted to the external data validator to review, and will include the reported sample results and batch-specific quality control data, including raw data back-up, in an effort to substantiate the reported values and verify that proper method-specific quality control was performed. In addition, calibration information will be included in an attempt to ensure acceptable instrument performance.

Data validation may be performed on select sets of data generated as part of the routine sampling activities. Data validation will be performed in accordance with the USEPA "Functional Guidelines for Data Validation" and with DER-10 Appendix 2B ("Guidance for Data Deliverables and Development of Data Usability Summary Reports"). The data reviewer will conduct a systematic review of the data for compliance with the established QC criteria based upon the results provided by the laboratory. An evaluation of data accuracy, precision, representativeness, and completeness, based upon criteria in Section 6.0, will be performed and presented in a DUSR.

The data validator will interact with the Project Manager and/or laboratory in an effort to correct data deficiencies. Decisions to repeat sample collection and analyses may be made by the

Project Manager based upon the extent of the deficiencies and their importance in the overall context of the investigation.

After data validation has been completed, it is anticipated that some results may require that data qualifiers be added or changed. The database manager will work closely with the data validator in an effort to identify changes that need to be reflected in the database. Changes will be made by the database manager, with QA/QC checks performed by the Project Manager and QAO.

Table 1. Field and Laboratory QC Summary

QC Check Type	Minimum Frequency	Use
<u>Field QC</u>		
Duplicate	1 per matrix per 20 samples or SDG [†]	Precision
Trip Blank	1 per VOC cooler	Sensitivity
Field Blank	1 per day	Sensitivity
<u>Laboratory QC</u>		
Laboratory Control Sample	1 per matrix per SDG	Accuracy
Matrix Spike/Matrix Spike Duplicate/Matrix Duplicate*	1 per matrix per SDG	Accuracy/Precision
Surrogate Spike	All organics samples	Accuracy
Laboratory Duplicate	1 per matrix per SDG	Precision
Method Blank	1 per matrix per SDG	Sensitivity

Notes:

* SDG - Sample Delivery Group - Assumes a single extraction or preparation

** Provided to lab by field sampling personnel

Citizen Participation Plan



New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan

112-21 Northern Boulevard
Corona, New York

November 2014

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4.0 SITE INFORMATION	8
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APPENDICES

- A. Project Contacts and Locations of Reports
- B. Site Contact List
- C. Site Location Map
- D. Brownfield Cleanup Program Process
- E. Scoping Sheet for Major Issues of Public Concern

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: **Eastern Emerald Group LLC (“Applicant”)**
Site Name: **112-21 Northern Boulevard, Corona (“Site”)**
Site Address: **112-21 Northern Boulevard, Corona NY 11369**

1.0 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 re-use or redevelop due to the presence or suspected 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>.

2.0 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 wellbeing. 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 interested 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.
- 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 web site. 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.

A document repository has been established at the following location:

Queens Public Library-Corona Branch
38-24 104 Street
Corona, NY 11368
(718) 426-2844

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.

Citizen Participation Requirements (Activities)	Timing of CP Activity(ies)
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 Action Work Plan (RAWP):	
<ul style="list-style-type: none"> • Distribute fact sheet to site contact list about proposed RAWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RAWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period 	Before NYSDEC approves RAWP. 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) 	After submittal of the Final Engineering Report to NYSDEC. A subsequent fact sheet will be distributed after the issuance of a Certificate of Completion to detail any institutional or engineering controls implemented at the site.

3.0 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.

No major issues of public concern have been identified yet that relate to the Site. A Scoping Sheet for Major Issues of Public Concern was prepared, and is included in Appendix E. This document will help the Applicant identify any potential issues. This Site is located within a potential environmental justice area. In addition, truck traffic coming on and off the Site as well as noise may be a concern to the community.

Furthermore, the Site will include procedures for protection of public health and safety during investigation and remediation activities. During investigation and remediation, worker and community health and safety activities will be conducted, including:

- Securing unenclosed portions of the site perimeter with an eight foot fence;
- On-site air monitoring for worker protection, if warranted;
- Perimeter air monitoring for community protection, if warranted; and
- Using odor, vapor, and dust controls such as water or foam sprays, as required during air monitoring, if needed.

Details on the Site Health and Safety Plan (HASP) and the Community Air Monitoring Plan (CAMP) will be included in the documents generated in support of the remediation.

4.0 SITE INFORMATION

Site Description

The property is located at 112-21 Northern Boulevard (Site) in the borough of Queens, city of New York. The property is located on the north side of Northern Boulevard between 112 Place and the Grand Central Parkway and encompasses approximately 1.62 acres (i.e. 70,613 square feet). The property is identified as Block 1707, Lot 8 on the New York City Tax Map and is affiliated with Community Board 4 of the Queens. The Site is listed under the following addresses:

- 112-36 Astoria Boulevard, Corona
- 112-47 Northern Boulevard, Corona
- 32-09 112th Place, Corona
- 32-11 112th Place, Corona

History of Site Use, Investigation, and Cleanup

The Site has been occupied by an automobile sales, service and repair facility since 1931. An onsite gasoline filling station was also operating from at least 1931 and 1980. Auto sales and service/repair activities as well as parking and storage of new vehicles are ongoing at the Site. The Site is encompassed by three separate buildings and a paved parking area used to store the dealership's inventory. Currently, two one-story buildings are located on the southeast and northwest corners of the Site and used as automobile repair shops. The two-story building located on the southwest corner of the Site is used as an auto parts distribution warehouse, showroom and offices.

Previous investigations performed by others at the Site identified petroleum-related volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals in the soil and groundwater.

5.0 INVESTIGATION AND CLEANUP PROCESS

Application

The Applicant has applied and is currently waiting for acceptance into the New York State Brownfield Cleanup Program as a Volunteer. This means would mean 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 restricted purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the Site.

Investigation

The Applicant will conduct an investigation of the Site officially called a “remedial investigation” (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation work plan, which is subject to public comment.

The Site investigation has several goals:

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

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to

address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

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

Remedy Selection

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

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (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 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 final engineering report. NYSDEC then will issue a Certificate of Completion (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 Brownfield Cleanup Program. This phase begins when the COC is issued. Site management may be conducted by the Applicant under NYSDEC oversight, if contamination is to remain in place. Site management incorporates any institutional and engineering controls required to ensure the remedy be implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An Institutional Control (IC) 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 IC may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An Engineering Control (EC) is a physical barrier or method to manage contamination. Some examples of ECs 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.

Project Contacts and Locations of Reports

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):

Jane O'Connell
Project Manager
NYSDEC Region 2
Division of Environmental Remediation
47-40 21st Street
Long Island City, New York 11101
Telephone: (718) 482-4800

Locations of Reports and Information:

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

Queens Public Library-Corona
32-84 104 Street
Corona, New York 11368
(718) 426-2844

Hours:

Monday	11:00 AM – 7:00 PM
Tuesday	2:00 PM – 7:00 PM
Wednesday	1:00 PM – 7:00 PM
Thursday	11:00 AM – 7:00 PM
Friday	11:00 AM – 7:00 PM
Saturday and Sunday	Closed

Site Contact List

SECTION VIII

Site Contact List

1. Local Officials

Hon. Mayor Michael R. Bloomberg
The City of New York, Mayor's Office
City Hall
New York, New York 10007
Telephone (212) 788-9600 or 311 within New York City
Fax (212) 788-2460

Amanda M. Burden
Chair of the City Planning Commission and
Director of the Department of City Planning
New York City Planning Commission
22 Reade Street
New York, New York 10007-1216
Telephone (212) 720-3300
Fax (212) 720-3219

Robert R. Kulikowski, Ph.D.
Director of the Mayor's Office of Environmental Coordination
253 Broadway – 14th Floor
New York, New York 10007
Telephone (212) 788-9956
Fax (212) 788-2941

Office of the Queens Borough President Helen M. Marshall
120-55 Queens Boulevard
Kew Gardens, New York 11424
Telephone (718) 286-3000

Director, NYC Department of City Planning – Queens Office
120-55 Queens Boulevard
Kew Gardens, New York 11424
Telephone (718) 286-3000

2. Residents, Owners and Occupants of the property and properties adjacent to the property

North of the Property

None.

South of the Property

Block: 1727
Lot: 8
Owner: Dorie Miller Housing
Address: 112-50 Northern Boulevard
Queens, New York 11368

Block: 1727
Lot: 1
Owner: 112 Northern Development
Address: 112-02 Northern Boulevard
Queens, New York 11368

Block: 1787
Lot: 2
Owner: Parks and Recreation
Address: 123-01 Roosevelt Avenue
Queens, New York 11368

East of the Property

None.

West of the Property

Block: 1706
Lot: 11
Owner: World's Fair Development
112-24 Astoria Boulevard
Queens, New York 11369

Block: 1706
Lot: 14
Owner: Mary Christie
32-10 112 Place
Queens, New York 11369

Block: 1706
Lot: 16
Owner: January Christie
32-12 112 Place
Queens, New York 11369

Block: 1706
Lot: 18
Owner: Maritza E. Acero
32-16 112 Place
Queens, New York 11369

Block: 1706
Lot: 20
Owner: Frank R. Garcia
32-22 112 Place
Queens, New York 11369

Block: 1706
Lot: 21
Owner: Juan A. Robles
32-24 112 Place
Queens, New York 11369

Block: 1706
Lot: 22
Owner: Rsy I Realty Corp
32-26 112 Place
Queens, New York 11369

Block: 1706
Lot: 25
Owner: HBC Corona LLC
112-15 Northern Boulevard
Queens, New York 11369

3. Local News Media

Daily News
450 West 33rd Street
New York, New York 10001
Telephone (212) 210-2100

New York Post
1211 Avenue of the Americas
New York, New York 10036
Telephone (212) 930-8000

New York 1 News
75 Ninth Avenue
New York, New York 10011
Telephone (212) 379-3311

ABC-7
7 Lincoln Square
New York, New York 10023
(212) 456-3100

Queens Community Board #4
46-11 104th Street
Corona, New York 11368
(718) 760-3141

Queens Chronicle
6233 Woodhaven Boulevard
New York, New York 11374
(718) 205-8000

1010 WINS-CBS Radio
888 7th Avenue, 10th Floor
New York, New York 10106

4. Public Water Supplier

New York City Department of Environmental Protection
Bureau of Water and Sewer Operations
59-17 Junction Boulevard, 17th Floor
Flushing, New York 11373
Telephone (212) NEW-YORK or 311 within the City of New York only.

5. Requests to be placed on the Contact List

No one has requested placement on this Contact List.

