REMEDIAL ACTION WORK PLAN

for

37-11 30th STREET
LONG ISLAND CITY, NEW YORK

Block 372, Lots 21 and p/o 8
NYSDEC BCP Site No. C241211

Prepared For:

37-11 30th Street Holdings LLC
c/o Slate Property Group
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New York, New York

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LANGAN

August 20, 2019
Langan Project No. 170512301

CERTIFICATION

I, Jason Hayes, PE, certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with 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.

STATE OF NEW YORK
JASON JAMES HAYES
089491
LICENSED PROFESSIONAL ENGINEER

Jason Hayes	8-20-2019	8/20
NYS Professional Engineer #089491	Date	Signature

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

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LIST OF ACRONYMS

Acronym	Definition
AAI	All Appropriate Inquiry
AOC	Area of Concern
ACM	Asbestos-containing Material
AGV	Air Guideline Values
ASP	Analytical Services Protocol
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials International
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below grade surface
BUD	Beneficial Use Determination
C&D	Construction and Demolition
CAMP	Community Air Monitoring Plan
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Contaminant of Concern
CP	Commissioner's Policy
CPP	Citizen Participation Plan
CQAP	Construction Quality Assurance Plan
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
DER	Division of Environmental Remediation
DMM	Division of Materials Management
DUSR	Data Usability Summary Report
E-Designation	Environmental Designation
EC	Engineering Control
EDD	Electronic Data Deliverable
EE	Environmental Easement
el	Elevation
ELAP	Environmental Laboratory Approval Program
ESA	Environmental Site Assessment
eV	electron volt
FEMA	Federal Emergency Management Agency
FER	Final Engineering Report
FIRM	Flood Insurance Rate Map

Acronym	Definition
FWRIA	Fish and Wildlife Resources Impact Analysis
GPR	Ground-Penetrating Radar
GQS	Groundwater Quality Standards
HASP	Health and Safety Plan
Hazmat	Hazardous Materials
IC	Institutional Control
L/min	liters per minute
LBP	Lead Based Paint
LTANK	Leaking Tank
$\mu g/m^3$	Micrograms per cubic meter
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAVD88	North American Vertical Datum of 1988
NNO	Notice of No Objection
NTP	Notice to Proceed
NYC	New York City
NYSDEC	New York State Department of Environmental Conservation
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYCDPC	New York City Department of City Planning
NYCRR	New York Codes, Rules, and Regulations
NYS	New York State
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OER	Office of Environmental Remediation
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PBS	Petroleum Bulk Storage
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PFC	Perfluorinated Chemical
PFAS	Polyfluoroalkyl substances
PG	Protection of Groundwater
PID	Photoionization Detector
PM10	Particulates less than 10 microns in diameter

Acronym	Definition
PPE	Personal Protective Equipment
ppm	parts per million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Recycled Concrete Aggregate
RCRA	Resource Conservation and Recovery Act
RE	Remediation Engineer
REC	Recognized Environmental Condition
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RURR	Restricted Use – Restricted-Residential
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SDS	Safety Data Sheets
SEQRA	State Environmental Quality Review Act
SGV	Standards and Guidance Values
SMP	Site Management Plan
SMMP	Soil/Materials Management Plan
SOE	Support of Excavation
SPDES	State Pollutant Discharge Elimination System
SVOC	Semivolatile Organic Compound
SWPPP	Stormwater Pollution Prevention Plan
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UU	Unrestricted Use
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

This Remedial Action Work Plan (RAWP) was prepared on behalf of 37-11 30th Street Holdings LLC (the Volunteer) for the proposed development located at 37-11 30th Street (Block 372, part of Lot 8) and 30-14 37th Avenue (Block 372, Lot 21) in the Long Island City neighborhood of Queens, New York (the site). The Volunteer entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on July 9, 2018 and Brownfield Cleanup Program (BCP) Site No. C241211 was assigned. The Volunteer proposes to remediate the site for residential, commercial, and light manufacturing use.

This RAWP summarizes the nature and extent of contamination as determined from data gathered during the remedial investigation (RI), performed between September and October 2018. 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 NYSDEC Division of Environmental Remediation (DER) Program Policy: Technical Guidance for Site Investigation and Remediation (DER-10) and complies with applicable federal, state, and local laws, regulations, and requirements. The Remedial Investigation Report (RIR) was submitted to the NYSDEC and New York State Department of Health (NYSDOH) on January 15, 2019. The NYSDEC and NYSDOH have determined that this site does not pose a significant threat to human health and the environment. Based on the findings of the RI, a fish and wildlife resources impact analysis was not required for this site.

SITE DESCRIPTION/PHYSICAL SETTING/SITE HISTORY

The site is located at 37-11 30th Street and 30-14 37th Avenue in the Long Island City neighborhood of Queens, New York and is identified as Block 372, Lot 21 and a part of Lot 8, on the Queens Borough Tax Map. The site encompasses an area of about 26,978 square feet (0.61 acres) and is occupied by a three-story warehouse building with multiple partial cellar levels in the southern part of Lot 8 (37-11 30th Street), a stockyard/storage area in the northern part of Lot 8, and a vacant lot on Lot 21 (30-14 37th Avenue). A lighting, audio, and production rental and warehousing company most recently occupied the buildings in Lot 8, and a two-story residential building demolished prior to execution of the BCA and implementation of the Remedial Investigation Work Plan (RIWP) formerly occupied the eastern part of Lot 21. The site is bound by 37th Avenue to the north, 31st Street to the east, 38th Avenue to the south, and 30th Street to the west. The elevated N and Q subway tracks run north-south above 31st Street and are located about 100 feet east of the site.

As a result of the City Environmental Quality Review (CEQR) process, Block 372, Lot 21 was assigned an Environmental Designation ([E-Designation] E-218) on October 7, 2008 by the New York City Department of City Planning (NYCDCP) as part of the Dutch Kills Rezoning (CEQR No.

08DCP021Q). The E-Designation requires coordination with the New York City Office of Environmental Remediation (OER) to obtain a Notice to Proceed (NTP) or a Notice of No Objection (NNO) prior to obtaining building permits. The E-Designation addresses environmental requirements for hazardous materials (Hazmat) and noise (window wall attenuation and alternative means of ventilation) during development.

Historical Sanborn Fire Insurance Maps indicate that the site was an undeveloped vacant lot until at least 1898. The 1915 map indicates the northern portion of the site was occupied by "McLaughlins Garage" and a residential development, while the southern portion of the site remained vacant. By 1920, the existing on-site warehouse was constructed and beginning in 1930 was occupied by a plastics manufacturer. The Marblette Corp. Mfg. of Plastic Materials occupied the site from at least 1930 to about 1980. During this time period, plastic was typically made using a mixture of synthetic chemicals, chlorinated solvents, metals and petroleum products. Following 1980, the site was occupied by a warehousing and distribution center for lighting and staging equipment.

Historic documents indicate two underground storage tanks (UST), including a 2,000-gallon and 550-gallon UST, and a 5,000-gallon aboveground storage tank (AST) were closed-in-place on July 7, 2000. The documents were prepared by U.S.A. Tank Maintenance, Inc. and were provided to the NYC Fire Department for documentation purposes. The tanks were not registered on the NYSDEC Petroleum Bulk Storage (PBS) database. Historical records documented the 5,000-gallon AST was installed in 1947, the 2,000-gallon UST was installed in 1933, and the 550-gallon UST was installed in 1941. According to historic Sanborn Fire Insurance Maps, a 10,000-gallon tank was also depicted at the site from 1947 to 1950; however, the tank was not listed in any regulatory records. The property was listed in the Leaking Tanks (LTANK) database due to a tank test failure on April 21, 1998. According to records provided by the NYSDEC, three soil borings were advanced in the vicinity of the tank in February 2000 as part of an investigation for a proposed building expansion. No evidence of impacts to the subsurface was noted during the investigation, and NYSDEC closed the LTANKS case on September 15, 2004.

SUMMARY OF THE REMEDIAL INVESTIGATION FINDINGS

The RI findings summarized herein are based on qualitative data (field observations and instrumental readings) and laboratory analytical soil, groundwater, and soil vapor sample results.

1. Stratigraphy: The site stratigraphy consists of a historic fill layer beneath concrete-paved surfaces that is predominately brown, medium-grained sand with varying amounts of gravel, silt, brick, coal, metal, clay, slag, glass, ceramics and concrete to depths ranging from 2 to 8.5 feet below grade surface (bgs). Fill material was underlain by a native brown fine- to coarse-grained sand layer observed to depths of about 32 to 69 feet bgs (about

elevation[1] [el] 8 and el -25, respectively), with occasional layers of silt. In one deep boring advanced to 70 feet bgs (SB05), the sand layer is underlain by an olive clay layer, which was observed to depths of about 59 to 70 feet bgs (about el -16.7 to -27.7, respectively). In a second deep boring advanced in the northern portion of the site (SB13), weathered rock fragments, potentially indicative of weathered bedrock or glacial till were observed between 69 and 72 feet bgs (about el -25 to el -28). Continental glaciation at the end of the Pleistocene and beginning of the Holocene epochs likely caused this distinctive stratigraphy identified beneath the fill layer. Melting of the Wisconsin Glacier contributed glacial outwash deposits to the region. Bedrock was not encountered in any of the soil borings.

2. Hydrogeology: Depth to groundwater was measured between about 22.76 to 27.77 feet bgs, with corresponding groundwater elevations ranging from about el 16.25 to el 18.02. The groundwater elevation is highest in the northern region of the site and appears to flow south toward Sunnyside Yards and Newtown Creek. The relative progression of the contours demonstrates a horizontal flow pattern across the site, with a downward vertical gradient toward the south.

3. Historic Fill: Fill material was identified below surface cover to depths ranging from 2 to 8.5 feet bgs. Contaminants related to historic fill material include semivolatile organic compounds (SVOCs), metals, and pesticides, which were detected at concentrations above Title 6 NYCRR Part 375 Unrestricted Use (UU), Restricted Use-Restricted Residential (RURR) and/or Protection of Groundwater (PG) soil cleanup objectives (SCO). SVOCs and dissolved metals potentially attributed to historic fill were also identified in groundwater at concentrations above the NYSDEC Title 6 NYCRR Part 703.5 and the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA water (collectively known as NYSDEC SGVs).

4. Hazardous Chromium in Historic Fill: Chromium was detected above the Resource Conservation and Recoveries Act (RCRA) Maximum Concentration of Contaminants for the Toxicity Characteristic in an 18-foot by 15-foot area of shallow fill (up to 8 feet) centered on boring SB04. In addition, groundwater beneath this location contained hexavalent and total chromium at concentrations above SGVs. Hazardous chromium and chromium impacts to groundwater may be associated with chrome plating related to the historical use of the site as a plastics manufacturer.

[1] Elevations are referenced to the USGS North American Vertical Datum of 1988 (NAVD88) unless otherwise noted.

5. Chlorinated Volatile Organic Compound (CVOC)-Impacted Soil Vapor: Tetrachloroethene (PCE) was detected in soil vapor and sub-slab vapor samples collected across the site. Based on a comparison of PCE concentrations in sub-slab vapor and indoor air to the NYSDOH Decision Matrices, vapor mitigation is recommended for the future development. A site source of PCE was not identified. Carbon tetrachloride was detected in sub-slab vapor samples collected in the southern portion of the site. Based on the comparison of carbon tetrachloride concentrations in sub-slab vapor and indoor air to the NYSDOH Decision Matrices, monitoring is recommended for future development. A site source of carbon tetrachloride was not identified.

6. Sufficient analytical data were gathered during the RI to establish site-specific soil cleanup levels and to develop a remedy for the site. The remedy, which is described in this RAWP, addresses impacts to soil, groundwater, and soil vapor described in the RIR.

QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

Based on the conceptual site model and review of environmental data, complete on-site exposure pathways appear to be present in current, construction-phase, and future conditions. The complete exposure pathways indicate there is a risk of exposure to humans from site contaminants via exposure to soil, groundwater, and soil vapor if appropriate measures, including institutional and engineering controls as necessary, are not implemented. A qualitative human health exposure assessment was performed to evaluate the exposure pathways, and the following conclusions were developed:

1. Under current conditions human exposure to contaminants is limited due to the surface cover, and access is limited to investigation workers and authorized guests. The primary exposure pathways are dermal contact, ingestion and inhalation of soil, soil vapor, or groundwater by authorized site visitors in instances where the integrity of the impermeable site cover is compromised. The exposure risks can be avoided or minimized by following the appropriate Construction Health and Safety Plan (CHASP) and vapor and dust suppression measures, and by implementing a Community Air Monitoring Plan (CAMP) during investigation activities.