6. School / Day Care Facilities Near The Property

P.S 143 Louis Armstrong School
34-74 113 Street
Queens, New York 11368
(718) 429-5700

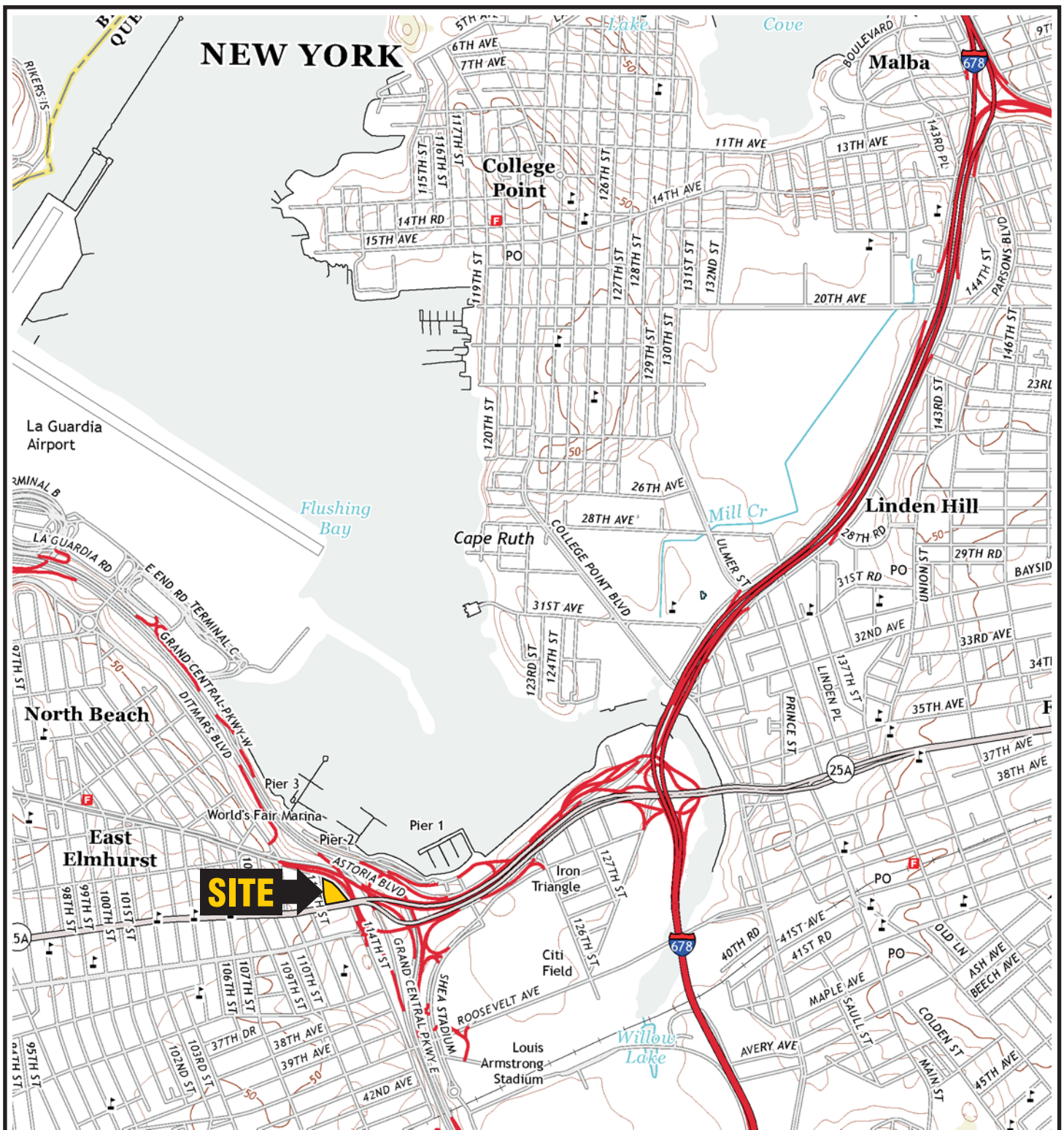
7. Local Community Board

Queens Community Board #4
46-11 104th Street
Corona, New York 11368
(718) 760-3141

8. Document Repository

Queens Public Library- Corona Branch
38-24 104 Street
Corona, New York 11368
(718) 426-2844
Library Manager: Vilma Daza

Site Location Map



QUADRANGLE LOCATION



SOURCE:
USGS; 2013, Flushing, NY
7.5 Minute Topographic Quadrangle



0 2000'

Title:

SITE LOCATION MAP

112-21 NORTHERN BOULEVARD
CORONA, NEW YORK

Prepared for:

EASTERN EMERALD GROUP, LLC

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting
& Management

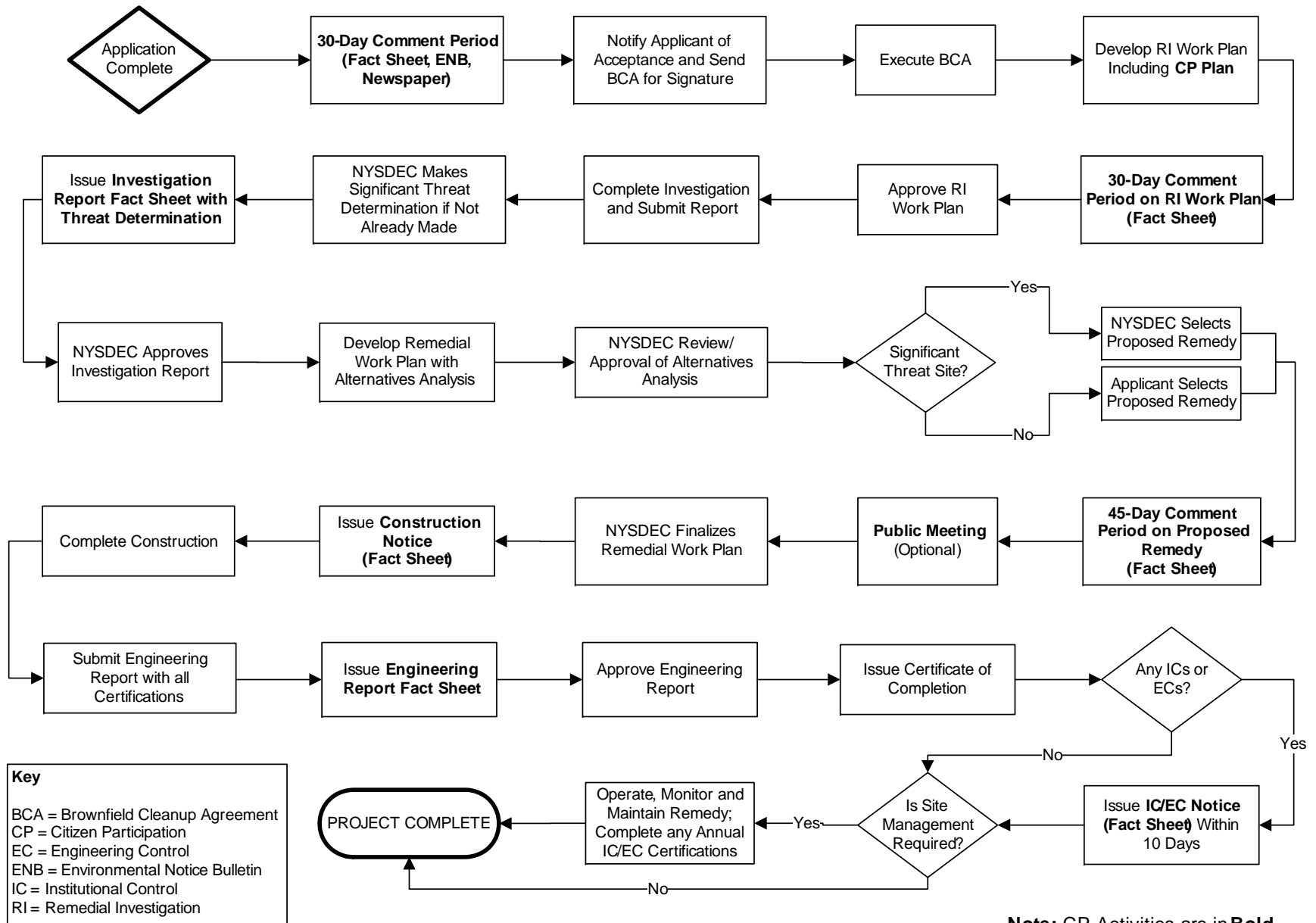
Compiled by: M.D.	Date: 23DEC13
Prepared by: B.H.C.	Scale: AS SHOWN
Project Mgr.: C.B.	Project No.: 2364.0001Y000
File: 2364.0001Y102.01.CDR	

FIGURE

1

Brownfield Cleanup Program Process

APPENDIX D – BROWNFIELD CLEANUP PROGRAM PROCESS



Scoping Sheet for Major Issues of Public Concern

Remedial Programs

Scoping Sheet for Major Issues of Public Concern

Instructions

This Scoping Sheet assesses: major issues of public concern; impacts of the site and its remedial program on the community; community interest in the site; information the public needs; and information needed from the public, if applicable.

The information generated helps to plan and conduct required citizen participation (CP) activities, and to choose and conduct additional CP activities, if appropriate. The scoping sheet can be revisited and updated as appropriate during the site's remedial process to more effectively implement the site's CP program.

Note: Use the information as an aid to prepare and update the Major Issues of Public Concern section of the site CP Plan.

General Instructions

- When to prepare: During preparation of the CP Plan for the site. It can be revisited and updated anytime during the site remedial process.
- Fill in site name and other information as appropriate.

Instructions for Numbered Parts

Consider the bulleted issues and questions below and any others that may be appropriate to the site and the community to help complete the five Parts of this Scoping Sheet. Include the issue stakeholders in Parts 1 through 3 and adjust the site's contact list accordingly.

Part 1. List Major Issues of Public Concern and Information the Community Wants.

- Is our health being impacted? (e.g. Are there problems with our drinking water or air? Are you going to test our water, yards, sumps, basements? Have health studies been done?)
- There are odors in the neighborhood. Do they come from the site and are they hazardous?
- Are there restrictions on what we may do (e.g. Can our children play outside? Can we garden? Must we avoid certain areas? Can we continue to recreate (fish, hunt, hike, etc. on/around the site?)
- How and when were the site's contamination problems created?
- What contaminants are of concern and why? How will you look for contamination and find out where it is going? What is the schedule for doing that?
- The site is affecting our property values!
- How can we get more information (e.g. who are the project contacts?)
- How will we be kept informed and involved during the site remedial process?
- Who has been contacted in the community about site remedial activities?
- What has been done to this point? What happens next and when?
- The site is going to be cleaned up for restricted use. What does that mean? We don't want redevelopment on a "dirty" site.

Part 2. List Important Information Needed From the Community, if Applicable.

- Can the community supplement knowledge about past/current uses of the site?
- Does the community have knowledge that the site may be significantly impacting nearby properties, natural resources, etc.?

- Are there activities currently taking place at the site or at nearby properties that may need to be restricted?
- Who may be interested or affected by the site that has not yet been identified?
- Are there unique community characteristics that could affect how information is exchanged?
- Do the community and/or individuals have any concerns they want monitored?
- Does the community have information about other sources in the area for the contamination?

Part 3. List Major Issues and Information That Need to be Communicated to the Community.

- The process and general schedule to investigate, remediate and, if applicable, redevelop the site.
- Current understanding about the site contamination and effects, if any, on public health and the environment.
- Site impacts on the community and any restrictions on the public's use of the site and/or nearby properties.
- Planned CP activities, their schedule, and how they relate to the site's remedial process.
- Ways for the community to obtain/provide information (document repositories, contacts, etc.).

Part 4. Community Characteristics

a. - e. Obtain information from local officials, property owners and residents, site reports, site visits, "windshield surveys," other staff, etc.

f. Has the affected community experienced other **significant** present or past environmental problems unrelated to this site? Such experiences could significantly affect public concerns and perspectives about the site; how the community will relate to project staff; the image and credibility of project staff within the community; and the ways in which project staff communicate with the community.

g. Consider factors such as:

- Is English the primary language of the affected community? If not, provisions should be considered regarding public outreach activities such as fact sheets, meetings, door-to-door visits and other activities to ensure their effectiveness.
- The age demographics of the community. For example, is there a significant number of senior citizens in the community? It may be difficult for some to attend public meetings and use document repositories. This may suggest adopting more direct interaction with the community with activities such as door-to-door visits, additional fact sheets, visits to community and church centers, nursing homes, etc.
- How do people travel about the community? Would most people drive to a public meeting or document repository? Is there adequate public transportation?

Part 5. Affected/Interested Public. Individuals and organizations who need or want information and input can change during the site's remedial process. This need is influenced by real, potential or perceived impacts of the site or the remedial process. Some people may want information and input throughout the remedial process. Others may participate only during specific remedial stages, or may only be interested in particular issues. It is important to revisit this question when reviewing this scoping sheet. Knowing who is interested in the site – and the issues that are important to them – will help in the selection and conduct of appropriate outreach activities, and to identify their timing and the information to be exchanged.

Check all affected/interested parties that apply to the site. **Note: Adjust the site's contact list appropriately.** The following are some ways to identify affected/interested parties:

- Tax maps of adjacent property owners
- Attendees at public meetings
- Telephone discussions
- Letters and e-mails to DER, the remedial party, and other agencies
- Political jurisdictions and boundaries
- Media coverage

- Current/proposed uses of site and/or nearby properties (recreational, commercial, industrial)
- Discussions with community organizations: grass roots organizations, local environmental groups, environmental justice groups, churches, and neighborhood advisory groups



Remedial Programs

Scoping Sheet for Major Issues of Public Concern (see instructions)

Remedial Party: Eastern Emerald Group LLC

Site Name: 112-21 Northern Boulevard, Corona

Site Number: Not yet assigned

Site County: Queens

Note: For Parts 1. – 3., the individuals, groups, organizations, businesses, and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses, and/or units of government related to the issue(s) and/or information. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**

A site contact list has been prepared as part of the Citizens Participation Plan (CPP), and a public notice will be sent following the completion of the Brownfield Cleanup Program application. No major issues of public concern have yet been identified.

How were these issues and/or information identified?

N/A

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses, and/or units of government related to the needed information.

NONE

How were these information needs identified?

N/A

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.

Going forward, the public will be notified regarding the schedule for investigation, remediation and redevelopment activities. Based on the Remedial Investigation results, the public will also be notified of any potential hazards to the community. For additional information about the site investigation, remediation and citizens participation process, refer to the flowchart in Appendix D.

How were these issues and/or information identified?

N/A

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning around site:

☒ **Residential** ☐ **Agricultural** ☐ **Recreational** ☒ **Commercial** ☐ **Industrial**

b. Residential type around site:

☒ **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:

☐ **High** ☒ **Medium** ☐ **Low**

d. Community economic status:

☐ **Yes** ☒ **No** ☐ **High** ☒ **Medium** ☒ **Low**

e. Water supply of nearby residences:

☒ **Public** ☐ **Private Wells** ☐ **Mixed**

f. Other environmental issues significantly impacting affected community?

Provide details if appropriate:

[Click here to enter text.](#)

g. Special considerations:

☐ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain marked categories in g.:

[Click here to enter text.](#)

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in the instructions for **Part 5**. Are other individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☐ **Non-Adjacent Residents/Property Owners:** [Click here to enter text.](#)

☒ **Local Officials:** [Click here to enter text.](#)

☒ **Media:** [Click here to enter text.](#)

☒ **Business/Commercial Interests:** [Click here to enter text.](#)

☐ **Labor Group(s)/Employees:** [Click here to enter text.](#)

☐ **Indian Nation:** [Click here to enter text.](#)

☒ **Citizens/Community Group(s):** [Click here to enter text.](#)

☐ **Environmental Justice Group(s):** [Click here to enter text.](#)

☐ **Environmental Group(s):** [Click here to enter text.](#)

☒ **Civic Group(s):** [Click here to enter text.](#)

☐ **Recreational Group(s):** [Click here to enter text.](#)

☐ **Other(s):** [Click here to enter text.](#)

Date Completed: 12/16/2013

Prepared By: Maria Drakos

Reviewed By: Nathan Epler

Professional Profiles

Brian P. Morrissey, P.E., BCEE Principal Engineer

Technical Specialties:

Preparation of feasibility studies, engineer's reports, design drawings, specifications, contract documents, cost estimates, operations and maintenance plans for the following:

- *In situ* groundwater remedial technologies
- Industrial and sanitary wastewater treatment systems
- Floating product recovery systems
- Ground water pumping and treatment facilities
- Water supply, treatment and distribution
- Underground storage tank (UST) systems
- Air sparging, soil vapor extraction and vapor treatment systems
- Hazardous waste soils removal, transportation, and disposal procedures

Experience Summary:

More than 30 years of experience: Principal Engineer at Roux Associates, Inc. and Remedial Engineering, P.C.; Senior Engineer and Senior Project Manager at ERM.

Credentials:

B.E., Civil Engineering, Cooper Union, 1980

M.S., Civil and Environmental Engineering, Polytechnic Institute of NYU, 1985

Professional Engineer: New York (1986), New Jersey (2003), and Virginia (2010)

Board Certified Environmental Engineer (BCEE) of the American Academy of Environmental Engineers-Specialty Certification in Hazardous Waste Management, 1995

Professional Affiliations:

Water Environment Federation

Key Projects:

- Principal Engineer for the remediation and monitoring of over 100 sites in New York City with petroleum releases in UST areas. The remediation systems at the various sites include multi-phase extraction (MPE), soil vapor extraction (SVE), air sparging, groundwater recovery and treatment, and automated product-only recovery systems. Priorities on this multi-year contract included expediting remedial progress, increasing the effectiveness of operating systems, achieving NFA status, and reducing NYC's overall program costs. The work also included conducting soil vapor studies at 9 sites to assess vapor intrusion concerns. Roux Associates also implemented *in situ* injections at 14 sites to cost-effectively achieve site closure. The *in situ* injections involve chemical oxidation and bioremediation products including sodium percarbonate, oxygen generating compounds, hydrogen peroxide, petroleum-degrading bacteria, and nutrient/enzyme complexes.

- Principal Engineer for design upgrades and operation of the groundwater depression and separate phase product recovery systems at former petroleum refinery in Brooklyn, New York. The site encompasses one of the nation's largest petroleum releases (18 million gallons). Recent system expansion and upgrades include adding recovery wells and USTs, providing additional groundwater treatment and enhancement of the automated controls using PLCs and telemetry.
- Principal Engineer for evaluation of remedial options at former electronics manufacturing plant in Taiwan. Prepared cost estimates for site remediation alternatives. Prepared Pilot Study Plan and presentation for Taiwanese regulatory officials on use of the *in situ* technologies of enhanced reductive dechlorination and chemical oxidation.
- Principal Engineer for remediation of former petroleum terminal in Oceanside, New York. Managed preparation of Remedial Action Plan, community air monitoring plan, detailed design drawings, bid documents and O&M Plan. Conducted discussions/negotiations with NYSDEC and also managed the annual budget for capital and operating expenses.
- Provided engineering evaluation of options for UST repair/replacement at major railroad yard in Sunnyside, New York. Also managed preparation of Demolition Work Plan and contract documents for debris removal and building demolition.
- Project Manager for Remedial Design and Construction Oversight at federal Superfund site in Elmira, New York. The 33-acre site included several areas of concern where the soil and groundwater had been contaminated by different types of hazardous wastes. Managed preparation of design submittals to USEPA Region II in accordance with CERCLA guidelines. The soil/sediment remediation design included requirements for materials handling, dewatering and disposal. PCB wastes were required to be segregated and disposed of at a TSCA-permitted facility. The design required stabilization of certain wastes and the installation of a RCRA cap. Recovery and treatment of construction wastewater and impacted site groundwater was also included in the design.
- Project Manager for remediation of several gasoline service station sites in Westchester County and Long Island, New York. Developed design/build approach for fast-track implementation while complying with NYSDEC guidelines. Typical remedial systems include groundwater recovery and treatment, soil vapor extraction and air sparging, and vapor treatment.

Brian P. Morrissey, P.E., BCEE

Principal Engineer

- Prepared plans, design documents and cost estimates for implementation of interim remedial measures, UST removals, and remedial actions at several state and federal Superfund sites.
- Project Manager for remediation of several US Postal Service sites. Prepared site-specific HASP and Work Plans for removal/replacement of USTs and characterization of impacted soils. Supervised field personnel during investigative and construction phases of work.
- Design Manager for groundwater recovery and treatment system at manufactured gas plant (MGP) in Atlantic Highlands, New Jersey. Implemented directional drilling under state highway to expand groundwater recovery system to capture off-site contamination. Design of treatment system included PLC-based control software that significantly reduced on-site staffing requirements. Also managed construction phase, negotiated/reduced change orders and worked with several subcontractors to meet tight schedule for system start-up. The system removes cyanide, metals, VOCs, and free-phase product.
- Project Manager for upgrading industrial process wastewater treatment system at medical products manufacturing facility in Hancock, New York. The upgraded system removes VOCs and metals, including lead, zinc, and copper, from highly variable waste streams generated by the manufacture of surgical instruments. Prepared design documents for automated system that allows for expected future increase in plant manufacturing capabilities. Also prepared O&M manual for the treatment system.
- Project Manager for tank replacement program and automation of fueling system for commuter railroad at sites in New York City and Westchester County. Fueling facilities were designed in compliance with federal and state UST regulations.
- Project Engineer for environmental audits at approximately 20 commercial and manufacturing facilities aimed at evaluating compliance with federal, state, and local air, wastewater, and hazardous waste regulations.
- Project Manager for remediation of industrial airport site in Millville, New Jersey under ECRA/ISRA. Managed design and permitting activities required to replace 1,000-gpm public supply well impacted by extensive chlorinated solvent plume. Also managed final design of 200-gpm groundwater recovery, treatment and recharge system that includes ultraviolet light/hydrogen peroxide system controlled by PLC. This project won the 1995 Honor Award given by the American Academy of Environmental Engineers.
- Project Manager for design and construction oversight of 12,000-foot sewer system for the collection of sanitary and industrial wastewater in Melville, New York. Sewer design included route selection, sizing of gravity sewers, provisions for utility crossings, solar powered flow meters, grease interceptor, pump station for one branch line, and proper abandonment of leaching facilities. Project also included installation of two 20,000-gallon underground storage tanks and a tanker truck fill area with secondary containment. The final phase of the project consisted of the addition of an industrial waste pretreatment system utilizing pH adjustment and a bioreactor tank. This project provided a safe and reliable wastewater disposal system and eliminated a 40,000-gallon per day hold and haul system.
- Senior Engineer for preparing and certifying Spill Prevention Control and Countermeasure (SPCC) Plans for 25 U.S. Postal Service facilities.
- Project Engineer, prepared feasibility study for state Superfund site in Glen Cove, New York. Evaluated ground water and soil remediation technologies. After approval of FS by NYSDEC, managed the final design, construction oversight, and startup phases of the project. Remedial system includes 30 variable speed controlled recovery pumps, filtration, iron sequestration, tray aeration, soil vapor extraction, and vapor treatment via catalytic oxidation.
- Project Manager for the design of wastewater treatment plant (WWTP) upgrades at three (3) separate facilities under the program to protect New York City's watershed. The work included preparing conceptual upgrade plans, facility plans, detailed cost estimates, design drawings and specifications, startup plans, O&M plans and oversight of construction. Design at one facility included replacement of secondary treatment components and the addition of recirculating sand filters, microfiltration units, emergency generator and telemetry systems.
- Principal Engineer for development of innovative approach for remediation and reuse of federal Superfund site in Plaistow, New Hampshire. Prepared cost estimates for approaches aimed at reducing project costs by utilizing alternate treatment technologies and maximizing efficiency of existing system. Phased approach for site includes hot spot soil removal, enhancements of existing remedial system, implementing air sparging with SVE and follow with polishing step of *in situ* bioremediation. This alternative plan will achieve environmental restoration of site and is tailored to anticipated re-development of land.