2. In the absence of institutional and engineering controls, there is a moderate risk of exposure during the construction and remediation activities. The primary exposure pathways are:

    a. Dermal contact, ingestion and inhalation of contaminated soil, groundwater or soil vapor by construction workers.

    b. Dermal contact, ingestion and inhalation of soil (dust) and inhalation of soil vapor by the community in the vicinity of the site.

These can be avoided or minimized by performing community air monitoring and by following the appropriate health and safety, vapor and dust suppression, and site security measures outlined in a site-specific HASP.

3. The existence of a complete exposure pathway for site contaminants to human receptors under future conditions is unlikely, as contaminant sources will likely be removed during site development, and if any residual soil remains, the impermeable foundation cover would serve as a cap. Regional groundwater is not used as a potable water source in New York City, so exposure to regional groundwater contaminants is unlikely. The potential pathway for soil vapor intrusion into the buildings would be addressed through the use of soil vapor mitigation measures (e.g., vapor barrier, sub-membrane depressurization system, or ventilated parking garage), thereby minimizing the risk of exposure to soil vapor.
4. It is unlikely that a complete exposure pathway exists for the migration of site contaminants to off-site human receptors for current, construction phase, or future conditions. Monitoring and control measures would be used during investigation and construction to prevent completion of this pathway. Under future conditions, the site will be remediated and, if necessary, engineering controls may be implemented (e.g. site-wide cap and a waterproofing/ vapor barrier) to prevent completion of this pathway.

SUMMARY OF THE REMEDY

The selected Track 1 remedy will include the following:

- Development and implementation of a CHASP and CAMP for the protection of on-site workers, community/residents, and environment during remediation and construction activities
- Abatement of hazardous materials (including asbestos containing materials [ACM] identified in building materials, lead based paint [LBP], polychlorinated biphenyls [PCB]-laden material, and other universal waste and miscellaneous hazardous waste articles) and demolition of existing buildings in order to prepare the site for remediation
- Construction of the support of excavation (SOE) system to facilitate the Track 1 remediation
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations
- Excavation, stockpiling, off-site transport, and disposal of about 15,000 cubic yards of historic fill and native soil that exceeds UU SCOs as defined by 6 NYCRR Part 375-6.8. Material that exceeds UU SCOs will be excavated

- Excavation and disposal of the hazardous chromium hotspot to a depth of up to eight feet bgs - This area covers a roughly 18-foot by 15-foot region in the northeast part of the 3-story vacant warehouse building.
- Removal of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-site disposal during redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements
- Screening for indications of contamination (by visual means, odor, and monitoring with photoionization detectors [PIDs]) of excavated material during intrusive site work
- Appropriate off-site disposal of material removed from the site in accordance with federal, state and local rules and regulations for handling, transport, and disposal
- Implementation of a short-term in-situ groundwater treatment technology (e.g., in-situ chemical reduction [ISCR] using 3-D Microemulsion and/or S-Micro Zero Valent Iron [ZVI] via injection points), to abiotically reduce hexavalent chromium concentrations in groundwater to a less toxic and less mobile trivalent chromium precipitate
- Backfilling of remediated areas to development sub-grade with certified-clean material (i.e., material meeting UU SCOs), virgin stone, or recycled concrete aggregate (RCA)
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 1 remedy was achieved; over-excavation will be required as necessary to meet Track 1 SCOs
- Installation of mechanical ventilation of enclosed subgrade areas that are proposed in future on-site buildings and completion of an evaluation of post-remediation soil vapor conditions to document that engineering controls are not required to address potential soil vapor intrusion
- Development and execution of plans for the protection of on-site workers, the community, and the environment during the remediation phase of development

Remedial activities will be performed in accordance with this RAWP and the Department-issued Decision Document. Deviations from the RAWP and/or Decision Document will be promptly reported to the NYSDEC for approval and fully explained in the Final Engineering Report (FER).

1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) was prepared on behalf of 37-11 30th Street Holdings LLC (the Volunteer) for the proposed development located at 37-11 30th Street (Block 372, part of Lot 8) and 30-14 37th Avenue (Block 372, Lot 21) in the Long Island City neighborhood of Queens, New York (the site). The Volunteer entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on July 9, 2018 and Brownfield Cleanup Program (BCP) Site No. C241211 was assigned. The Volunteer proposes to remediate the site for residential, commercial, and light manufacturing use.

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1.1 Site Location and Description

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A Site Location Map, which includes a United States Geological Survey (USGS) topographical quadrangle map, is included as Figure 1. The metes and bounds of the site are detailed on the Boundary Survey included in Appendix A. A site plan is included as Figure 2.

1.2 Redevelopment Plan

The remedy proposed in this RAWP is intended to make the site protective of human health and the environment consistent with the contemplated unrestricted end use. The proposed redevelopment plan and end use are described here to provide the basis for this assessment; however, the remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Current plans call for the development to include abatement and demolition of the existing three- and one-story warehouse buildings within the southern part of the site (Tax Block 372, Lot 8). A new seven-story, mixed-use residential, commercial, and light manufacturing building will be constructed with a footprint of about 26,978 square feet. The new development will include one full cellar level with about 17,250 square feet of parking, about 3,000 square feet of tenant amenity space (i.e. recreation room, bicycle storage, lounge area), and remaining areas of the cellar occupied by utility rooms, a trash compactor room, corridors, stairs, elevators, and a detention tank. The first floor of the new development will include about 11,000 square feet of commercial/retail areas, about 10,750 square feet of light manufacturing areas, and the remaining portions will include a residential lobby, mail room, corridors, a loading dock, and ADA-accessible apartment. The second through seventh floors will be occupied by 198 residential units, thirty percent of which will be designated for affordable housing. Proposed redevelopment plans are provided in Appendix B and the proposed cellar plan is provided as Figure 3.

Excavation across the site footprint to elevation[1] (el) 26.5 to el 29.5 (about 15 feet below grade) will be required to accomplish the Track 1 unrestricted remediation and to accommodate construction of the cellar levels and foundation components. Support of excavation (SOE) construction will be implemented to facilitate excavation, as required.

1.3 Description of Surrounding Property

The site is located in a mixed-use area with commercial, residential, and institutional uses. The following is a summary of surrounding property usage:

[1] Elevations are referenced to the USGS North American Vertical Datum of 1988 (NAVD88) unless otherwise noted.

Direction	Adjoining and Adjacent Properties			Surrounding Properties
	Block No.	**Lot No.**	**Description**	
North	599	1	37th Avenue followed by Supreme Glass and Windows (30-01 37th Avenue)	31st Street (N and Q subway lines beneath) followed by multi-story and multi-family residential, commercial, and industrial buildings
West	371	23	30th Street followed by a two - story industrial building (29-16 37th Avenue)	Old Ridge Road followed by multi-story and multi-family residential buildings and industrial buildings
		27	30th Street followed by a three-story industrial building (37-12 30th Street)	
		29	30th Street followed by a two-story industrial building (37-14 30th Street)	Old Ridge Road followed by multi-story and multi-family residential buildings and industrial buildings
		31	30th Street followed by a two-story industrial building (37-20 30th Street)	
		32	30th Street followed by a two-story commercial office building (37-22 30th Street)	
		33	30th Street followed by a one-story industrial building (37-24 30th Street)	
		34	30th Street followed by a two-story industrial building (37-28 30th Street)	
South	372	7	Two-story public institution building (37-31 30th Street)	Multi-story residential, mixed-use commercial and industrial buildings
		8	One-story industrial/ warehouse building (37-11 30th Street)	

Direction	Adjoining and Adjacent Properties			Surrounding Properties
	Block No.	Lot No.	Description	
East	372	22	Two-story residential-commercial mixed-use building (30-16 37th Avenue)	31st Street (N and Q subway lines beneath) followed by multi-story mixed-use residential-commercial and commercial office buildings
		8	One-story industrial/ warehouse building (37-11 30th Street)	31st Street (N and Q subway lines beneath) followed by multi-story mixed-use residential-commercial and commercial office buildings

Public infrastructure (storm drains, sewers, and underground utility lines) exists within the streets surrounding the site.

Land use within a half-mile radius is urban and includes residential, commercial, institutional, and light industrial buildings and public parks. The nearest ecological receptor is Dutch Kills Green, located about 2,150 feet southwest of the site. Sensitive receptors, as defined in DER-10, located within a half mile of the site include those listed below:

Number	Name (Approximate distance from site)	Address
1	Dutch Kills Playground (about 0.12 miles northwest of the site)	36th Avenue and Crescent Street Queens, NY 11106
2	The Oliver Wendell Holmes Intermediate School 204 (about 0.12 miles north of the site)	36-41 28th Street Queens, NY 11106
3	Queensbridge Early Childhood Development Center (about 0.15 miles west of the site)	38-11 37th Street Queens, NY 11101
4	PS 112 Dutch Kills (about 0.17 miles northwest of the site)	25-05 37th Avenue Queens, NY 11101
5	Growing up Green Charter School (about 0.23 miles southwest of the site)	39-37 28th Street Queens, NY 11101
6	Baccalaureate School for Global Education (about 0.24 miles northeast of the site)	34-12 36th Avenue Queens, NY 11106
7	A.R.R.O.W. Field House (about 0.27 miles northeast of the site)	35-30 35th Street Queens, NY 11106
8	Newcomers High School (about 0.29 miles southeast of the site)	28-01 41st Avenue Queens, NY 11101
9	PS 166 Henry Gradstein (about 0.32 miles northeast of the site)	33-09 35th Avenue Queens, NY 11106
10	All Children's Child Care (about 0.34 miles northeast of the site)	35-01 24th Street Queens, NY 11106
11	Academy for New Americans (about 0.36 miles southeast of the site)	30-14 30th Street Queens, NY 11102
12	Andrew Landi Early Childhood Development Center (about 0.41 miles northeast of the site)	21-20 35th Avenue Queens, NY 11106
13	Sixteen Oaks Grove (about 0.41 miles northwest of the site)	13-19 37th Avenue Queens, NY 11101
14	PS 111 Jacob Blackwell (about 0.45 miles northeast of the site)	37-15 13th Street Queens, NY 11101
15	Jackson Developmental Center and Children's Services (about 0.47 miles northeast of the site)	36-02 14th Street Queens, NY 11106
16	Playground 35 XXXV (approximately 0.48 miles northeast of the site)	35-01 Steinway Street Queens, NY 11101

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The RI was completed in accordance with Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR) Part 375, DER-10, the NYSDEC Draft BCP Guide (May 2004), and the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006 and subsequent updates). The RI was completed between September 26, 2018 to October 5, 2018, and October 15, 2018 to October 17, 2018 and the RIR was submitted to the NYSDEC and NYSDOH on January 15, 2019. The RI was completed to characterize the nature and extent of contamination at the site.

2.1 Remedial Investigation

The RI consisted of the following:

- A geophysical survey to identify potential underground storage tanks (UST), underground structures, and utilities
- Advancement of 11 soil borings to depths of about 30 to 40 feet below grade surface (bgs) and advancement of two deep soil borings to depths of about 70 to 72 feet bgs, from which 45 soil samples (including 3 quality assurance/quality control [QA/QC] duplicate samples) were collected
- Advancement of 10 shallow soil borings up to 6 feet bgs and collection of 35 soil samples (including two QA/QC duplicate samples) to delineate hazardous levels of chromium
- Installation of 11 groundwater monitoring wells (9 at select shallow boring locations and 2 at deep borings coupled with select shallow monitoring wells) and collection of 18 groundwater samples (including 3 QA/QC duplicate samples)
- Survey and gauging of monitoring wells to evaluate groundwater elevation, flow direction, and depth to product, if any
- Installation of 3 temporary soil vapor probes and 3 temporary sub-slab vapor points and collection of 7 soil vapor samples (including 1 duplicate sample), 3 co-located indoor air samples, and 1 ambient air sample

2.1.1 Geophysical Investigation

On September 26, 2018, NOVA Geophysical Services Inc. (NOVA) of Douglaston, New York completed a geophysical survey under the supervision of a Langan field engineer. NOVA used ground-penetrating radar (GPR) to identify potential USTs and locate buried utilities near each boring location. Borings were relocated as necessary to avoid subsurface utilities and anomalies (other subsurface impediments).

2.1.2 Soil Investigation

Thirteen soil borings were installed by AARCO Environmental Services Corp. (AARCO) of Lindenhurst, New York. Boring locations were selected to evaluate potential Areas of Concern (AOC) and to supplement the previous environmental investigations. Nine soil borings were advanced with Sonic drilling methodologies using a Geoprobe® 8140LC Sonic drill rig, two soil borings were advanced with direct push methodologies using a Geoprobe® 6610DT drill rig, and two soil borings were advanced with direct push methodologies using a Geoprobe® 7822DT drill rig. Soil boring locations from the RI are shown on Figure 4A.