Nathan A. Epler, Ph.D. Principal Hydrogeologist

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Technical Specialties:

Quantitative Hydrogeology / Geochemistry / Environmental Forensics / Regulatory Advocate / Environmental Project Management. Expert witness / litigation support. Project Manager for remedial investigations, feasibility studies, and remedial actions. Re-development of Brownfield, petroleum spill and MGP Sites. Specialties include analytical and numerical groundwater flow and contaminant transport modeling for hazardous waste sites, landfills, remedial design and litigation support. Specialist in computerized mapping, 3D graphics, and Geographic Information Systems.

Experience Summary:

Twenty-three years of experience: Hydrogeologist at Roux Associates, Hydrogeologist at United States Geological Survey.

Credentials:

Licensed Environmental Professional in the State of Connecticut, 2011. Ph.D. in Hydrogeology, State University of New York at Stony Brook, 1991.

M.S. in Geology, State University of New York at Stony Brook, 1986.

B.S. in Geology, Queens College, City University of New York, 1983.

Publications and Presentations:

2012 Served on Faculty for American Bar Association Environmental Litigation Conference Faculty, Washington DC.

2011 "Environmental Science and General Hydrogeologic Principles for Lawyers", in Environmental Issues in Real Estate Business Transactions, Lawrence Schnapf Editor, Published by American Bar Association.

2011 Served on Faculty for American Bar Association Environmental Litigation Conference Faculty, Washington DC.

2011 DC Building Industry Association meeting. Vapor Intrusion and Other Environmental Issues During Redevelopment.

2011 Guest Lecturer, New York Law School Seminar on hydrogeologic principles, NPL and Superfund processes.

2010 Guest Lecturer, New York Law School Seminar on hydrogeologic principles, NPL and Superfund processes.

2009 American Bar Association Dispute Resolution Section Annual Conference, in New York. Served on panel discussion.

2009 Guest Lecturer, Columbia Law School. Seminar for second year law class on interpretation of environmental data.

Epler, N. et al., 2005, Use of Graphics in Environmental Litigation Support. Manuscript and presentation at National Ground Water Association Environmental Law Conference, Baltimore, MD.

Epler, N. et al., 1993, Retardation of ²³⁸U and ²³²Th decay chain radionuclides in Long Island and Connecticut aquifers. *Geochimica et Cosmochimica Acta*, v 57, 597-603.

Epler, N., 1991, A Multiple Tracer Study of Ground Water From A Shallow, Unconfined Aquifer, Long Island, New York, Ph.D. Dissertation, State University of New York at Stony Brook, 156pp. The research included contaminant transport modeling and groundwater dating.

Epler, N., 1990 Dating Shallow Ground Water, Groundwater, V28.

Investigation and Remediation Projects

- Project Manager of groundwater Remedial Investigation at an ISRA Site in New Jersey. Project included installation of over 120 monitoring wells to delineate off-site plume of chloroform and pesticides in groundwater; installation and testing of a 1,500-gallon per minute interceptor/recharge system to capture the plume; applying for and acquiring Discharge-to-Groundwater and Water Allocation permits; and, quarterly monitoring.
- Project Manager, Site investigation and remediation at a NYS Superfund Site in Glen Cove, New York. Project included performing Remedial Investigation to identify the nature and extent of impacts to soil and groundwater and developing a remedial action plan.
- Project Manager, Site investigation and remediation at a bulk petroleum storage terminal in New York. Project included soil

borings and installation of wells to delineate free-product plume. Successfully negotiated with NYSDEC regarding scope and design of active free-product recovery system.

- Project Manager Remedial Investigation at a New York State Superfund Site. Site was a former dye and pigment manufacturing facility for over 100 years. Extensive soil and groundwater contamination was delineated and remediated under a series of IRMs designed to be coordinated with the future re-development of the Site into a newsprint recycling facility.
- Project Manager remedial investigation under the New York State Voluntary Cleanup Program of a Closed Industrial Landfill. Site was contaminated with numerous compounds and contained drums and construction debris. Site was evaluated using electromagnetic surveys, trenching and borings. Remedial Action Work Plan using phyto-technology to address leachate control is being prepared.
- Project Manager remedial investigation under the New York State Voluntary Cleanup Program of an undeveloped area associated with an industrial parcel, where arsenic-contaminated fill was placed. Successfully demonstrated efficacy of using field-screening techniques for arsenic delineation.
- Project Manager of remediation of industrial landfill in Newburgh, New York. Project includes evaluated pre-treatment options for waste impacted by high concentrations of metals, including cadmium and lead, and VOCs, including MEK and MIBK.
- Project Manager of Site investigation and re-development project for 10 parcels in Manhattan. Sites are impacted by MGP waste and petroleum hydrocarbons. Site remedies include installation of sheet-piling containment barrier, and incorporation of vapor barrier and active venting systems into building construction.
- Project Manager of soil Remedial Investigation at an ISRA Site in New Jersey. Project included delineation of pesticides in soil at a 28-acre facility. Higher delineation limits and cleanup levels were successfully negotiated with the NJDEP to reduce the volume of soil to be remediated.
- Project Manager of Remedial Investigation at Delaware City PVC Site. Project includes well installation, water-level measurements and groundwater sampling to determine whether PVC Site could be source of VOCs beneath petroleum refinery.
- Project Manager of Performance Monitoring at the Delaware City PVC Superfund Site. Project includes sampling of over 100 monitoring wells to assess the performance of a 12-well groundwater interceptor and treatment system. Due to large reductions in plume volume, recommendations were accepted by the USEPA to reduce the number of pumping wells and the total pumping rate.
- Project Manager, installation of a 2,000-gallon per minute supply well for a New Jersey utility. Project included startup testing, 72-hour aquifer test and preparation of Water Allocation Permit.
- Project Manager of soil remediation at an ISRA Site in New Jersey. Implemented excavation and on-site consolidation and capping of pesticide-contaminated soil. Capped areas were designed to be incorporated into a Site re-development plan for use as a parking area.

Nathan A. Epler, Ph.D. Principal Hydrogeologist

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- Project Manager of lagoon remediation at a former dye manufacturing facility in New York. Project included separation and cleaning of 3,000 cubic yards of contaminated riprap for reuse onsite.
- Project Manager offsite soil gas and groundwater investigation in residential neighborhood adjacent to former dye manufacturing facility.
- Project Manager site investigation at a dry cleaner in Staten Island, New York where both soil and groundwater are impacted by tetrachloroethene. Site is adjacent to church and school, requiring significant community involvement.
- Directed research into the use of naturally-occurring radium isotopes, tritium and radiocarbon to date shallow groundwater for flow model calibration in the Upper Glacial aquifer on Long Island, New York.

Litigation Support Projects

- Testifying Expert for a case involving impacts to public supply wells on Long Island.
- Expert Witness for water district impacted by a Superfund Site on Long Island, New York. Provided opinions on source and timing of VOC plume and apportionment.
- Consulting Expert to provide opinions on impact of product release at a petroleum terminal relative to existing impacts.
- Consulting Expert to provide opinions on nature and timing of pipeline release.
- Expert Witness for former service station owners in Westchester, NY defending against claim of impact to adjacent private properties. Demonstrated that additional third party defendants were equally responsible for impact.
- Gross v. Pall Corporation. Expert Witness for Long Island industrial site. Successfully defended third party against claim that they contributed to offsite contamination of a public supply well. Case settled prior to trial.
- Expert Witness for upstate New York industrial site where residents were claiming indoor air impacts due to migration of chlorinated solvents in groundwater along sewer lines. Used historic release data and GIS interpretation of chemical signatures to demonstrate that additional responsible parties likely contributed to contamination, which were not named in the original complaint.
- Expert Witness for an insurance carriers' defense group. Provided expert report concerning the timing of ground-water contamination. Case settled prior to deposition.
- Major et al. and Green et al. v. AstraZeneca Inc., et al. Expert Witness for upstate New York industrial site. Provided litigation support on case involving a former industrial dump site where wastes were burned and whether migration from the site could have impacted surrounding domestic supply wells. Case settled prior to deposition.
- FMC Corporation v. The Vendo Company and Wier Floway, Inc. Consulting Expert for plaintiff. Reviewed groundwater fate and transport model created by defendants. Model was shown to be flawed, inaccurate and invalid according to generally-accepted modeling practices. Case settled prior to deposition.
- Consulting expert for New Jersey Industrial Site. Provided litigation support concerning the source, timing and extent of pesticides in soil and groundwater. Reviewed and analyzed consultant's reports, exhibits, and technical data. Client settled case prior to trial.

Groundwater Flow and Contaminant Transport Projects

- Principal Modeler, groundwater flow and contaminant transport at a former picture tube manufacturing facility in Taiwan.
- Principal Modeler, groundwater flow and remedial design for a 600-gpm groundwater extraction system to prevent off-site migration of petroleum hydrocarbons from an 850-acre former refinery in Rhode Island.
- Principal Modeler, LNAPL and groundwater flow and transport modeling to support risk assessment and remedial design for an 800,000-gallon LNAPL plume at a former refinery site in Rhode Island.
- Principal Modeler, surface-water flow, solute and sediment transport in a river adjacent to an 850-acre petroleum terminal. Dissolved phase hydrocarbon fluxes into the river were calculated based on a groundwater flow model. The fluxes were used as input into a 2D finite element river model. The river model was used to predict the maximum downstream transport of dissolved phase and sediment borne contaminants.
- Principal Modeler, LNAPL recovery simulations using finite-element modeling. Recovery simulations were performed to evaluate the feasibility of recovery of a benzene plume at an industrial facility in Brazil. The modeling results indicated that LNAPL recovery alone would be inadequate to remediate the plume. Air sparging and soil vapor extraction were proposed as alternatives.
- Principal Modeler, groundwater flow and solute transport at an industrial site on Long Island, New York, where groundwater is impacted by hexavalent chromium that threaten public water-supply wells downgradient of the site.
- Principal Modeler, groundwater and surface-water flow and contaminant transport at a Superfund Site in New Jersey. Groundwater contaminant fluxes based on a 3D groundwater flow model are used to provide input into a 2D finite element surface-water model of a tidally-influenced creek and wetlands system. The combined models are used to study the flux of contaminants through the groundwater/surface-water flow system.
- Principal Modeler, groundwater flow and remedial design at a Superfund site in Delaware impacted by volatile organic compounds. Performed DNAPL investigation. Designed remedial system consisting of 12 interceptor wells.
- Principal Modeler, groundwater flow and remedial design at an ISRA site in New Jersey where groundwater is impacted by pesticides that threaten public water-supply wells downgradient of the site. Prepared work plans and reports for the delineation of on-site and off-site groundwater plumes.
- Principal Modeler, groundwater flow at a Superfund site (No. 5 on NPL) in Massachusetts. This project involved modeling to determine the interaction between groundwater and surface water in a stratified drift aquifer.