Discrete soil samples were collected from the surface to the final depth of each boring and were visually classified for soil type, grain size, texture, and moisture content. Samples were collected in 5-foot long plastic bag liners from the sonic drill core barrel, and 4-foot long acetate liners from the direct push Geoprobe® 7822DT and Geoprobe® 6610DT.

The soil was screened for visual, olfactory, and instrumental evidence of environmental impacts and was visually classified for soil type, grain size, texture, and moisture content. Instrument screening for the presence of volatile organic compounds (VOC) was performed with a photoionization detector (PID) equipped with a 10.6-electron volt (eV) lamp. A Langan engineer documented the work, logged the soil type, screened the soil samples for environmental impacts, and collected environmental samples for laboratory analyses. Following sample collection, nine borings were converted to groundwater monitoring wells. Additional permanent monitoring wells were installed at two boring locations, adjacent to the original boring location, in order to create a coupled monitoring well set. Soil cuttings were backfilled into the original boring locations that were not converted into permanent monitoring wells and/or containerized into New York City Department of Transportation (NYCDOT)-approved 55-gallon steel drums.

2.1.3 Hazardous Chromium Soil Delineation

Hexavalent and trivalent chromium were identified in shallow soil collected from soil boring SB04 at potentially hazardous concentrations. Subsequent toxicity characteristic leaching procedure (TCLP) analysis identified chromium above the United States Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA) Characteristics of Hazardous Waste in two samples. To further define the extent of chromium impacts at this location, 10 shallow delineation borings were advanced on November 20, 2018. During the hazardous chromium delineation, one boring was advanced adjacent to the original SB04 boring location to 6 feet bgs. Nine additional soil borings were advanced in three radial directions around boring location SB04A, and grab soil samples were collected from 1 to 3 feet bgs, 3 to 5 bgs, and 5 to 6 bgs to delineate the extent of chromium impacted soil.

Hazardous chromium soil boring locations are shown on Figure 4B.

2.1.4 Groundwater Investigation

A Langan field engineer documented conversion of 9 soil borings into permanent groundwater monitoring wells by AARCO during the RI. Groundwater monitoring wells were installed to investigate potential impacts to groundwater associated with the identified AOCs and to characterize groundwater conditions.

Nine of the borings were converted into groundwater monitoring wells. An additional permanent monitoring well was installed adjacent to the original boring location, in order to create a coupled monitoring well set

Following completion of soil borings, the shallow monitoring wells were constructed using 2-inch diameter polyvinyl chloride (PVC) riser pipes attached to 10 to 12-foot-long 0.01-inch slotted screens. Monitoring wells installed to investigate historic fill impacts were constructed so that the well screen straddled the observed groundwater table. The well annulus around the screen of each well was backfilled with No. 1 sand up to about the top of the screen. A minimum of about 1- to 2-foot thick hydrated bentonite seal was installed above the sand pack, and the borehole annulus was backfilled with soil cuttings to the surface. The monitoring wells were finished with flush-mount metal manhole covers encased in concrete.

Deep monitoring wells were constructed using 2-inch diameter PVC riser pipes attached to 5-foot-long 0.01-inch slotted screens, with the slotted screen placed between 60 and 70 feet bgs. The annulus of the borehole was backfilled to about 2 feet above the screen with No. 1 sand and a 2-foot hydrated bentonite seal above the pack. The remainder of the annulus was backfilled with soil cuttings and a hydrated bentonite seal at the surface. To minimize the potential for drag-down of observed contamination to beneath the impermeable layer, all wells were installed as a double-cased well using a Sonic drill rig. An outer casing was advanced to the targeted well depth, and the inner casing was advanced through the outer casing to the targeted depth. The annular space between the outer casing and borehole wall was filled with No. 1 sand and sealed with 2 feet of bentonite approximately 2 feet above the well screen. The remainder of the annular space was backfilled with drill cuttings to the surface.

The top of casing elevations of monitoring wells were surveyed by Langan on October 17, 2018. A Langan field engineer completed synoptic groundwater gauging on October 15, 16 and 17, 2018 using a Solinst 122 oil/water interface probe. Groundwater elevations ranged from el 16.25 to el 18.02. Groundwater monitoring well locations are shown on Figure 5.

2.1.5 Soil Vapor Investigation

Three soil vapor points were installed in an attempt to identify impacts associated with historic site use in the northern portion of the property. Three sub-slab soil vapor points were collected to investigate potential soil vapor intrusion within the on-site buildings in the southwest area of the site in Lot 8. Three indoor air samples were co-located with the sub-slab samples. One duplicate soil vapor and one ambient air sample were collected for QA/QC purposes.

Soil vapor points were installed by AARCO using a Geoprobe® 7822DT drill rig and advanced to depths of about 5 feet bgs. Sub-slab vapor points were installed just below the concrete slab within the existing on-site buildings using a Bosch hammer drill with a 7/8th-inch drill bit. As a QA/QC measure, an inert tracer gas (helium) was introduced into an above-grade sampling chamber to ensure that the soil vapor and sub-slab vapor sampling points were properly sealed above the target sampling depth, thereby preventing subsurface infiltration of ambient air. Direct readings of less than 10 percent helium in the sampling tube were considered sufficient to verify a tight seal at each sample point.

Concurrently with sub-slab and soil vapor sampling, three co-located indoor air samples and one ambient air sample were collected at about 4 to 5 feet above ground (i.e., at breathing height) to evaluate potential matrix interferences and external influences on soil vapor quality.

Soil vapor, sub-slab vapor, indoor air, and ambient air sample locations are shown on Figure 6.

2.1.6 Samples Collected

Forty-five soil samples, including three field duplicates, were collected for laboratory analysis. A minimum of three grab soil samples were collected for laboratory analysis from each boring location to investigate potential AOCs and to provide vertical and horizontal delineation of identified impacts. For AOC 1, samples were collected within the historic fill material. For AOCs 2, 4 and 5, samples were collected from native material and the interval of the groundwater interface. For AOC 3, representative samples were collected since visual, olfactory, or instrumental evidence of a chemical or petroleum release was not apparent.

Thirty-five discrete (grab) samples were collected (including two QA/QC duplicate samples) to delineate shallow chromium impacts from 1 to 6 feet bgs. Soil samples were collected in the field from the delineation soil borings; however, not all samples were analyzed initially. The samples collected closest to the known hazardous material were analyzed first. When sample analysis indicated hazardous concentrations, the next closest samples were analyzed. When sample analysis indicated non-hazardous concentrations, no additional samples were analyzed. In total, 14 discrete samples were submitted for analysis of total and TCLP chromium.

Eighteen groundwater samples, including one sample from each well, three samples for emerging contaminants, and three duplicate samples were collected into laboratory-supplied glassware, packed with ice to maintain a temperature of 4°C, and transported via courier service to Alpha Analytical Laboratories under chain-of-custody protocol. In addition, nine QA/QC samples (including three duplicates, four matrix spike/ matrix spike duplicate [MS/MSD] samples, and two field blanks) were collected. Groundwater samples were analyzed for Part 375/Target Compound

List (TCL) VOCs, Semivolatile organic compounds (SVOC), and polychlorinated biphenyls (PCB), Part 375/Target Analyte List (TAL) total and dissolved metals, pesticides, and herbicides. Three samples were analyzed for emerging contaminants (including 1,4-dioxane, and per- and polyfluoroalkyl substances [PFAS]).

Three soil vapor, three sub-slab soil vapor, and three indoor air samples were collected into laboratory-supplied, batch-certified, 2.7-Liter Summa® canisters that were calibrated for a sampling rate of about 0.0045 liters per minute (L/min) over about 480 minutes of sampling. For QA/QC purposes, one exterior ambient air sample was collected in the vacant lot in Lot 8.

All soil, groundwater, and soil vapor samples were submitted for laboratory analysis to Alpha Analytical Inc., an NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory located in Westborough, Massachusetts.

2.1.7 Chemical Analysis

The laboratory analyses performed on the soil, groundwater, soil vapor, and ambient air samples collected are summarized below by media.

Soil samples were analyzed for the following parameters:

- Part 375-listed VOCs via USEPA Method 8260C
- Part 375-listed SVOCs via USEPA Method 8270D
- PCBs via USEPA Method 8082A
- Part 375-listed pesticides via USEPA Method 8081B
- Part 375-listed herbicides via USEPA Method 8151A
- Part 375-listed metals including hexavalent and trivalent chromium via USEPA Methods 6010C, 7471B, and 7196A
- Total cyanide via USEPA Method 9010C/9012B

Groundwater samples collected were analyzed for the following parameters:

- TCL VOCs and 1,4-dioxane via USEPA Method 8260C
- TCL SVOCs via USEPA Method 8270D
- PCBs via USEPA Method 8082A
- Part 375-listed pesticides via USEPA Method 8081B
- Part 375-listed herbicides via USEPA Method 8151A
- TAL metals (total and dissolved) via USEPA Methods 6020A and 7470A

- Perfluorinated chemicals (PFCs) via USEPA Method 537 (MW01, MW05A and MW07 only)

Soil vapor, Sub-slab soil vapor, indoor air, and ambient air samples were analyzed for VOCs via USEPA Method TO-15.

2.1.8 Remedial Investigation Findings Summary

The findings summarized herein are based on qualitative data (field observations and instrumental readings) and laboratory analytical soil, groundwater, and soil vapor sample results. Soil sample results are summarized on Figure 4A and 4B, groundwater sample results are summarized on Figure 5, and soil vapor sample results are summarized on Figure 6.

1. Stratigraphy: The site stratigraphy consists of a historic fill layer beneath concrete-paved surfaces that is predominately brown, medium-grained sand with varying amounts of gravel, silt, brick, coal, metal, clay, slag, glass, ceramics and concrete to depths ranging from 2 to 8.5 feet bgs. Fill material was underlain by a native brown fine- to coarse-grained sand layer observed to depths of about 32 to 69 feet bgs (about el 8 and el -25, respectively), with occasional layers of silt. In one deep boring advanced to 70 feet bgs (SB05), the sand layer is underlain by an olive clay layer, which was observed to depths of about 59 to 70 feet bgs (about el -16.7 to -27.7, respectively). In a second deep boring advanced in the northern portion of the site (SB13), weathered rock fragments, potentially indicative of weathered bedrock or glacial till were observed between 69 and 72 feet bgs (about el -25 to el -28). Continental glaciation at the end of the Pleistocene and beginning of the Holocene epochs likely caused this distinctive stratigraphy identified beneath the fill layer. Melting of the Wisconsin Glacier contributed glacial outwash deposits to the region. Bedrock was not encountered in any of the soil borings.

2. Hydrogeology: Depth to groundwater was measured between about 22.76 to 27.77 feet bgs, with corresponding groundwater elevations ranging from about el 16.25 to el 18.02. The groundwater elevation is highest in the northern region of the site and appears to flow south toward Sunnyside Yards and Newtown Creek. The relative progression of the contours demonstrates a horizontal flow pattern across the site, with a downward vertical gradient toward the south.

3. Historic Fill: Fill material was identified below surface cover to depths ranging from 2 to 8.5 feet bgs. Contaminants related to historic fill material include SVOCs, metals, and pesticides which were detected at concentrations above Title 6 NYCRR Part 375 Unrestricted Use (UU), Restricted Use-Restricted Residential (RURR) and/or Protection of Groundwater (PG) soil cleanup objectives (SCO) within this layer. SVOCs and dissolved metals potentially attributed to historic fill were also identified in groundwater at

concentrations above the NYSDEC Title 6 NYCRR Part 703.5 and the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values for Class GA water (collectively known as NYSDEC SGVs).

4. Hazardous Chromium in Historic Fill: Chromium was detected above the RCRA Maximum Concentration of Contaminants for the Toxicity Characteristic in an 18-foot by 15-foot area of shallow fill (up to 8 feet) centered on boring SB04. In addition, groundwater beneath this location contained hexavalent and total chromium at concentrations above SGVs. Hazardous chromium and chromium impacts to groundwater may be associated with chrome plating related to the historical use of the site as a plastics manufacturer.

5. Chlorinated Volatile Organic Compound (CVOC)-Impacted Soil Vapor: Tetrachloroethene (PCE) was detected in soil vapor and sub-slab vapor samples collected across the site. Based on a comparison of PCE concentrations in sub-slab vapor and indoor air to the NYSDOH Decision Matrices, vapor mitigation is recommended for the future development. A site source of PCE was not identified. Carbon tetrachloride was detected in sub-slab vapor samples collected in the southern portion of the site. Based on the comparison of carbon tetrachloride concentrations in sub-slab vapor and indoor air to the NYSDOH Decision Matrices, monitoring is recommended for future development. A site source of carbon tetrachloride was not identified.

6. Sufficient analytical data were gathered during the RI to establish site-specific soil cleanup levels and to develop a remedy for the site. The remedy, which is described in this RAWP, addresses impacts to soil, groundwater, and soil vapor described in the RIR.

2.2 Significant Threat

The NYSDEC and NYSDOH have determined that this site does not pose a significant threat to human health and the environment. Notice of that determination was provided in the Fact Sheet distributed in May 2019 for public review.

2.3 Site History

2.3.1 Past Uses and Ownership

Historical Sanborn Fire Insurance Maps indicate that the site was an undeveloped vacant lot until at least 1898. The 1915 map indicates the northern portion of the site was occupied by "McLaughlins Garage" and a residential development, while the southern portion of the site remained vacant. By 1920, the existing on-site warehouse was constructed and beginning in 1930 was occupied by a plastics manufacturer. The Marblette Corp. Mfg. of Plastic Materials occupied the site from at least 1930 to about 1980. During this time period, plastic was typically made using a mixture of synthetic chemicals, chlorinated solvents, and petroleum products.

Following 1980, the site was occupied by a warehousing and distribution center for lighting and staging equipment.

Historic documents indicate two USTs, including a 2,000-gallon and 550-gallon UST, and a 5,000-gallon aboveground storage tank (AST) were closed-in-place on July 7, 2000. The documents were prepared by U.S.A. Tank Maintenance, Inc. and were provided to the NYC Fire Department for documentation purposes. The tanks were not registered on the NYSDEC Petroleum Bulk Storage (PBS) database. Historical records documented the 5,000-gallon AST was installed in 1947, the 2,000-gallon UST was installed in 1933, and the 550-gallon UST was installed in 1941. According to historic Sanborn Fire Insurance Maps, a 10,000-gallon tank was also depicted at the site from 1947 to 1950; however the tank was not listed on any regulatory records. The property was listed in the Leaking Tanks (LTANK) database due to a tank test failure on April 21, 1998. According to records provided by NYSDEC, three soil borings were advanced in the vicinity of the tank in February 2000 as part of an investigation for a proposed building expansion.

2.3.2 Previous Environmental Reports

Previous environmental reports were reviewed as part of this RAWP and are summarized in chronological order below. The previous environmental reports are included in Appendix C.

- Phase I Environmental Site Assessment (ESA), prepared by Hillman Consulting LLC, Dated April 8, 2014
- Focused Subsurface Site Investigation, prepared by Merritt Environmental Consulting Corp., Dated July 7, 2014
- Limited Subsurface Investigation, prepared by Hydro Tech Environmental Corp., dated December 2017

Phase I ESA, prepared by Hillman Consulting LLC, Dated April 8, 2014

The Phase I ESA was completed in general accordance with ASTM International (ASTM) Standard E1527-13 and the USEPA All Appropriate Inquiries (AAI) Rule. The following recognized environmental conditions (REC) were identified:

- <u>REC 1 - Historical On-Site Operations</u>: The site historically operated as a plastics manufacturer (The Marblette Corp. Mfg. of Plastic Materials) from at least 1930 to about 1980. During this time period, plastic was typically made using a mixture of synthetic chemicals, solvents, and petroleum products. Leaks or spills of petroleum products, solvents, and/or other hazardous materials associated with plastics manufacturing during the 50 years of operation may have adversely affected soil, groundwater and/or soil vapor at the site.

- REC 2 - Historic Petroleum Storage and Use: Documents indicate two USTs (2,000-gallon and 550-gallon USTs) and a 5,000-gallon AST were closed-in-place on July 7, 2000. Historical records documented the 5,000-gallon AST was installed in 1947, the 2,000-gallon UST was installed in 1933, and the 550-gallon UST was installed in 1941. According to historic Sanborn Fire Insurance Maps, a 10,000-gallon tank was also depicted within the site from 1947 to 1950; however the tank was not listed on any regulatory records. The property was listed in the LTANK database due to a tank test failure on April 21, 1998. According to records provided by NYSDEC, three soil borings were advanced in the vicinity of the tank in February 2000 as part of an investigation for a proposed building expansion. No evidence of impacts to the subsurface was noted during the investigation, and NYSDEC closed the LTANKS case on September 15, 2004; however, undocumented spills or releases of petroleum products associated with the tanks or piping may have adversely affected soil, groundwater, or soil vapor beneath the site.
- REC 3 - Historical Use of Surrounding Properties: Historical uses of adjoining and surrounding properties included auto repair facilities (1936, 1947-1950, 1999-2010), gasoline filling stations (1947-1950, 1970-1996, 2001-2006) dry cleaners (2004-2009), and various manufacturing facilities (1970-1996, 2001-2006). Records identified multiple lots in the surrounding area assigned with an Environmental Designation (E-Designation) for Hazardous Materials. The Hazardous Materials E-Designation requires appropriate subsurface investigation and remediation, if necessary, of each property assigned prior to redevelopment. Undocumented spills or releases of petroleum products or hazardous substances associated with historical uses of nearby properties including petroleum bulk storage may have adversely affected groundwater or soil vapor beneath the site.

Focused Subsurface Site Investigation, prepared by Merritt Environmental Consulting Corp., Dated July 7, 2014

Merritt Environmental Consulting Corp. (Merritt) completed a Limited Subsurface Site Investigation in June 2014 to determine if soil and groundwater conditions were impacted as a result of the historical use as a plastics manufacturing and historical petroleum bulk storage on site. The investigation included a geophysical survey, advancement of six soil borings, installation of four temporary groundwater monitoring wells, and collection of soil and groundwater samples. Field observations and laboratory analytical results are summarized below:

- Geophysical Survey: The geophysical survey identified two subsurface anomalies in locations consistent with the reported closed-in-place 2,000-gallon, and 550-gallon USTs. The 2,000-gallon UST was identified in the sidewalk along 31st Street, which adjoins Lot 8 to the east. The 550-gallon UST was identified in the sidewalk along 30th Street, which adjoins Lot 8 to the west. Abandoned vent and fill lines were observed in the vicinity of the closed-in-place 5,000-gallon AST located in the east-central portion of Lot 8.

- Soil: Four soil borings were advanced up to 32 feet bgs using a track-mounted GeoProbe® rig in the vicinity of an oil/water separator and closed-in-place 2,000-gallon UST (B-3), along the western portion of the site (B-4), and in the northwest exterior stockyard/storage area (B-5 and B-6). Two soil borings (B-1 and B-2) were advanced to six feet bgs in the vicinity of the closed-in-place 5,000-gallon heating oil AST. No evidence of petroleum impacts (e.g., staining, odors or PID readings above background) was observed during the soil boring investigation. Soil samples were analyzed for VOCs, SVOCs and PCBs. With the exception of methylene chloride (concentration of 0.004 milligrams per kilogram [mg/kg]), no VOCs were detected in soil samples. In addition, no SVOCs or PCBs were detected in soil samples.

- Groundwater: One VOC, chloroform (maximum concentration of 20 micrograms per liter [µg/L]), was detected in monitoring well B-3GW at a concentration above NYCRR Part 703.5 Groundwater Quality Standards (GQS). CVOCs including PCE (concentration of 3.5 µg/L in monitoring well B-3GW) and 1,1,1-trichloroethane (concentration of 2.2 µg/L in monitoring well B-4GW) were detected in two monitoring wells along the eastern and western perimeters of the site, but at concentrations below the NYSDEC GQS.

Limited Subsurface Investigation, prepared by Hydro Tech Environmental Corp., dated December 2017

Hydro Tech Environmental Corp. (Hydro Tech) performed a Limited Subsurface Investigation at the site in December 2017 to determine, to the extent practical, the nature and extent of contamination in soil, groundwater, and soil vapor. The investigation included advancement of nine soil borings, installation of five groundwater monitoring wells, installation of six sub-slab soil vapor sampling points, installation of three soil vapor sampling points, and collection of soil, groundwater, soil vapor, sub-slab vapor, indoor air, and outdoor ambient air samples. Langan was provided with copies of the site sampling location plan, and analytical result summary tables for soil, groundwater, and soil vapor samples collected during the limited investigation. Laboratory analytical results are summarized below:

- Soil: Metals including copper, mercury and lead were detected at concentrations above Title 6 NYCRR Part 375 RURR SCOs. Metals including barium, hexavalent chromium, copper, lead and zinc were detected at concentrations above Part 375 UU and/or RURR SCOs. One VOC, acetone, was detected at a concentration above the Part 375 UU SCOs.

- Groundwater: Dissolved metals including magnesium, manganese, and sodium were detected at concentrations above the NYSDEC GQS. PCE was detected at concentrations ranging between 0.3 and 1.5 μg/L in three monitoring wells located in the west-central portion of the site. Detected concentrations of PCE in groundwater samples were below the NYSDEC GQS.

- Indoor Air, Sub-Slab Vapor, and Soil Vapor: Indoor air analytical results were compared to the Air Guidance Values (AGV) specified in the NYSDOH guidance document. PCE was detected at concentrations of 66 to 68 micrograms per cubic meter (μg/m^3) in indoor air sample, which are two-times greater than the NYSDOH AGV of 30 μg/m^3. PCE concentrations detected in sub-slab vapor samples ranged from 7 μg/m^3 to 12,000 μg/m^3. Trichloroethene (TCE) concentrations detected in sub-slab vapor samples ranged from 7.70 μg/m^3 to 16 μg/m^3.
- In addition, NYSDOH provides decision matrices for eight CVOCs (carbon tetrachloride, 1,1-dichloroethene, cis-1,2-dichloroethene, TCE, methylene chloride, PCE, 1,1,1-trichloroethane, and vinyl chloride). The decision matrices recommend a range of activities (e.g., monitor, mitigate) based on the soil vapor and sub-slab and indoor air sample results collected. Two of the eight VOCs that can be evaluated using the NYSDOH decision matrices were detected in sub-slab soil vapor samples (PCE and TCE). Based on the concentrations detected, the NYSDOH decision matrices recommend mitigation for PCE and monitoring for TCE.

2.4 Geology and Hydrogeology

Geologic and hydrogeologic observations are described below. Soil boring logs, a groundwater contour map, and groundwater monitoring well construction logs are appended to the RIR.

2.4.1 Historic Fill Material

The concrete-paved surfaces are underlain by a historic fill layer that extends from surface grade to between about 2 to 8.5 feet bgs. The fill layer was most shallow in the southern portion of the site and deepest in the northern portion of the site. The historic fill predominantly consisted of brown, medium-grained sand with varying amounts of gravel, silt, brick, coal, metal, clay, slag, glass, ceramics and concrete.

2.4.2 Native Soil

Fill material is underlain by a native brown, fine- to coarse-grained sand layer observed to depths of about 32 to 69 feet bgs (about el 8 and el -25, respectively), with occasional layers of silt ranging in thickness from about 4 inches to 3 feet. In one deep boring advanced to 70 feet bgs (SB05), the sand layer is underlain by an olive clay layer, which was observed to depths of about 59 to 70 feet bgs (about el -16.7 to -27.7, respectively). In a second deep boring advanced in the northern portion of the site, weathered rock fragments, potentially indicative of weathered bedrock or glacial till were observed between 69 and 72 feet bgs (about el -25 to el -28).

2.4.3 Bedrock

The USGS "Bedrock and Engineering Geologic Maps of Bronx County and Parts of New York and Queens Counties, New York" indicates that the bedrock underlying the site is part of the Hartland Formation. Competent bedrock was not encountered during the RI.

2.4.4 Hydrogeology

Synoptic groundwater level measurements were collected on October 15, 16, and 17, 2018. Depth to groundwater was measured between about 22.76 to 27.77 feet bgs, with corresponding groundwater elevations ranging from about el 16.25 to el 18.02 NAVD88. The groundwater elevation is highest in the northern region of the site and appears to flow south toward the Sunnyside Yards and Newtown Creek. The relative progression of the contours demonstrates a horizontal flow pattern across the site, with a downward vertical gradient toward the south. Underground utilities and other subsurface structures may locally influence the direction of groundwater flow.

2.5 Contaminant Conditions

2.5.1 Conceptual Site Model

A conceptual site model (CSM) has been developed based on the findings of the RI. The purpose of the CSM is to develop a simplified framework for understanding the distribution of impacted materials, potential migration pathways, and potentially complete exposure pathways.

<u>Potential Sources of Contamination</u>

Potential sources of contamination have been identified and include historic fill, historic site usage, and off-site sources.

Chromium detected in soil and groundwater is potentially related to chrome plating associated with the former use of the site as a plastic manufacturer.

Historic fill material encountered beneath surface cover to depths ranging from about 2 to 8.5 feet bgs originated from unidentified source areas and was placed as backfill at an unknown time, prior to the development of the current on-site buildings. SVOCs and metals detected at concentrations above the Part 375 UU, PG and RURR SCOs, with the exception of chromium, is related to the nature of the historic fill.

CVOCs were detected in soil vapor; however, the site investigation found no on-site sources of chlorinated VOCs in soil or groundwater. CVOC concentrations in sub-slab/soil vapor originate from an unidentified site source or an off-site source.