Christopher Battista

Senior Construction Manager

Technical Specialties:

Management of heavy construction and remediation projects, including Brownfield redevelopment, building foundation construction, structural waterproofing and vapor barrier installation and inspection, excavation and disposal of impacted soil, UST removal and construction of groundwater treatment systems, management of Phase II Environmental Site Assessments, including monitoring well installation and soil boring and groundwater sampling programs.

Experience Summary:

Thirteen years of experience as Senior, Project and Staff Construction Manager, and Site Investigation Project Manager with Roux Associates.

Credentials:

B.S., Environmental Science, SUNY Oneonta
 OSHA 40-hour HAZWOPER Training
 OSHA 30-Hour Construction Safety Training
 OSHA 10-Hour Construction Safety Training
 OSHA Trenching and Excavation Competent Person Training
 ExxonMobil Loss Prevention System Training

Key Projects:

- Construction Manager of numerous remedial excavation/foundation construction projects at former MGP sites in New York City. These projects consisted of excavation and disposal of petroleum and MGP impacted soil, removal of USTs, installation of subsurface site perimeter containment walls, installation and inspection of foundation waterproofing and vapor barriers, preparation of site-specific work plans and remedial action completion reports and oversight of foundation construction activities. Work on these projects also included assistance and support during foundation contracting and negotiations with NYSDEC and NYCDEP, as well as former property owners.
- Construction Manager of a two story mixed used (industrial/commercial) building in Brooklyn, New York. Project included management of foundation construction, masonry, steel framing, site development and utilities, groundwater treatment system and industrial process system construction, framing, plumbing, electric, HVAC, finishing's and solar power system.
- Construction Manager for the expansion of a two story pre-fab industrial building used for water treatment system equipment. Project included, deep foundation construction, structural steel framing, structural concrete, pre-fab building assembly, interior office construction, water treatment system construction, utilities, HVAC and finishing's.
- Field inspector responsible for overseeing the installation of a complex vapor barrier system for a high rise residential building in Brooklyn, New York. The vapor barrier system required the proper integration of components from different manufacturers and in various configurations around the building foundation.

- Construction Manager an underground utility construction project for the expansion of a large groundwater treatment operation. Project included excavation and installation of over 3500 linear feet of water main, vacuum piping, product pipeline and control conduits within NYC streets.
- Construction Manager of a NYCDEP storm and sanitary sewer construction project in Brooklyn, New York. Work included construction of approximately 800 linear feet of RCP storm sewer, approximately 350 feet of ductile iron sanitary sewer and replacement of approximately 220 feet of 20" cast iron water main.
- Project Manager/Owners Representative of a soil remediation and UST removal project in Manhattan, New York. Work included initial subsurface investigation, remedial design, negotiations with NYSDEC, bid support and field management of the Owner's contractors. Work resulted in the closure of a spill that had been open for over 20 years without any delays to the Owner's redevelopment schedule.
- Onsite construction manager/owners representative for an excavation and river dredging remediation project at a former metals smelting plant in Staten Island, New York. Project included excavation of petroleum impacted soils and dredging of river and estuary sediments impacted with hazardous levels of heavy metals, wastewater treatment and permitted discharge, sediment stabilization, site sewer system cleaning and abandonment and landfill capping. Work included regulatory negotiation and reporting to NYSDEC, NYSDOH and NYCDEP, community relations and development alternate of remedial strategies.
- Project Manager for a building demolition project at an active railroad facility in Queens, New York. Project included production of demolition specifications, collection of waste characterization soil and water samples, air monitoring, removal and disposal of impacted soil, removal and disposal of asbestos containing material, removal and disposal of demolition debris and preparations of a demolition completion report.
- Construction manager of excavation and disposal of over 25,000 cubic yards of hazardous and non-hazardous contaminated soil and buried waste material at a chemical production facility near Albany, New York. The work included construction of groundwater collection trenches and recovery well system around the Sites perimeter. Excavation, staging, sampling and disposal of impacted soils.
- Construction Manager of remedial excavation and UST removal at an active steel fabrication facility in Buffalo, New York to address solvent, petroleum and PCB impacted soils. Activities included management of excavation and disposal of hazardous process waste containing PCBs and solvents, and non-hazardous contaminated soils, collection of confirmatory samples and oversight of Site restoration.

Yixian Zhang, Ph.D Senior Scientist

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Technical Specialties:

More than 10 years of experience in environmental chemistry with extensive experience in assessment and remediation of sediments contaminated with PCBs, PAHs, and petroleum hydrocarbons. Designed, implemented, and managed data collection programs including field, laboratory, and data interpretation components to study transport, fate, and effects of organic and inorganic contaminants in terrestrial and marine environments. Specialized in environmental forensic techniques including advanced chemical fingerprinting for source identification and timing of releases. Expertise in contaminant partitioning in aqueous, solid, and biota phases and implications to contaminant bioavailability. Significant experience in research and development of new analytical methods including *in situ* chemical sensors, field-screening techniques and fixed laboratory methods. Strong knowledge in toxicity and bioaccumulation testing of contaminated sediments and sediment quality triad assessment. Additional area of expertise includes quality assurance/quality control (QA/QC) plan development and implementation and data quality evaluation.

Experience Summary:

Senior Scientist, Roux Associates (2009 – present)
Principal Research Scientist, Battelle (2005 – 2009)
Environmental Scientist, Tetra Tech ECI (formerly Foster Wheeler Environmental Corp) (2001-2005)
Research Assistant, University of Massachusetts, Boston (1995-2001)
Environmental Scientist, Shanghai Environmental Monitoring Center (1991-1995)

Credentials:

B.S. Environmental Sciences, East China Normal University, Shanghai, China, 1991
Ph.D. Environmental Sciences (Concentration on Environmental Geochemistry), University of Massachusetts, Boston, 2003

Publications:

Wang, X., Y. Zhang, and R. F. Chen. 2001. Distribution and Partitioning of Polycyclic Aromatic Hydrocarbons (PAHs) in Different Size Fractions in Sediments from Boston Harbor, United States. *Marine Pollution Bulletin*. 42 (11): 1139-1149.
Chen R.F., Y. Zhang, P. Vlahos, and S. M. Rudnick. 2002. The Fluorescence of Dissolved Organic Matter in the Mid-Atlantic Bight. *Deep Sea Research*. 49 (20): 4439-4459.

Presentations:

Zhang, Y. and Chen, R. F. Determination of PAHs and DOC in Sediment Porewater Using TR-LIF. Fifth International Conference on Remediation of Contaminated Sediments, Jacksonville, Florida. February 2009. Session E3.
Burgess, R.M.; Zhang, Y.; McKee, M.P.; Lohmann, R.; Luey, P.J.; Friedman, C.L.; Schubauer-Berigan, J.P. and Lefkowitz, L. Evaluating PCB Bioavailability Using Passive Samplers and Mussels at a Contaminated Sediment Site. Fifth International Conference on Remediation of Contaminated Sediments, Jacksonville, Florida. February 2009. Session C4.

Burgess, R.M.; Zhang, Y.; McKee, M. P.; Lohmann, R.; Luey, P.J.; Friedman, C.L.; Schubauer-Berigan, J.P. and Lefkowitz, L. Comparison of Passive Sampling Devices for Measuring Dissolved PCBs in the Water Column of a Marine Superfund Site. North American Society of Environmental Toxicology and Chemistry (SETAC) National meeting, Tampa Bay, Florida. November 2008. Session TP73.

Zhang, Y.; Chen, R. F. and Wang, X. Laser-Induced Fluorescence Measurements of Natural and Anthropogenic Organic Compounds in Coastal Marine Sediments. American Geophysical Union, 2002 Ocean Sciences Meeting, Honolulu, Hawaii. February 2002. Session OS12A.

Chen, R. F.; Gardner, G. B.; Zhang, Y. and Govignnon-Berry, A. Chromophoric Dissolved Organic Matter (CDOM) in the Mississippi River Plume. American Geophysical Union, 2002 Ocean Sciences Meeting, Honolulu, Hawaii. February 2002. Session OS01.

Emsbo-Mattingly, S.; Douglas, H.; Beliveau, A.; Wojtas, M.; Zhang, Y. and Ferro, H. The Analysis of PCBs in New Bedford Harbor Sediments: Selecting and Optimizing Immunoassay, GC/ECD, and GC/MS Methods Based on Multiple Site-Specific DQOs. The Annual International Conference on Soils, Sediments, Water, and Energy. Amherst, Massachusetts. October 2001. Environmental Forensics Session.

Chen, R. F.; Zhang, Y.; Vlahos, P. and Rudnick, S. M. The Fluorescence of Dissolved Organic Matter in the Mid-Atlantic Bight. American Society of Limnology and Oceanography, 2001 Aquatic Science Meeting, Albuquerque, New Mexico. February 2001. Session SS06-03.

Chen, R. F.; Gardner, G. B.; Zhang, Y.; Vlahos, P.; Wang, X. and Rudnick, S. M. Chromophoric Dissolved Organic Matter (CDOM) in Four US Estuaries. American Geophysical Union, 2000 Ocean Science Meeting, San Antonio, Texas. January 2000. Session OS21k-03.

Chen, R. F.; Rudnick, S. M. and Zhang, Y. Chromophoric Dissolved Organic Matter in the Chesapeake Bay. American Society of Limnology and Oceanography, 1999 Aquatic Science Meeting, Santa Fe, New Mexico. February 1999. Session SS34TU1130E.

Chen, R. F.; Gardner, G. B.; Rudnick, S. M. and Zhang, Y. High-Resolution, In Situ Optical Measurement of Dissolved Organic Components in Four US Estuaries. American Geophysical Union, 1999 Spring Meeting, Boston, Massachusetts. June 1999. Session OS22D-05.

Chen, R. F.; Jiang, Y.; Johnson, A.; Shull, D.; Siegener, R.; Vlahos, P. and Zhang, Y. Organic Carbon Cycling in Boston Harbor. American Geophysical Union, 1998 Spring Meeting, Boston, Massachusetts. May 1998. Session OS52B-05.

Chen, R. F.; Zhang, Y. and Rudnick, S. M. Optical Properties of Chromophoric Dissolved Organic Matter (CDOM) on the Mid-Atlantic Bight. American Geophysical Union, 1998 Ocean Science Meeting, San Diego, California. February 1998. Session OS21H-10.

Yixian Zhang, Ph.D Senior Scientist

Page 2 of 2

Zhang, Y. and Chen, R. F. Fluorescence Measurements of Coastal Marine Sediments. American Geophysical Union, 1998 Ocean Science Meeting, San Diego, California. February 1998. Session OS42N-11.

Zhang, Y. and Chen, R. F. Chromophoric Dissolved Organic Matter (CDOM) in the Mid-Atlantic Bight Measured by Absorption and Fluorescence. American Geophysical Union, 1996 Fall Meeting, San Francisco, California. December 1996. Session OC72B-10.