Exposure Media and Contaminants of Concern

Impacted media include soil, groundwater, and soil vapor. Analytical data suggests that historic fill contains SVOCs, metals and pesticides up to about 7.5 feet bgs in exceedance of UU SCOs. Historic fill-related metals, including hazardous chromium (central-east portion of the site only) were detected in soil across the site. Polycyclic Aromatic Hydrocarbons (PAHs) were identified in historic fill material in the northeast corner of the site. Groundwater was observed at depths ranging from 22.76 to 27.77 feet bgs, and impacts include VOCs, SVOCs, and metals. Soil vapor is impacted with CVOCs including PCE and TCE (limited to sub-slab soil vapor samples).

Receptor Populations

The site is currently vacant and secured with locked roll-up gates and/or construction fencing, with receptors restricted to authorized personnel. Under future conditions, human receptors may include construction and remediation workers, authorized guests visiting the site, and the public adjacent to the site, as well as potential future building occupants.

2.5.2 Description of AOCs

Based on site observations, site development history, and the findings of the previous environmental reports, four AOCs were identified. This section discusses the results of the RI with respect to the AOCs.

AOC 1: Historic Fill

Historic fill, which is ubiquitous across the site footprint, was encountered to depths ranging from 2 to 8.5 feet bgs. The historic fill predominantly consists of brown, medium-grained sand with varying amounts of gravel, silt, brick, coal, metal, clay, slag, glass, ceramics and concrete. VOCs, SVOCs, metals, and pesticides were detected at concentrations above the Part 375 UU, PG and/or RURR SCOs in samples of historic fill, with the deepest exceedance identified at 7.5 feet bgs. Concentrations of PAHs and metals are likely associated with the general quality of the fill placed at the site or historical industrial uses of the site. The origin of chromium in historic fill material is associated with historical plastics manufacturing.

Similar compounds detected in soil were also identified in groundwater at concentrations above NYSDEC SGVs. SVOC and metals concentrations detected in groundwater are likely related to historic fill material. Magnesium, manganese, and sodium are regionally present in groundwater throughout New York City. The analytical data indicate that the contaminants associated with historic fill have not impacted soil vapor.

AOC 2: Historical Site Use

The site historically operated as a plastics manufacturer (The Marblette Corp. Mfg. of Plastic Materials) from at least 1930 to about 1980. During this time period, plastic was typically made using a mixture of synthetic chemicals, solvents, and petroleum products. Releases of petroleum products, solvents, and/or other hazardous materials associated with plastics manufacturing during the 50 years of on-site operations may have adversely affected soil, groundwater and/or soil vapor.

Concentrations of several PAHs and metals are likely associated with the general quality of the historic fill material. Chromium-impacted soil and groundwater may be associated with chrome plating related to the historical use of the site as a plastics manufacturer. Chloroform detected above NYSDEC SGVs are disinfection byproducts associated with chlorinated drinking water. Chloroform and PCE were detected in soil samples collected from the former plastics manufacturing warehouses on site and the former stock yard, but at concentrations below the UU and/ or PG SCOs. A source of VOCs associated with historical use of the site was not identified in soil or groundwater. A source of PCE in soil vapor was not identified.

AOC 3: Historical and Suspect Petroleum Storage on Site

Historical records indicate one 550-gallon UST located in the sidewalk adjoining the site along 30th Street. This UST was installed in 1941 and closed-in-place on July 7, 2000. According to Sanborn Fire Insurance Maps, a 10,000-gallon tank was also depicted at the site from 1947 to 1950 in the east-central part of the site; however the tank was not listed on any regulatory records. Undocumented releases of petroleum products associated with the closed-in-place UST or suspect 10,000-gallon UST or associated piping may have adversely affected soil, groundwater, or soil vapor. Petroleum-related contamination was not observed in soil, groundwater or soil vapor samples at the site. At least one of the former petroleum storage tanks remain on site and must be decommissioned and registered in accordance with NYSDEC PBS regulations.

AOC 4: PCE and TCE Impacted Soil Vapor

During the 2017 Limited Subsurface Investigation by Hydro Tech, PCE and TCE were detected in soil vapor and sub-slab vapor samples throughout the site. During the RI performed by Langan, PCE concentrations detected in soil vapor ranged from about 7.39 $\mu g/m^3$ to 26.9 $\mu g/m^3$. PCE was detected in the sub-slab soil vapor samples at concentrations ranging from 64.6 $\mu g/m^3$ to 8,270 $\mu g/m^3$. PCE's daughter product, TCE, was detected in sub-slab soil vapor at concentrations ranging from 21.8 $\mu g/m^3$ to 22.3 $\mu g/m^3$. Carbon tetrachloride was also detected at a concentration of 11.3 $\mu g/m^3$ in one sub-slab soil vapor sample. Based on a comparison of carbon tetrachloride and TCE concentrations detected in indoor air and sub-slab vapor to NYSDOH decision matrices, no further action is recommended for TCE, and monitoring is recommended for carbon tetrachloride.

A source of PCE was not identified. Based on a comparison of PCE concentrations detected in indoor air and sub-slab vapor to NYSDOH decision matrices, mitigation is recommended.

2.5.3 Nature and Extent of Contamination

This section evaluates the nature and extent of soil, groundwater, and soil vapor contamination. The nature and extent of the contamination is derived from a combination of field observations and analytical data detailed in the RIR. Soil sample results are summarized on Figure 4A and 4B, groundwater sample results are summarized on Figure 5, and soil vapor sample results are summarized on Figure 6.

Soil Contamination

Contaminants related to historic fill material include SVOCs, pesticides, and metals. Historic fill is present across the site to depths ranging from about 2 to 8.5 feet bgs. Four soil samples collected from the historic fill contained concentrations of SVOCs (including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) above the UU, RURR, and/or PG SCOs. Nine soil samples, predominantly in the historic fill layer up to 7.5 feet bgs, contained concentrations of metals (including copper, chromium, lead, mercury, nickel, and zinc) above the UU, RURR, and/or PG SCOs. One pesticide, 4,4'-DDT, was detected in one fill sample in the northern portion of Lot 21 above the UU SCO.

Hexavalent and trivalent chromium were identified in soil from SB04 at potentially hazardous concentrations. Subsequent TCLP analysis identified chromium above the USEPA RCRA characteristics hazardous waste limit in two samples. The extent of hazardous chromium was delineated and determined to extend to a depth of 8 feet bgs over a roughly 18-foot by 15-foot area in the northeast part of the 3-story vacant warehouse building. The source of chromium-impacted soil is historical site use as a plastics manufacturer.

Groundwater Contamination

Evaluation of the groundwater analytical results identified VOCs, SVOCs, chromium, and naturally occurring metals above applicable regulatory standards. Total and hexavalent chromium were detected at concentrations above SGVs and are related to historical site use as a plastics manufacturer. The source of SVOC and other metals concentrations detected in groundwater is historic fill material, and not indicative of a release associated with historical site use. Antimony, magnesium, manganese, and sodium are also regionally present in groundwater throughout New York City. Chloroform, which is a disinfection byproduct associated with chlorinated drinking water, was also detected at concentrations above the NYSDEC SGVs in six groundwater samples. PCE was detected at a concentrations below the NYSDEC SGVs. A site source of PCE was not identified.

Soil Vapor Contamination

Total VOCs in soil vapor samples ranged from 832 μg/m³ in SV01 to 1,100 μg/m³ in SV02, as compared to 45.8 μg/m³ in the outdoor ambient air sample AA01. PCE was detected at concentrations ranging from 7.39 μg/m³ in SV03 to 26.9 μg/m³ in SV02 (PCE concentration in ambient air was 1.3 μg/m³). PCE was detected in the sub-slab soil vapor samples at concentrations ranging from 64.6 μg/m³ in SSV01 to 8,270 μg/m³ in SSV02. A comparison of the sub-slab soil vapor and indoor air analytical data to the NYSDOH Decision Matrix (Matrix B) indicates that mitigation is recommended for PCE. TCE was detected in the sub-slab soil vapor sample SSV03 and duplicate sample at a concentration of 21.8 and 22.3 μg/m³, respectively, and in the co-located indoor air sample (IA03) at a concentration of 0.156 μg/m³. A comparison of the sub-slab soil vapor and indoor air analytical data to the NYSDOH Decision Matrix (Matrix A) indicates that no further action is recommended for TCE. Carbon tetrachloride was detected in the sub-slab soil vapor sample duplicate of SSV03 at a concentration of 11.3 μg/m³, and in the co-located indoor air sample (IA03) at a concentration of 0.472 μg/m³. A comparison of the sub-slab soil vapor and indoor air analytical data to the NYSDOH Decision Matrix (Matrix A) indicates that monitoring is recommended for carbon tetrachloride.

2.6 Qualitative Human Exposure Assessment

Human health exposure risk was evaluated for both current and future site and off-site conditions, in accordance with DER-10. The assessment includes an evaluation of potential sources and migration pathways of site contamination, potential receptors, exposure media, and receptor intake routes and exposure pathways.

In addition to the human health exposure assessment, DER-10 requires an on-site and off-site Fish and Wildlife Resources Impact Analysis (FWRIA) if certain criteria are met. Based on the requirements stipulated in Section 3.10 and Appendix 3C of DER-10, there was no need to prepare an FWRIA for the site. The same qualitative human health exposure assessment for the site is also presented in the RIR.

2.6.1 Potential Exposure Pathways – On-Site

Current Conditions

Human exposure to contaminated soil is limited as impermeable building structures and a concrete slab are present throughout the existing building on Lot 8, and the majority of the open stockyard in the northern portion of Lot 8. In places where no building slab exists or may be compromised (i.e. within Lot 21), human exposure is limited to site owners and authorized visitors. Access to the site is restricted by wooden construction fences and/or locked gates; therefore, human exposure to contaminated soil is limited. The potential pathway is through dermal absorption, inhalation and ingestion.

Groundwater in this area of New York City is not used as a potable water source. There is a potential exposure pathway during groundwater sampling associated with site investigation. The potential pathway is through dermal absorption, inhalation and ingestion.

Soil vapor is impacted by VOCs and CVOCs. There is a potential exposure pathway during sub-slab soil vapor sampling associated with investigation and intrusion through potential cracks in the building's slabs. The potential pathway is through inhalation. The sub-slab soil vapor analytical results for the existing on-site building in Lot 8 suggest that this pathway may exist, as the detected PCE concentrations categorized by the NYSDOH Guidance Matrix 2 recommend mitigation. The building is currently vacant and is only accessible to the owners and authorized visitors.

Construction/Remediation Condition

Construction and remediation may result in potential exposures to site contaminants in the absence of a Construction Health and Safety Plan (CHASP) and a Community Air Monitoring Plan (CAMP). Construction and remedial activities will likely include demolition, excavation and off-site disposal of impacted soil, and construction of foundation components. In the absence of a CHASP and CAMP, this scenario presents the potential for exposure of soil contaminants to construction and remediation workers via dermal absorption, ingestion, and inhalation of vapors and particulate matter. This exposure pathway will be marginalized through the implementation of the CHASP, CAMP, and vapor and dust suppression techniques.

Proposed Future Conditions

Currently, the contemplated project includes a mixed-use residential, commercial, and light manufacturing development with one full cellar level. New development will incorporate a cover system across the site and vapor mitigation measures. These measures will prevent human exposure to impacted soil and groundwater and potential soil vapor intrusion.

There is no pathway for ingesting groundwater contaminant of concerns (COC), since the site and surrounding areas obtain their drinking water supply from surface water reservoirs located upstate and not from groundwater. Future conditions will likely have a deed restriction on site and groundwater use to prevent exposure to residual contamination.

As necessary, institutional controls will require maintenance of engineering controls and will serve to further mitigate exposure under future conditions.

2.6.2 Potential Exposure Pathways – Off-Site

Soil vapor may migrate off-site vertically through the subsurface and dissipate and dilute with ambient air in instances where the vacant Lot 21 surface is compromised or during site construction/remediation.

The potential off-site migration of site soil contaminants is not expected to result in a complete exposure pathway for current, construction and remediation, or future conditions for the following reasons:

- The site is located in an urban area and predominantly covered with continuous relatively impervious surface covering (i.e. building foundations and concrete paving)
- During site redevelopment remediation and construction, the following protective measures will be implemented:
    - A site-specific HASP including a CAMP will be implemented to protect on-site personnel and to monitor the perimeter of the site to mitigate off-site migration of particulates and VOCs during construction.
    - Air monitoring will be conducted for particulates (i.e., dust) and VOCs during intrusive activities as part of a CAMP. Dust and/or vapor suppression techniques will be employed to limit potential for off-site migration of soil and vapors.
    - Vehicle tires and undercarriages will be washed as necessary prior to leaving the site to prevent tracking material off-site.
    - A soil erosion/sediment control plan will be implemented during construction to control off-site migration of soil.

2.6.3 Evaluation of Human Health Exposure

Based upon the CSM and the review of environmental data, partial on-site exposure pathways appear to be present under current conditions, and in the absence of institutional and engineering controls, complete on-site exposure pathways could potentially exist in construction/remediation and future conditions.

Complete exposure pathways have the following five elements: 1) a contaminant source; 2) a contaminant release and transport mechanism; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population.

<u>Current Conditions</u>

Contaminant sources include historic fill with elevated levels of SVOCs, metals, and pesticides; PAH and metals impacted soil and groundwater; and CVOC-impacted soil vapor.

Contaminant release and transport mechanisms include contaminated soil transported as dust (dermal, ingestion, inhalation), and existing soil vapor contaminants (inhalation). Under current conditions, the likelihood of human exposure is limited, as 1) Site access is restricted to employees, ownership and authorized visitors; and 2) impermeable concrete surfaces and building foundations cover the majority of the site.

Construction/Remediation Activities

During development and remediation, the contaminant sources are the same as for current conditions. Points of exposure include disturbed and exposed soil during excavation, dust and organic vapors generated during excavation, and contaminated groundwater that will be encountered during excavation and/or dewatering operations. Routes of exposure include ingestion and dermal absorption of contaminated soil and groundwater, inhalation of organic vapors arising from contaminated soil and groundwater, and inhalation of dust arising from contaminated soil. The receptor population includes construction and remediation workers and, to a lesser extent, the public adjacent to the site.

The potential for completed exposure pathways is present since all five elements exist; however, the risk will be minimized by the implementation of appropriate health and safety measures, such as monitoring the air for organic vapors and dust, using vapor and dust suppression measures, cleaning truck undercarriages before they leave the site to prevent off-site soil tracking, maintaining site security, and wearing the appropriate personal protective equipment (PPE).

Proposed Future Conditions

For the proposed future conditions, residual contaminants may remain on-site, depending on the selected remedy, and would, to a lesser extent, include those listed under current conditions. If institutional and/or engineering controls are not implemented, points of exposure include potential cracks in the foundation or lower-level slab of the proposed development, and exposure during any future soil-disturbing activities. Routes of exposure would be limited to inhalation of vapors entering the buildings. The receptor population includes potential building tenants and/or employees, visitors and maintenance workers. The possible routes of exposure can be avoided or mitigated by the installation of engineering controls, such as soil vapor mitigation measures and/or a site capping system, and the implementation of institutional controls, such as a Site Management Plan (SMP).

2.6.4 Human Health Exposure Assessment Conclusions

1. Under current conditions, there is a marginal risk for exposure. The primary exposure pathways are dermal contact, ingestion and inhalation of soil, soil vapor, or groundwater by authorized site visitors in instances where the integrity of the impermeable site cover

is compromised. The exposure risks can be avoided or minimized by following the appropriate HASP and vapor and dust suppression measures, and by implementing a CAMP during intrusive activities.

2. In the absence of institutional and engineering controls, there is a moderate risk of exposure during the construction and remediation activities. The primary exposure pathways are:

    a. Dermal contact, ingestion and inhalation of contaminated soil, groundwater or soil vapor by construction workers.

    b. Dermal contact, ingestion and inhalation of soil (dust) and inhalation of soil vapor by the community in the vicinity of the site.

    These can be avoided or minimized by performing community air monitoring and by following the appropriate health and safety, vapor and dust suppression, and site security measures outlined in a site-specific HASP.

3. The existence of a complete exposure pathway for site contaminants to human receptors under future conditions is unlikely, as contaminant sources will likely be removed during site development, and if any residual soil remains, the impermeable foundation cover would serve as a cap. Regional groundwater is not used as a potable water source in New York City, so exposure to regional groundwater contaminants is unlikely. The potential pathway for soil vapor intrusion into the buildings would be addressed through the use of soil vapor mitigation measures (e.g., vapor barrier, sub-membrane depressurization system, or ventilated parking garage), thereby minimizing the risk of exposure to contaminated sub-slab soil vapor.

4. It is unlikely that a complete exposure pathway exists for the migration of site contaminants to off-site human receptors for current, construction phase, or future conditions. Monitoring and control measures would be used during investigation and construction to prevent completion of this pathway. Under future conditions, the site will be remediated and, if necessary, engineering controls may be implemented (e.g. site-wide cap and a waterproofing/ vapor barrier) to prevent completion of this pathway.

2.7 Remedial Action Objectives

The following Remedial Action Objectives (RAO) have been identified for this site.

2.7.1 Soil

RAOs for Public Health Protection:

- Prevent ingestion/direct contact with contaminated soil

- Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil or contaminated soil in particulate form

RAOs for Environmental Protection:

- Prevent migration of contaminants that would result in groundwater or surface water contamination

2.7.2 Groundwater

RAOs for Public Health Protection:

- Prevent ingestion of groundwater with contamination levels exceeding drinking water standards
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater
- Reduce dissolved contaminant concentrations in groundwater and prevent off-site migration.

2.7.3 Soil Vapor

RAOs for Public Health Protection:

- Mitigate the risk of impacts to public health resulting from existing, or the potential for, soil vapor intrusion into building(s) at the site

3.0 SUMMARY OF REMEDIAL ACTION

This Section presents an analysis of two remedial actions that can potentially be achieved under the BCP. The proposed SCOs will be the Track 1 Part 375 UU SCOs for Alternative I and Track 2 RURR SCOs for Alternative II.

3.1 Alternative I – Technical Description

Alternative I, a Track 1 remedy, will include the following tasks:

- Development and implementation of a CHASP and CAMP for the protection of on-site workers, community/residents, and environment during remediation and construction activities
- Abatement of hazardous materials (including asbestos containing materials [ACM] identified in building materials, lead based paint [LBP], polychlorinated biphenyls [PCB]-laden material, and other universal waste and miscellaneous hazardous waste articles) and demolition of existing buildings in order to prepare the site for remediation
- Construction of the support of excavation (SOE) system to facilitate the Track 1 remediation
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations
- Excavation, stockpiling, off-site transport, and disposal of about 15,000 cubic yards of historic fill and native soil that exceeds UU SCOs as defined by 6 NYCRR Part 375-6.8. Material that exceeds UU SCOs will be excavated
- Excavation and disposal of the hazardous chromium hotspot to a depth of up to eight feet bgs - This area covers a roughly 18-foot by 15-foot region in the northeast part of the 3-story vacant warehouse building.
- Removal of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-site disposal during redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements
- Screening for indications of contamination (by visual means, odor, and monitoring with photoionization detectors [PIDs]) of excavated material during intrusive site work
- Appropriate off-site disposal of material removed from the site in accordance with federal, state and local rules and regulations for handling, transport, and disposal

- Implementation of a short-term in-situ groundwater treatment technology (e.g., in-situ chemical reduction [ISCR] using 3-D Microemulsion and/or S-Micro Zero Valent Iron [ZVI] via injection points), to abiotically reduce hexavalent chromium concentrations in groundwater to a less toxic and less mobile trivalent chromium precipitate
- Backfilling of remediated areas to development sub-grade with certified-clean material (i.e., material meeting UU SCOs), virgin stone, or recycled concrete aggregate (RCA)
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 1 remedy was achieved; over-excavation will be required as necessary to meet Track 1 SCOs
- Installation of mechanical ventilation of enclosed subgrade areas that are proposed in future on-site buildings and completion of an evaluation of post-remediation soil vapor conditions to document that engineering controls are not required to address potential soil vapor intrusion
- Development and execution of plans for the protection of on-site workers, the community, and the environment during the remediation phase of development

The Alternative I remediation extent is shown on Figure 7 and is based on data presented in the RIR. The requirements for each of the Alternative I tasks are described below.

<u>Fill and Soil Removal</u>

Abatement of hazardous building materials and demolition of the existing buildings will be required to prepare the site for the remedial excavation. SVOCs, metals, and pesticides were detected in historic fill at concentrations that exceed the UU SCOs. To achieve Track 1, soil removal and disposal will extend from surface grade to elevations ranging from approximately el 26.5 to 29.5 (about 15 feet below sidewalk grade) across the 26,978 square foot site footprint. The estimated volume of material requiring removal and off-site disposal for a Track 1 cleanup is about 15,000 cubic yards, including about 120 cubic yards of RCRA hazardous chromium. Excavation is not expected to extend below the water table during remedial excavation or construction; therefore, installation of a dewatering system or localized dewatering is not anticipated.

<u>Tank Removal</u>

A geophysical anomaly potentially indicative of a UST was identified in the northeast corner of the one-story warehouse building within Lot 8. An associated fill port was identified within the sidewalk adjacent to the anomaly. This suspect UST and any additional encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) will be decommissioned and disposed of off-site during site redevelopment in accordance with DER-10, 6 NYCRR Part

613.9, NYSDEC Commissioner's Policy (CP)-51, and other applicable NYSDEC UST closure requirements. Any impacted soil, if encountered, will be excavated, stockpiled separately, characterized, and disposed of off-site at a permitted facility. Following removal of any UST and associated grossly-impacted soil, if encountered, confirmation soil samples will be collected from the base and sidewalls of the excavation in accordance with DER-10. If the excavation is enlarged horizontally beyond the dimensions of the tank, additional confirmation soil samples will be collected as required. Following removal of any encountered USTs, the NYSDEC PBS registration will be updated. Closure documentation, such as contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, will be provided as appendices in the Final Engineering Report (FER).

Confirmation Soil Sampling

Per NYSDEC DER-10, confirmation soil samples will be collected from the excavation base at a frequency of one per 900 square feet. Sidewall samples will not be collected from the site perimeter because excavation will extend across the site footprint and SOE measures (e.g., sheeting and lagging) will preclude access to soil sidewalls. An estimated 30 confirmation soil samples, plus QA/QC samples, will be collected to confirm remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, PCBs, pesticides, cyanide, and metals including hexavalent and trivalent chromium.

In-Situ Groundwater Treatment

Groundwater localized to the central-east corner of the site (MW04 region) will be treated through ISCR (bioremediation using ZVI or an approved alternative), via temporary injection points to abiotically reduce hexavalent chromium concentrations in groundwater to a less toxic and less mobile trivalent chromium precipitate. Application of 3-D Microemulsion and/or S-MicroZVI will create reducing conditions in groundwater, which will result in the electrochemical reduction of hexavalent to trivalent chromium. Trivalent chromium has limited solubility in water and precipitates as insoluble chromium hydroxide. The selected ISCR compound(s) will be applied directly to the chromium-impacted groundwater via temporary injection points. The treatment depth will vary, however the treatment depth will at minimum target the upper 10 feet of the water table.

A complete description of the ISCR remedy application, including quantities and specific chemical information will be provided to the DEC as a technical memorandum, prior to its implementation. Langan will oversee the application of the 3-D Microemulsion and/or S-MicroZVI compounds and document operations. Groundwater will be sampled following the injection event to evaluate the efficacy of the remedial system. Groundwater monitoring will be performed until analytical results indicate there has been a bulk reduction of residual hexavalent chromium in groundwater to asymptotic levels.

A groundwater monitoring program will be implemented upon completion of the foregoing remediation to document groundwater quality and verify that the Track 1 remedy is achieved. The groundwater monitoring program details and schedule will be outlined in a forthcoming technical memorandum. The samples would be submitted to an NYSDOH ELAP-accredited laboratory for analysis of total, hexavalent and trivalent chromium (total and dissolved analysis). Follow-up ISCR reduction application may be required, depending on the groundwater monitoring results. Based on groundwater sample results showing remediation and declining trend in dissolved concentrations of hexavalent chromium, a request will be made to NYSDEC to discontinue sampling and consider the groundwater remedy complete.

Backfill

Imported material will consist of clean fill that meets the UU SCOs or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the site, it will come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities will not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete (less than 10% by weight passing through a No. 80 sieve). RCA is not acceptable for, and will not be used as, site cover or drainage material.

On-Site Worker, Public Health, and Environmental Protection

A site-specific CHASP is appended to this RAWP (Appendix D) and will be enforced during excavation and foundation construction to protect site workers from accidents and acute and chronic exposures to the identified contaminated media. Public health will be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP will include continuous perimeter monitoring of dust and organic vapor using DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. A field engineer, scientist, or geologist will monitor site perimeters for visible dust and odors. The environment will be protected by implementing and enforcing the appropriate soil erosion prevention measures.

Soil Vapor Mitigation

CVOCs were identified in soil vapor at concentrations above NYSDOH Decision Matrix values at which mitigation is recommended; however, a site source was not identified. A mechanical ventilation system will be installed within subgrade areas including the parking garage, utility rooms, mechanical spaces, and amenity areas compliant with the NYC Mechanical Code requirements to mitigate any potential soil vapor intrusion. Although not considered an engineering control, the building foundations will be waterproofed as part of building construction.