Key Projects:

- Task Manager/Project Scientist, Remedial Investigation and Clean-up, New Bedford Harbor Superfund Site, MA: More than 7 years of experience with the investigation and remediation of PCB-contaminated sediments at the site: 2001-2005 at Tetra Tech and 2006 - 2009 at Battelle. Responsibilities included providing technical expertise and oversight for multidisciplinary tasks, preparing and reviewing workplans, field sampling plans (FSPs), and quality assurance project plans (QAPPs), performing data interpretation to evaluate the effectiveness of various contaminant mitigation (e.g., dredging, capping) and source control measures, and preparing technical reports on study findings. Experience highlights included developing and comparing various field-screening, on-site, and off-site laboratory analytical approaches for obtaining fast-turnaround and cost-effective data, leading a sediment trap study to evaluate sediment transport due to natural processes and remediation activities, performing advanced fingerprinting and other environmental forensic techniques to determining the sources of re-deposited sediments, and participating in a study design to determine facilitated migration of PCBs through groundwater pathway into the harbor due to the co-presence of chlorinated solvents in the contamination source area.
- Project/Task Manager, Evaluation of Contaminant Release from Sediments, New Bedford Harbor Superfund Site, MA: The objectives of this multi-year research project were to better understand the release of PCBs from sediments into the water column under field conditions during active remedial dredging and non-dredging periods. Responsible for providing project/task management and overall scientific oversight. Prepared the project workplan and QAPP, coordinated field investigation activities, developed new analytical methods for C18 and solid phase microextraction (SPME) techniques in the laboratory, and evaluated the use of sediment traps, passive samplers including semipermeable membrane devices (SPMDs), SPME, and polyethylene devices (PEDs), as well as biomonitoring organisms (e.g. blue mussels) to measure sediment resuspension, transport, and release of bioavailable PCBs in the water column.
- Project Manager, Sediment Innovative Treatment Demonstration Project, Long Island Sound, NY: Managed testing of treated sediments to determine the feasibility and cost-effectiveness of using treated sediment for one or more beneficial uses (e.g., soil or aggregate manufacturing process). Responsibilities included Sampling and Analysis Plan (SAP) preparation, field sampling and analytical task management, and subcontractor coordination for this multi-phase project. Prepared final reports that summarized bulk chemistry of the treated sediments to evaluate direct exposure concerns and leachability testing results to determine contaminant mobility potential.
- Project/Task Manager, Dredged Material Testing, Various Locations in New England States: Managed physical, chemical, and biological testing of dredged material from various New England locations to evaluate potential environmental impacts as a result of ocean disposal of dredged material. Responsibilities included preparing project SAPs, managing analyses of water, sediment, and biological tissue samples for pesticides, PCBs, and PAHs in the laboratory, coordinating other physical, chemical, and biological testing tasks such as grain size and TOC measurements, trace metal analysis, acute and chronic bioassay and bioaccumulation tests, performing data interpretation, and preparing reports. The testing and data interpretation followed EPA/USACE guidance "Evaluation of Dredged Material Proposed for Ocean Disposal—Testing Manual" (the "Green Book").
- Project Manager, Analytical Chemistry, Bioaccumulation, and Benthic Infauna Community Analysis Support for Naval Station Sediment Total Maximum Daily Load (TMDL) Assessment, San Diego, CA: Managed the chemical analysis of water, sediment, and biota samples, sediment bioaccumulation tests, and benthic infauna community analysis. The final report incorporated sediment chemistry and benthic infauna results to assess sediment quality using statistical tools such as cluster and ordination analysis, principal components analysis (PCA), and multiple regression analysis.
- Technical Support, Ashtabula River Contaminated Sediment Remediation Dredging, OH: Served as technical expert for the extensive monitoring effort during the pre- and post-dredging phases to measure sediment residuals and immediate and long-term impacts of contaminant removal on the ecosystem. Major author of the monitoring program design, QAPP, and data interpretation report regarding the innovative field assessment devices such as SPME, PED, and bio-monitoring techniques.
- Project Manager, Analytical Method Development for Emerging Contaminants: Managed the method development effort in the laboratory for emerging contaminants including pharmaceuticals and personal care products (PPCPs) such as prescription and nonprescription drugs, steroids, and hormones, as well as brominated flame retardants such as polybrominated diphenyl ethers (PBDEs).
- Task Manager/Project Scientist, Navel Weapons Industrial Reserve Plant, MA: An *in situ* thermal treatment system using electrical resistance heating (ERH) technology was implemented to further clean up the residual chlorinated solvents and BETX contamination in soil and groundwater of two areas at the site. Responsibilities included managing project chemistry task and preparing final report to evaluate the ERH treatment efficiency and whether natural attenuation was occurring after the treatment.
- Task Manager/Project Scientist, Navy Tank Farms 1, 2, 4 and 5, RI: Managed chemistry tasks to support on-going investigation and remediation activities including preparing project QA/QC plan, performing field screening tests (using PetroFlag) for rapid qualification of oil contamination in soil, coordinating subcontract labs, and performing data validation. The project was to further define the nature and extent of petroleum hydrocarbon contamination in the soil and groundwater, and to perform necessary clean-up for the purpose of reuse of the area as a golf course.

Chemical Oxidant Information



CHEMICAL OXIDATION REDEFINED...

RegenOx™ is an advanced in situ chemical oxidation technology designed to treat organic contaminants including high concentration source areas in the saturated and vadose zones*

PRODUCT FEATURES:

- Rapid and sustained oxidation of target compounds
- Easily applied with readily available equipment
- Destroys a broad range of contaminants
- More efficient than other solid oxidants
- Enhances subsequent bioremediation
- Avoids detrimental impacts to groundwater aquifers



RegenOx product application

HOW IT WORKS:

RegenOx maximizes in situ performance using a solid alkaline oxidant that employs a sodium percarbonate complex with a multi-part catalytic formula. The product is delivered as two parts that are combined and injected into the subsurface using common drilling or direct-push equipment. Once in the subsurface, the combined product produces an effective oxidation reaction comparable to that of Fenton's Reagent without a violent exothermic reaction. RegenOx safely, effectively and rapidly destroys a wide range of contaminants in both soil and groundwater (Table 1).

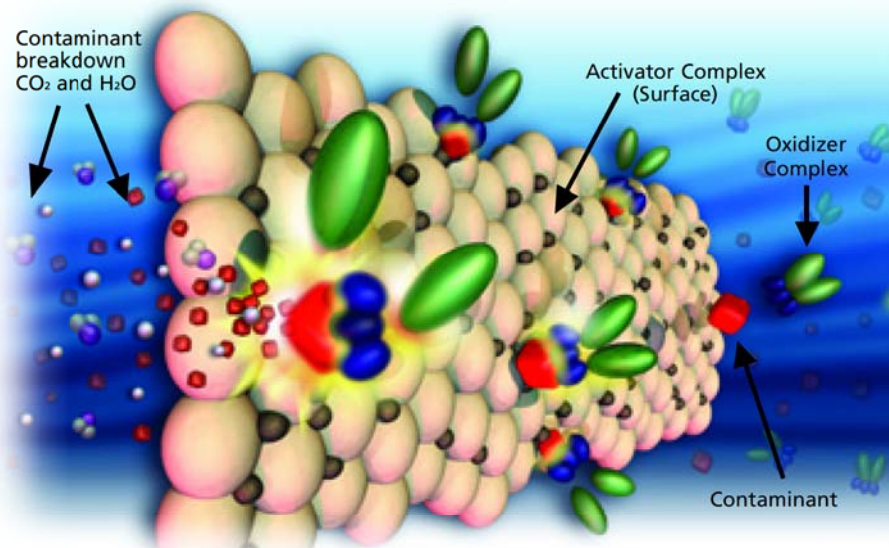
ACHIEVES RAPID OXIDATION VIA A NUMBER OF MECHANISMS

RegenOx directly oxidizes contaminants while its unique catalytic complex generates a suite of highly charged, oxidative free radicals that are responsible for the rapid destruction of contaminants. The mechanisms by which RegenOx operates are:

- Surface-Mediated Oxidation: (see Figure 1 and description below)
- Direct Oxidation: $\text{C}_2\text{Cl}_4 + 2 \text{Na}_2\text{CO}_3 + 3 \text{H}_2\text{O}_2 + 2 \text{H}_2\text{O} \leftrightarrow 2\text{CO}_2 + 4 \text{NaCl} + 4 \text{H}_2\text{O} + 2 \text{H}_2\text{CO}_3$
- Free Radical Oxidation:
 - Peroxyl Radical ($\text{HO}_2\bullet$)
 - Hydroxyl Radical ($\text{OH}\bullet$)
 - Superoxide Radical ($\text{O}_2\bullet$)

Figure 1. Surface-Mediated Oxidation is responsible for the majority of RegenOx contaminant destruction. This process takes place in two stages. First, the RegenOx activator complex coats the subsurface. Second, the oxidizer complex and contaminant react with the activator complex surface destroying the contaminant.

Figure 1. RegenOx™ Surface-Mediated Oxidation



* Patent applied for



From Mass Reduction to Bioremediation:

RegenOx™ is an effective and rapid contaminant mass reduction technology. A single injection will remove significant amounts of target contaminants from the subsurface. Strategies employing multiple Regenox injections coupled with follow-on accelerated bioremediation can be used to treat highly contaminated sites to regulatory closure. In fact, RegenOx was designed specifically to allow for a seamless transition to low-cost accelerated bioremediation using any of Regenesi controlled release compounds.

Significant Longevity:

RegenOx has been shown to destroy contaminants for periods of up to one month.

Product Application Made Safe and Easy:

RegenOx produces minimal heat and as with all oxidants proper health and safety procedures must be followed. The necessary safety guidance accompanies all shipments of RegenOx and additional resources are available on request. Through the use of readily available, highly mobile, direct-push equipment and an array of pumps, RegenOx has been designed to be as easy to install as other Regenesi products like ORC® and HRC®.

Effective on a Wide Range of Contaminants:

RegenOx has been rigorously tested in both the laboratory and the field on petroleum hydrocarbons (aliphatics and aromatics), gasoline oxygenates (e.g., MTBE and TAME), polyaromatic hydrocarbons (e.g., naphthalene and phenanthrene) and chlorinated hydrocarbons (e.g., PCE, TCE, TCA).

Oxidant Effectiveness vs. Contaminant Type:

Table 1						
Contaminant	RegenOx™	Fenton's Reagent	Permanganate	Persulfate	Activated Persulfate	Ozone
Petroleum Hydrocarbons	A	A	B	B	B	A
Benzene	A	A	D	B	B	A
MTBE	A	B	B	C	B	B
Phenols	A	A	B	C	B	A
Chlorinated Ethenes (PCE, TCE, DCE, VC)	A	A	A	B	A	A
Chlorinated Ethanes (TCA, DCA)	A	B	C	D	C	B
Polycyclic Aromatic Hydrocarbons (PAHs)	A	A	B	B	A	A
Polychlorinated Biphenyls (PCBs)	B	C	D	D	D	B
Explosives (RDX, HMX)	A	A	A	A	A	A

Based on laboratory kinetic data, thermodynamic calculations, and literature reports.

Oxidant Effectiveness Key:

- A = Short half life, low free energy (most energetically favored), most complete
- B = Intermediate half life, low free energy, intermediate degree of completion
- C = Intermediate half life, intermediate free energy, low degree of completion
- D = Long half life, high free energy (least favored), very low degree of completion



Advanced Technologies for Groundwater Resources

1011 Calle Sombra / San Clemente / California 92673-6244
Tel: 949/366-8000 / Fax: 949/366-8090 / www.regenesi.com



An All-In-One Combined Remedy Approach to Address Soil and Groundwater Contamination

Klozur® CR, a Combined Remedy technology, is comprised of a specially formulated mixture of Klozur® Persulfate and PermeOx® Ultra.

Klozur CR is a single, all-in-one formulated product that can be readily applied to either source areas or plumes with mixed petroleum and chlorinated solvents contamination. Klozur CR destroys contaminants in soil and groundwater by promoting three modes of action: Klozur activated persulfate chemical oxidation, aerobic bioremediation and anaerobic bioremediation.

The benefits of Klozur CR

Two field proven technologies formulated into an all-in-one preblended product.

- **The Power of Klozur Activated Persulfate**

- A built in Klozur persulfate activator delivers proven and powerful chemical oxidation action from generated sulfate and hydroxyl radicals
- Rapid in situ chemical oxidation to target source and hot spot contaminate zones, typically lasting 3-6 months

- **The Performance of PermeOx Ultra**

- Engineered calcium peroxide providing extended oxygen release for up to one year; longer than any other oxygen release compound available
- Longevity delivers enhanced aerobic bioremediation in down gradient plumes



Examples of Contaminants of Concern

CHLORINATED SOLVENTS

PCE, TCE, DCE,
VC, TCA, DCA

PETROLEUM

GRO, DRO, ORO, BTEX

PAHs

Creosote, MGP residuals
1,4-dioxane, MTBE, TBA

The sound science of Klozur CR

Klozur CR provides self-activating Klozur persulfation oxidation technology, utilizing the alkalinity generated by calcium peroxide to achieve a pH in the range of 11. In addition, the calcium peroxide will slowly generate hydrogen peroxide allowing for peroxide activation of persulfate. High pH activated persulfate is capable of destroying a wide range of contaminants, including petroleum hydrocarbons and chlorinated solvents.





Following the initial chemical oxidation phase, Klozur CR will continue to release oxygen to be used as an electron receptor for aerobic bioremediation for up to a year, as a result of the slow hydration of the engineered calcium peroxide. Diffusion and transport of oxygen downgradient will support contaminant reductions in plume areas, treating BTEX, PAH's and petroleum hydrocarbons.

As a result of the persulfate oxidation with organic compounds, generated sulfate ions can be utilized by sulfate reducing bacteria as an electron acceptor under anaerobic conditions to degrade BTEX, PAH's and petroleum hydrocarbons.

Application Methods

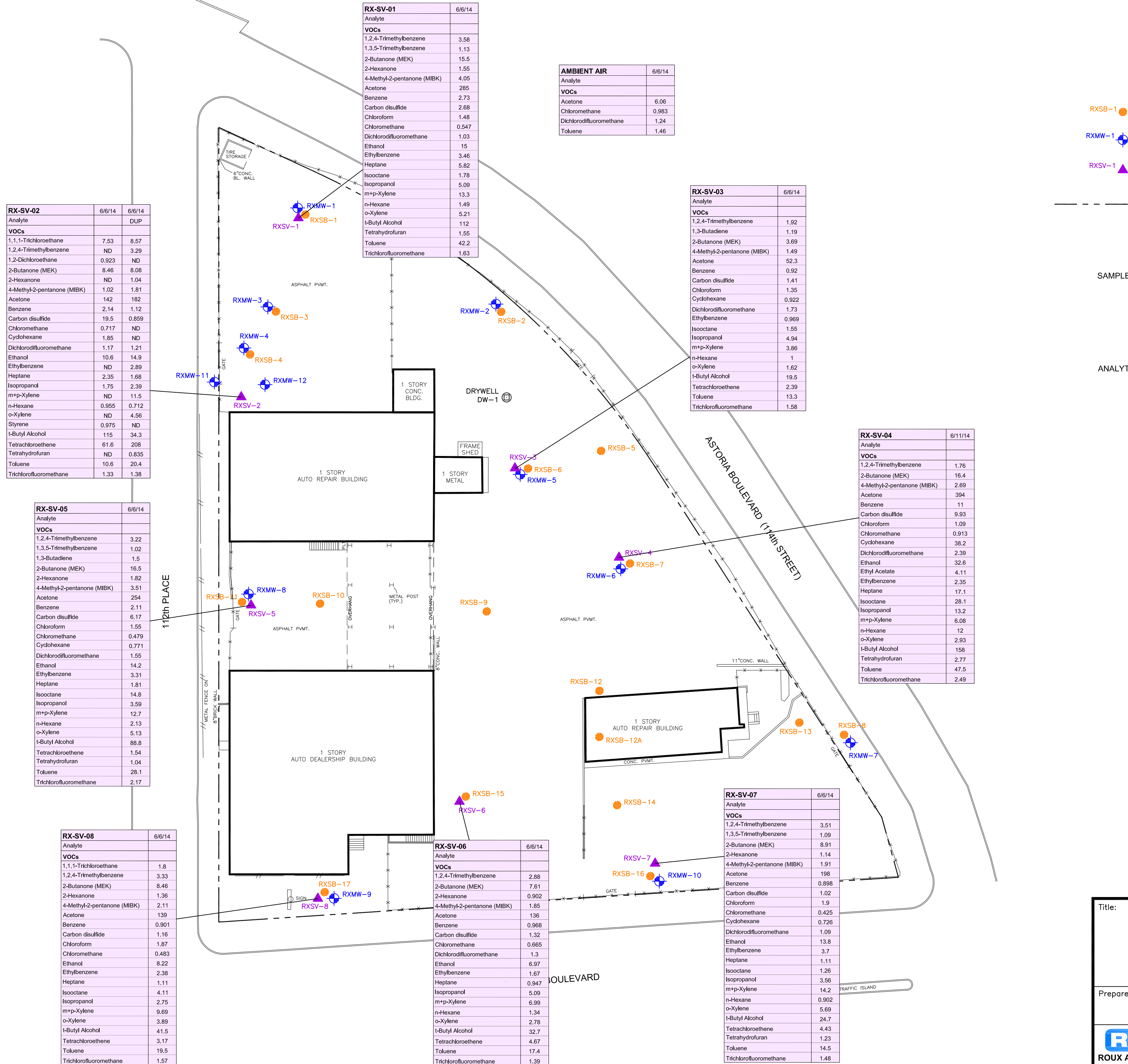
- Direct push injection
- Soil blending
- Direct application in an excavation

For more information and detailed case studies, please visit our website.



1. VOCs Detected in Soil Vapor
2. Soil Detections in Excess of NYSDEC Subpart 375-6 Soil Cleanup Objectives
3. Water -Table Elevations – June 18, 2014
4. Groundwater Detections in Excess of NYSDEC TOGS 1.1.1 AWQSGVs
5. Remedial Alternative 1
6. Remedial Alternative 2

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Title:			
VOCs DETECTED IN SOIL VAPOR			
REMEDIAL INVESTIGATION 112-21 NORTHERN BOULEVARD SITE NO. C241157			
Prepared For:			
EASTERN EMERALD GROUP LLC			
ROUX ROUX ASSOCIATES, INC. Environmental Consulting & Management	Compiled by: C.B.	Date: 10JUL14	PLATE
	Prepared by: B.H.C.	Scale: AS SHOWN	1
	Project Mgr: C.B.	Project: 2364.0001Y000	
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RXSB-4	6/4/14	6/4/14
Depth (ft bls)	30 - 32	30 - 32
VOCs		DUP
1,2,4-Trimethylbenzene	3.8	NE
2-Butanone (MEK)	0.17 J	ND
Methylene chloride	ND	0.12 J
Xylenes (total)	1.4	1.2

DW-1	6/6/14
Depth (ft bls)	
VOCs	
Acetone	0.59 J
Methylene chloride	0.59 J
Metals	
Cadmium	4.9
Copper	220
Lead	130
Nickel	45
Zinc	1700

RXSB-6	6/2/14
Depth (ft bls)	35 - 37
Metals	
Chromium	43
Nickel	31

RXSB-9	5/29/14
Depth (ft bls)	34 - 36
Metals	
Chromium	38

LEGEND

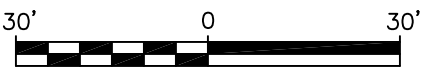
- RXSB-1 ● LOCATION AND DESIGNATION OF SOIL BORING
- RXMW-1 ● LOCATION AND DESIGNATION OF SOIL VAPOR SAMPLING PORT
- RXSV-1 ▲ LOCATION AND DESIGNATION OF SOIL VAPOR SAMPLE
- PROPERTY BOUNDARY

TYPICAL DATA BOX INFORMATION

SAMPLE ID	RXSB-6	6/2/14	SAMPLE DATE
	Depth (ft bls)	35 - 37	SAMPLE DEPTH
ANALYTES	Metals		CONCENTRATIONS
	Chromium	43	
	Nickel	31	

Parameter	Standards* (mg/kg)	Standards** (mg/kg)
VOCs		
1,2,4-Trimethylbenzene	3.6	52
2-Butanone (MEK)	0.12	100
Acetone	0.05	100
Methylene chloride	0.05	100
Xylenes (total)	0.26	100
Metals		
Cadmium	3	4
Chromium	30	180
Copper	50	270
Lead	63	400
Nickel	30	310
Zinc	109	10000

Concentrations in µg/kg
µg/kg - Micrograms per kilogram
* - NYSDEC Part 375 Unrestricted Use Standards
** - NYSDEC Part 375 Restricted Residential Standards
NYSDEC - New York State Department of Environmental Conservation
- - Not detected above NYSDEC CP-51 Contaminated Soil Cleanup Levels
J - Estimated value
DUP - Duplicate Sample
VOCs - Volatile Organic Compounds
NE - No exceedance
ND - No detection
NA - Not analyzed for by laboratory
ft bls - Feet below land surface