3.2 Alternative II – Technical Description

Alternative II, a Track 2 remedy, will include the following tasks:

- Development and implementation of a CHASP and CAMP for the protection of on-site workers, community/residents, and environment during remediation and construction activities
- Abatement of hazardous materials (including ACM identified in building materials, LBP, PCB-laden material, and other universal waste and miscellaneous hazardous waste articles) and demolition of existing buildings in order to prepare the site for remediation (see Appendix B for asbestos abatement report and demolition plans)
- Construction of the SOE system to facilitate the Track 2 remediation
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations
- Excavation, stockpiling, off-site transport, and disposal of about 15,000 cubic yards of historic fill and native soil that exceeds RURR SCOs as defined by 6 NYCRR Part 375-6.8
- Excavation and disposal of hazardous chromium hotspot to a depth of up to eight feet bgs - This area covers a roughly 18-foot by 15-foot region in the northeast part of the 3-story vacant warehouse building.
- Removal of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning/ disposal off-site during site redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements
- Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) of excavated material during intrusive site work
- Appropriate off-site disposal of material removed from the site in accordance with federal, state and local rules and regulations for handling, transport, and disposal
- Implementation of a short-term in-situ groundwater treatment technology (e.g. in-situ chemical reduction [ISCR] using 3-D Microemulsion and/or S-Micro Zero Valent Iron [ZVI] via injection points), to abiotically reduce hexavalent chromium concentrations in groundwater to a less toxic and less mobile trivalent chromium precipitate

- Backfilling of excavated areas, as necessary for development, with certified-clean material (meeting both the protection of groundwater and Track 2 SCOs), RCA, or virgin, native crushed stone
- Installation of a waterproofing/vapor barrier membrane below the basement slab and along sidewalls to grade
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm Track 2 SCOs were achieved; over-excavation would be required as necessary to meet site SCOs
- Mechanical ventilation of enclosed subgrade areas that are proposed in future on-site buildings, to mitigate any potential residual soil vapor intrusion
- Development and execution of plans for the protection of on-site workers, the community, and the environment during the remediation phase of development
- Establishment of use restrictions including prohibitions on the use of groundwater from the site and prohibitions on sensitive site uses, such as farming or vegetable gardening in residual site soil, to eliminate future exposure pathways
- Establishment of an approved SMP to ensure long-term management of engineering and institutional controls, including the performance of periodic inspections and certification that the controls are performing as they were intended
- Recording of an Environmental Easement (EE) to memorialize the remedial action and the engineering and institutional controls to ensure that future owners of the site continue to maintain these controls as required

The Alternative II remediation extent is shown on Figure 8 and is based on data presented in the RIR and the proposed development plans. The requirements for each of the Alternative II tasks are described below.

<u>Fill and Soil Removal</u>

Abatement of hazardous materials and demolition of the existing buildings will be required to prepare the site for the remedial excavation. SVOCs, metals, and pesticides were detected in historic fill at concentrations that exceed the UU SCOs. To achieve Track 2, soil removal and disposal will extend from surface grade to elevations ranging from approximately el 26.5 to 29.5 (about 15 feet below sidewalk grade) across the 26,978 square foot site footprint. The estimated volume of material requiring removal and off-site disposal for a Track 2 cleanup is about 15,000 cubic yards, including about 120 cubic yards of RCRA hazardous chromium. Excavation is not expected to extend below the water table during remedial excavation or construction; therefore, installation of a dewatering system or localized dewatering is not anticipated.

Tank Removal

A geophysical anomaly potentially indicative of a UST was identified in the northeast corner of the one-story warehouse building within Lot 8. An associated fill port was identified within the sidewalk adjacent to the anomaly. This suspect UST and any additional encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) will be decommissioned and disposed of off-site during site redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements. Any impacted soil, if encountered, will be excavated, stockpiled separately, characterized, and disposed of off-site at a permitted facility. Following removal of any UST and associated grossly-impacted soil, if encountered, confirmation soil samples will be collected from the base and sidewalls of the excavation in accordance with DER-10. If the excavation is enlarged horizontally beyond the dimensions of the tank, additional confirmation soil samples will be collected as required. Following removal of any encountered USTs, the NYSDEC PBS registration will be updated. Closure documentation, such as contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, will be provided as appendices in the FER.

Confirmation Soil Sampling

Per NYSDEC DER-10, confirmation soil samples will be collected from the excavation base at a frequency of one per 900 square feet. Sidewall samples will not be collected from the site perimeter because excavation will extend across the site footprint and SOE measures (e.g., sheeting and lagging) will preclude access to soil sidewalls. An estimated 30 confirmation soil samples, plus QA/QC samples, will be collected to confirm remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, PCBs, pesticides, cyanide, and metals including hexavalent and trivalent chromium.

In-Situ Groundwater Treatment

Groundwater localized to the central-east corner of the site (MW04 region) will be treated through ISCR (bioremediation using ZVI or an approved alternative), via temporary injection points to abiotically reduce hexavalent chromium concentrations in groundwater to a less toxic and less mobile trivalent chromium precipitate. Application of 3-D Microemulsion and/or S-MicroZVI will create reducing conditions in groundwater, which will result in the electrochemical reduction of hexavalent to trivalent chromium. Trivalent chromium has limited solubility in water and precipitates as insoluble chromium hydroxide. The selected ISCR compound(s) will be applied directly to the chromium-impacted groundwater via temporary injection points. The treatment depth will vary, however the treatment depth will at minimum target the upper 10 feet of the water table.

A complete description of the ISCR remedy application, including quantities and specific chemical information will be provided to the DEC as a technical memorandum, prior to its implementation. Langan will oversee the application of the 3-D Microemulsion and/or S-MicroZVI compounds and document operations. Groundwater will be sampled following the injection event to evaluate the efficacy of the remedial system. Groundwater monitoring will be performed until analytical results indicate there has been a bulk reduction of residual hexavalent chromium in groundwater to asymptotic levels.

A groundwater monitoring program will be implemented upon completion of the foregoing remediation to document groundwater quality and verify that the Track 1 remedy is achieved. The groundwater monitoring program details and schedule will be outlined in a forthcoming technical memorandum. The samples would be submitted to an NYSDOH ELAP-accredited laboratory for analysis of total, hexavalent and trivalent chromium (total and dissolved analysis). Follow-up ISCR reduction application may be required, depending on the groundwater monitoring results. Based on groundwater sample results showing remediation and declining trend in dissolved concentrations of hexavalent chromium, a request will be made to NYSDEC to discontinue sampling and consider the groundwater remedy complete.

Backfill

Imported material will consist of clean fill that meets the Track 2 SCOs or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the site, it will come from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. RCA imported from compliant facilities will not require chemical testing, unless required by NYSDEC under its terms for operation of the facility. Imported RCA must be derived from recognizable and uncontaminated concrete (less than 10% by weight passing through a No. 80 sieve). RCA is not acceptable for, and will not be used as, site cover or drainage material.

Vapor Barrier/Waterproofing Membrane

A vapor barrier/waterproofing membrane will be installed that will serve to mitigate potential soil vapor intrusion into the planned building. The vapor barrier membrane will be installed under the slab of the entire proposed building and along all foundation sidewalls to grade, will be a minimum 20 mil thickness, and will be compatible with potential petroleum and CVOC contaminants.

Soil Vapor Mitigation

Soil vapor mitigation for Alternative II would be performed as described above in Alternative I. This constant mechanical ventilation in the cellar along with the vapor barrier membrane beneath the concrete slab will mitigate any potential soil vapor effects.

On-Site Worker, Public Health, and Environmental Protection

A site-specific CHASP is appended to this RAWP (Appendix D) and will be enforced during excavation and foundation construction to protect on-site workers from accidents and acute and chronic exposures to the identified contaminated media. Public health will be protected by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures included in the CAMP. The CAMP will include continuous perimeter monitoring of dust and organic vapor using DustTrak aerosol monitors and PIDs capable of recording data and calculating 15-minute averages. A field engineer, scientist, or geologist will monitor site perimeters for visible dust and odors. The environment will be protected by implementing and enforcing the appropriate soil erosion prevention measures.

Site Management Plan and Environmental Easement

An EE would be recorded referencing Institutional Controls (ICs) and Engineering Controls (ECs) that are part of the selected remedy, which would be binding upon all subsequent owners and occupants of the property. The ICs would: 1) restrict the site's use to restricted residential, commercial and industrial uses, although land use is subject to local zoning laws; 2) restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDEC or NYSDOH; 3) require implementation of an NYSDEC-approved SMP; 4) require the completion and submission to the NYSDEC a periodic certification of ICs and ECs in accordance with Part 375; and 5) include notice-of-use restrictions of the site's soil. The ECs would be the ventilated cellar, and waterproofing/vapor barrier described in this RAWP.

The SMP would identify all use restrictions and ECs and long-term monitoring and maintenance requirements to ensure the ICs and/or ECs remain in place and are effective. The SMP will include, but may not be limited to:

1. An Excavation Work Plan which details the provisions for management of future excavations in areas of remaining contamination
2. Descriptions of the provisions of the EE including any land use, and/or groundwater use restrictions
3. 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
4. Provisions for the management and inspection of the identified ECs
5. Maintaining site access controls and NYSDEC notification
6. The steps necessary for the periodic reviews and certification of the ICs and/or ECs

7. A Monitoring Plan to assess the performance and effectiveness of the remedy. The Monitoring plan includes, but may not be limited to:
   a. Monitoring for vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above
   b. A schedule of monitoring and frequency of submittals to NYSDEC.

3.3 Evaluation of Remedial Alternatives

The following is an evaluation of the proposed remedy based on the BCP remedy evaluation criteria listed below. The first two criteria are considered "threshold criteria" and the remaining criteria are "balancing criteria". A remedial alternative must meet the threshold criteria to be considered and evaluated further under the balancing criteria.

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

3.3.1 Protection of Human Health and the Environment

Alternative I – The remedy would eliminate all pathways of exposure from on-site contaminated media. Remediating the site to Track 1 standards would result in the elimination of RCRA characteristic hazardous waste and site soil that exceeds Track 1 SCOs. Any encountered USTs would be decommissioned, removed and disposed off-site, and petroleum-impacted material, if encountered, would be excavated and disposed off-site. An in-situ remedy will be implemented to address chromium-impacted groundwater. The RAOs for public health and environmental protection would be met through the removal of all contaminated media at the site, which would eliminate any possible ingestion, inhalation or dermal contact.

The ventilated cellar (including a parking garage and mechanical/amenity rooms) will mitigate the risk of potential soil vapor intrusion from off-site sources. Since no engineering or institutional controls will be required for this remedy to maintain the site in the future, this remedy is the most protective of human health and the environment.

Alternative II – The Track 2 remedy will provide similar overall protection to public health and the environment as Alternative I. Remediating the site to Track 2 standards will result in the removal of all site soil that exceeds RURR SCOs. An in-situ remedy will be implemented to address chromium-impacted groundwater. The ventilated cellar level (including parking garage and mechanical room space) and waterproofing/vapor barrier installed beneath the foundation will mitigate the risk of potential soil vapor intrusion from off-site sources.

Public health will be protected during remediation under both remedial alternatives by implementing and enforcing dust, odor, and organic vapor control and monitoring procedures when needed. The environment will be protected by implementing and enforcing soil management controls when needed during future site excavation and any other institutional and engineering controls by implementation of the SMP and through enforcement of the EE.

3.3.2 Compliance with Standards, Criteria, and Guidance

Both alternatives will be in compliance with applicable standards, criteria, and guidance listed in Section 4.1 by removing site sources of contamination to achieve the RAOs. While implementing either remedy, protection of public health and the environment will be maintained by enforcing a site-specific CHASP and CAMP. Occupational Safety and Health Administration (OSHA) requirements for on-site construction safety will be followed by site contractors performing work.

3.3.3 Short-Term Effectiveness and Impacts

Alternative I – The most significant short-term adverse impacts and risks to the community will be the potential complications and risk involved with designing and constructing SOE and underpinning for the building and structures adjoining the site. Potential impositions on roadway and pedestrian traffic associated with construction may be a result of the remedial excavation to achieve a Track 1 cleanup. Increased truck traffic and construction-related noise levels may be necessary to haul out soil that exceeds UU SCOs to achieve Track 1 standards, relative to Alternative II.

The excavated soil and fill would require about 750 20-cubic-yard truck trips. Implementing the Alternative I concept would require approximately 6 months of effort (assuming normal work hours). Truck traffic will be routed on the most direct course using major thoroughfares where possible and flaggers will be used to protect pedestrians at site entrances and exits. Waiting times associated with analysis of confirmation sampling and resampling may delay construction, leaving soil exposed for a longer time resulting in a potential increase in dust, odors, and/or organic vapor from the excavation and construction-related noise. The effects of these potential adverse impacts to the community, workers, and the environment will be minimized by implementing the respective control plans.