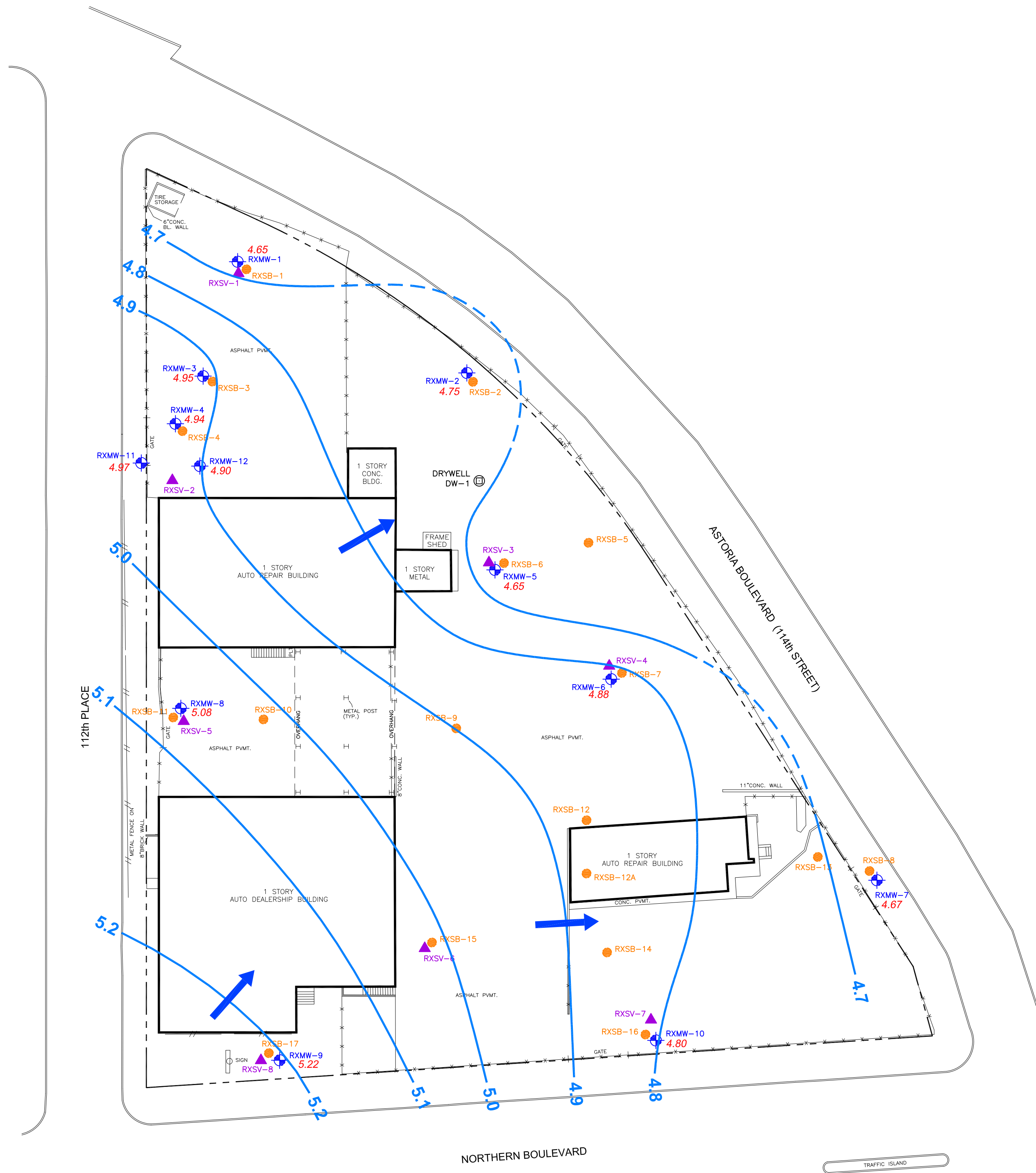


Title: **SOIL DETECTIONS IN EXCESS OF
NYSDEC SUBPART 375-6 SOIL CLEANUP
OBJECTIVES**
REMEDIAL INVESTIGATION
112-21 NORTHERN BOULEVARD
SITE NO. C241157

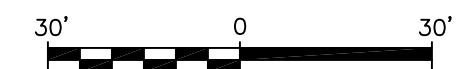
Prepared For: **EASTERN EMERALD GROUP LLC**

ROUX ROUX ASSOCIATES, INC. Environmental Consulting & Management	Compiled by: C.B.	Date: 10JUL14	PLATE 2
	Prepared by: B.H.C.	Scale: AS SHOWN	
	Project Mgr: C.B.	Project: 2364.0001Y000	
	File: 2364.0001Y107.01.DWG		

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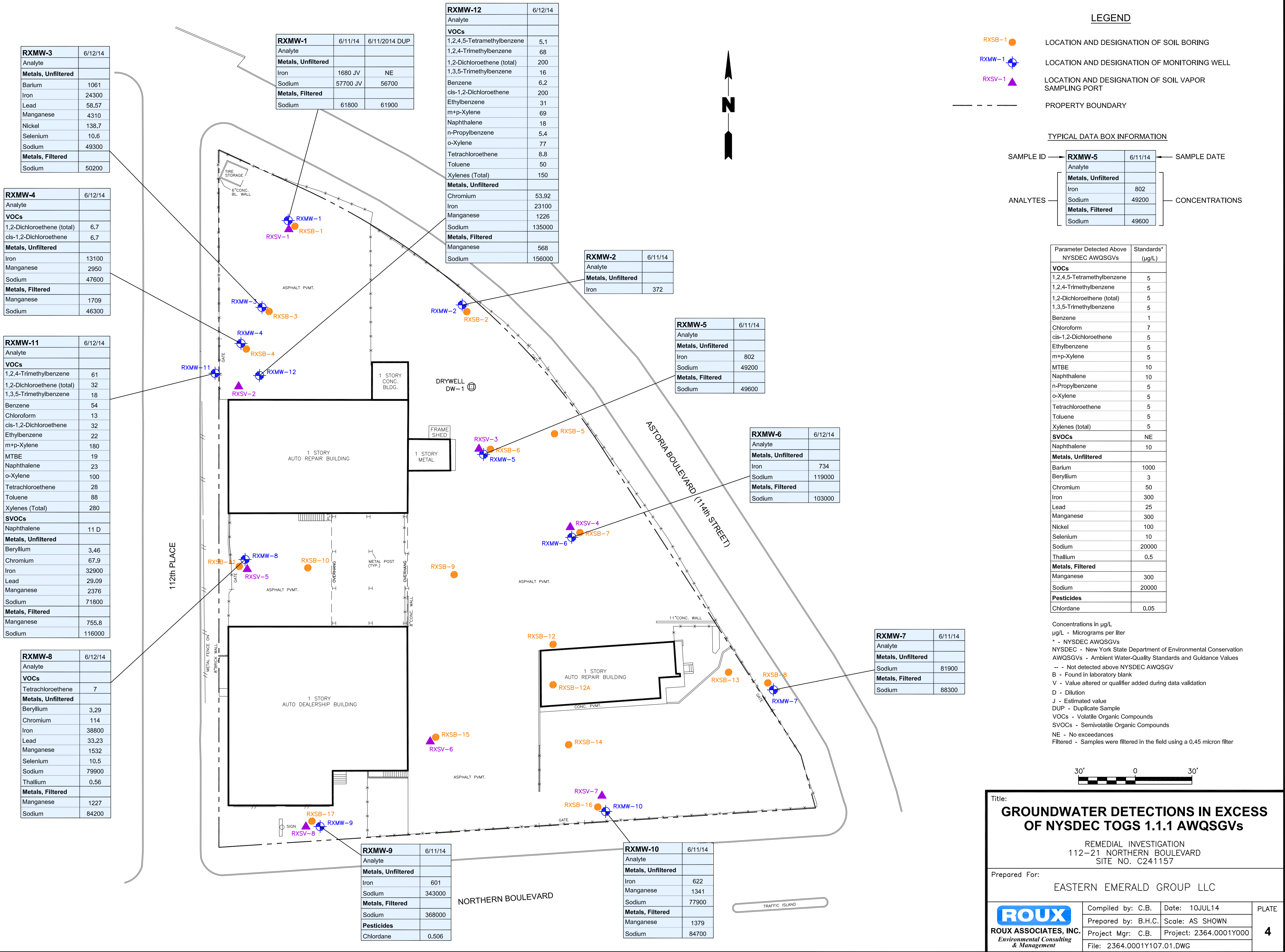


- LEGEND**
- RXSB-1 LOCATION AND DESIGNATION OF SOIL BORING
 - ⊕ RXMW-1 LOCATION AND DESIGNATION OF MONITORING WELL
 - ▲ RXSV-1 LOCATION AND DESIGNATION OF SOIL VAPOR SAMPLING PORT
 - PROPERTY BOUNDARY
 - 4.67 WATER-TABLE ELEVATION, IN FEET RELATIVE TO MEAN SEA LEVEL
 - 5.0 LINE OF EQUAL WATER-TABLE ELEVATION, IN FEET RELATIVE TO MEAN SEA LEVEL (DASHED WHERE INFERRED)
 - INFERRED DIRECTION OF GROUNDWATER FLOW

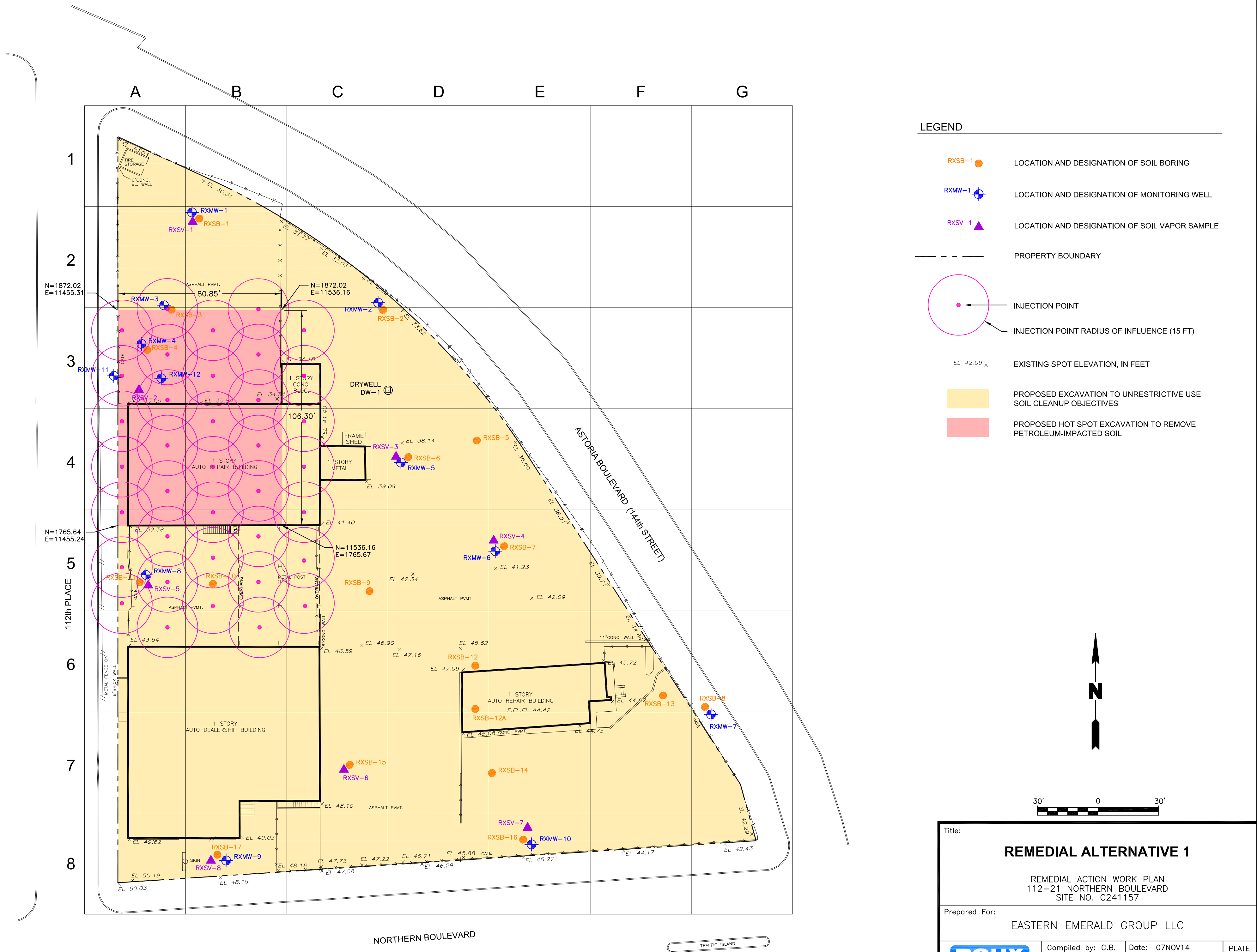


Title:			
WATER-TABLE ELEVATIONS JUNE 18, 2014			
REMEDIAL INVESTIGATION 112-21 NORTHERN BOULEVARD SITE NO. C241157			
Prepared For:			
EASTERN EMERALD GROUP LLC			
ROUX ROUX ASSOCIATES, INC. Environmental Consulting & Management	Compiled by: C.B.	Date: 10JUL14	PLATE
	Prepared by: B.H.C.	Scale: AS SHOWN	
	Project Mgr: C.B.	Project: 2364.0001Y000	
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