Alternative II – Alternative II will result in similar, if not the same, short-term adverse impacts and risks to the community. The excavated soil and fill would require approximately 750 20-cubic-yard truck trips. Implementing the Alternative II concept would require approximately 6 months of effort (assuming normal work hours).

Under both remedial alternatives, dust will be controlled by the on-site application of water spray as needed. Engineering controls, such as slowing the pace of work, applying foam and/or dust suppressant, and/or covering portions of the excavation will be used to suppress odors/dust when required. Work will be modified or stopped according to the action levels defined in the CAMP. Therefore, short term impacts are the same for both alternatives.

3.3.4 Long-Term Effectiveness and Permanence

Both remedial alternatives will remove all contaminated media from the site exceeding UU (Alternative I) or RURR (Alternative II) SCOs for soil and meet the requirements of the NYSDOH soil vapor guidance for soil vapor. Under both remedial alternatives, an in-situ remedy will be implemented to treat residual chromium-impacted groundwater. In addition, groundwater in this area of New York City is not used for drinking water. Therefore, the long-term effectiveness of this remedy would eliminate risks and satisfy the objectives of the Alternative I and II criterion.

3.3.5 Reduction of Toxicity, Mobility, or Volume of Contaminated Material

Both remedial alternatives would permanently and significantly reduce the toxicity, mobility, and volume of contamination through removal of contaminated fill through excavation and off-site disposal. Under both remedial alternatives, an in-situ remedy will be implemented to treat residual chromium-impacted groundwater.

3.3.6 Implementability

Alternative I – Implementing a Track 1 remedy will be technically challenging because of SOE requirements associated with protection of the neighboring buildings and streets; however, the SOE hardship is not significant as it will not extend beyond that which is required for construction. This remedy will consist primarily of excavation with standard bucket excavators. The availability of local contractors, personnel, and equipment suitable to working in a structurally challenging environment is high due to the frequency of this type of remediation in the region. It is not expected to require schedule extensions or additional costs associated with the excavation and SOE. However, if deeper contamination above UU SCOs is encountered below development depth and requires over-excavation, the cost is marginal compared to the benefit of achieving an unrestricted use remediation and elimination of long-term engineering and institutional controls. Following remedial activities and installation of the building foundation elements, a ventilation system will be installed throughout the cellar level of the proposed development. Additional coordination between trades may be required. This alternative is considered feasible.

Alternative II – The technical feasibility of implementing the Alternative II remedy is similar to Alternative I as significant excavation is still required to achieve the Track 2 RURR SCOs. This alternative will consist mostly of excavation with standard bucket excavators and installation a vapor barrier. The availability of local contractors, personnel, and equipment suitable to working in a structurally challenging environment is high due to the frequency of this type of remediation in the region. Following remedial activities, a waterproofing/vapor barrier and ventilation system will be required to be installed throughout the cellar level of the proposed development. Additional coordination between trades may be required. This alternative is considered feasible.

3.3.7 Cost Effectiveness

Alternative I – Based on the assumptions detailed for Alternative I, the estimated remediation cost of a Track 1 cleanup is approximately $5.8 million. Because the site will be remediated to UU SCOs, there are no long-term operation, maintenance, or monitoring costs associated with the proposed remedy. Table 1 details the individual cost components used to arrive at this cost estimate. Alternative I is the most cost effective alternative.

Alternative II – Based on the assumptions detailed for Alternative II, the estimated remediation cost to achieve a Track 2 cleanup is approximately $6.2 million. Even though the same volume of soil removal and similar soil vapor mitigation is anticipated to be required for both alternatives, this alternative is more costly over the long term than a Track 1 remedy due to the installation of a more robust waterproofing/vapor barrier and long-term implementation and verification of the institutional and engineering controls (e.g., EE). In addition, an SMP will be required to assure compliance with the remediation goals and objectives. Table 2 outlines the individual cost-components used to arrive at this cost estimate.

3.3.8 Community Acceptance

Both remedial alternatives should be acceptable to the community because the potential exposure pathways to on-site contamination will be addressed upon completion of the respective remedies and the site will be remediated to allow for a higher level use. The selected remedy will be subject to a 45-day public comment period in accordance with the Citizen Participation Plan (CPP), included as Appendix E. Any substantive public comments received will be addressed before the remedy is approved.

3.3.9 Land Use

The current, intended, and reasonably anticipated future mixed commercial, light industrial, and residential land use of the site and its surroundings are compatible with both remedial alternatives. The proposed development will include construction of a mixed-use commercial, light industrial and residential building with one cellar level. The site borders a mixed-use residential and commercial building and other light-industrial buildings. Light industrial, mid-rise mixed-use commercial/residential, and multiple-story commercial and institutional buildings are located at properties surrounding the site. The East River is about 0.85 miles west of the site.

3.4 Selection of the Preferred Remedy

Both alternatives will be protective of human health and the environment and meet the remedy selection criteria. Alternative I achieves all of the remedial action goals established for the redevelopment project, and is effective in the short-term. Alternative I effectively reduces contaminant mobility and toxicity and is a superior alternative in the reduction of contaminant toxicity and volume. Alternative I is more effective in the long-term because it achieves unrestricted land use that is free of long-term site management, engineering controls, an EE, and associated future costs that would be required under Alternative II. The excavation depths for both remedial alternatives are comparable and will produce similar remedial costs; however installation of a more robust waterproofing/vapor barrier membrane (minimum 20 mils thickness) throughout the footprint of the site and along building foundation sidewalls to grade in the Alternative II scenario will increase overall construction costs.

Alternative I is preferred over Alternative II if it can be feasibly and practically implemented at a similar cost while providing greater overall protection to human health and the environment. Therefore, Alternative I is the recommended remedial alternative for this site. However, if this Alternative is not achievable, Alternative II is similarly protective of human health and the environment. If ICs and ECs are required, these controls should be easily implementable long term pursuant to an SMP and EE.

Figure 7 depicts the Alternative I cleanup plan.

3.4.1 Zoning

The current site use conforms to applicable zoning laws and maps, as does the reasonably anticipated future mixed residential, commercial, and light manufacturing use of the site.

3.4.2 Applicable Comprehensive Community Master Plans or Land Use Plans

The site is within the bounds of the Long Island City Special Mixed Use Paired District (M1-2/R6A) and the proposed development is consistent with community land use plans.

3.4.3 Surrounding Property Uses

The current, intended, and reasonably anticipated future land use of the site and its surroundings are compatible with the selected remedy. The reasonably anticipated future use of the site and the use of its surroundings have been documented by the Volunteer. The construction of a mixed-use commercial, light industrial, and residential development conforms to recent development patterns in the area.

3.4.4 Citizen Participation

The CPP is discussed in Section 4.1.9.

3.4.5 Environmental Justice Concerns

Per the "Potential Environmental Justice Areas in Northwest Queens County, New York" The site is in a potential Environmental Justice area. NYSDEC's Office of Environmental Justice acts as an advocate on behalf of these areas, which are disproportionately affected by environmental burdens.

3.4.6 Land Use Designations

There are no federal or state land use designations.

3.4.7 Population Growth Patterns

The population growth patterns and projections support the current and reasonably anticipated future land use.

3.4.8 Accessibility to Existing Infrastructure

The site is accessible to existing infrastructure.

3.4.9 Proximity to Cultural Resources

The site is not in close proximity to a registered landmark. The nearest registered landmark, the Famous Players-Lasky Studio, is located at 35-11 35th Avenue, about 0.4 miles northeast of the site.

3.4.10 Proximity to Natural Resources

The site is not located in close proximity to important federal, state, or local natural resources including waterways, wildlife refuges, wetlands, and critical habitats of endangered or threatened species. The nearest ecological receptor is the East River, which is located about 0.85 miles to the west.

3.4.11 Off-Site Groundwater Impacts

Municipal water supply wells are not present in this area of New York City; therefore, groundwater from the site cannot affect municipal water supply wells or recharge areas.

3.4.12 Proximity to Floodplains

According to the FEMA Preliminary Flood Insurance Rate Map (FIRM) dated December 5, 2013 (Map Number 3604970093G), the site is located in Zone X, which is designated for area of 0.2 percent annual chance flood; area of one percent annual chance flood with average depths of less than one foot or with drainage areas less than one square mile; and areas protected by levees from one percent annual chance flood.

3.4.13 Geography and Geology of the Site

The site geology is described in Section 2.4.

3.4.14 Current Institutional Controls

As a result of the City Environmental Quality Review (CEQR) process, Block 372, Lot 21 was assigned an E-Designation (E-218) on October 7, 2008 by the New York City Department of City Planning (NYCDCP) as part of the Dutch Kills Rezoning (CEQR No. 08DCP021Q). The E-Designation requires coordination with the New York City Office of Environmental Remediation (OER) to obtain a Notice to Proceed (NTP) or a Notice of No Objection (NNO) prior to obtaining building permits. The E-Designation addresses environmental requirements for hazardous materials (Hazmat) and noise (window wall attenuation and alternative means of ventilation) during development. After E-Designation requirements are shown to be satisfied by OER following construction, a Notice of Satisfaction (NOS) will be issued. A certificate of occupancy will only be issued after the NOS is obtained.

3.5 Summary of the Selected Remedial Action

The selected Track 1 remedy will include the following:

- Development and implementation of a CHASP and CAMP for the protection of on-site workers, community/residents, and environment during remediation and construction activities
- Abatement of hazardous materials (including ACM identified in building materials, LBP, PCB-laden material, and other universal waste and miscellaneous hazardous waste articles) and demolition of existing buildings in order to prepare the site for remediation
- Construction of the SOE system to facilitate the Track 1 remediation

- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations
- Excavation, stockpiling, off-site transport, and disposal of about 15,000 cubic yards of historic fill and native soil that exceeds UU SCOs as defined by 6 NYCRR Part 375-6.8. Material that exceeds UU SCOs will be excavated
- Excavation and disposal of the hazardous chromium hotspot to a depth of up to eight feet bgs - This area covers a roughly 18-foot by 15-foot region in the northeast part of the 3-story vacant warehouse building.
- Removal of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning and off-site disposal during redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements
- Screening for indications of contamination (by visual means, odor, and monitoring with PIDs) of excavated material during intrusive site work
- Appropriate off-site disposal of material removed from the site in accordance with federal, state and local rules and regulations for handling, transport, and disposal
- Implementation of a short-term in-situ groundwater treatment technology (e.g. ISCR using 3-D Microemulsion and/or S-MicroZVI via injection points), to abiotically reduce hexavalent chromium concentrations in groundwater to a less toxic and less mobile trivalent chromium precipitate
- Backfilling of remediated areas to development sub-grade with certified-clean material (i.e., material meeting UU SCOs), virgin stone, or RCA.
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 1 remedy was achieved; over-excavation will be required as necessary to meet Track 1 SCOs
- Installation of mechanical ventilation of enclosed subgrade areas that are proposed in future on-site buildings and completion of an evaluation of post-remediation soil vapor conditions to document that engineering controls are not required to address potential soil vapor intrusion.
- Development and execution of plans for the protection of on-site workers, the community, and the environment during the remediation phase of development

Remedial activities will be performed in accordance with this RAWP, and the Department-issued Decision Document. Deviations from the RAWP and/or Decision Document will be promptly reported to the NYSDEC for approval and fully explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

4.1 Governing Documents

The primary documents governing the remedial action are summarized in this section.

4.1.1 Standards, Criteria and Guidance

The following standards, criteria, and guidance are typically applicable to Remedial Action projects in New York State, and will be consulted and adhered to as applicable:

- 29 Code of Federal Regulations (CFR) Part 1910.120 – Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 371 – Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 372 – Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
- 6 NYCRR Subpart 373-4 – Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators
- 6 NYCRR Subpart 374-1 – Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 6 NYCRR Subpart 374-3 – Standards for Universal Waste
- 6 NYCRR Part 375 – Environmental Remediation Programs
- 6 NYCRR Part 376 – Land Disposal Restrictions
- 6 NYCRR Part 750 – State Pollutant Discharge Elimination System (SPDES) Permits
- 12 NYCRR Part 56 – Industrial Code Rule 56 (Asbestos)
- CP-43 – Commissioner Policy on Groundwater Monitoring Well Decommissioning (December 2009)
- CP-51 – Soil Cleanup Guidance (2010)
- DER-10 – Technical Guidance for Site Investigation and Remediation (May 3, 2010)
- DER-23 – Citizen Participation Handbook for Remedial Programs (March, 2010)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)
- TOGS 1.1.1 – Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations

- USEPA OSWER Directive 9200.4-17 – Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (December 1997)
- Screening and Assessment of Contaminated Sediment (Division of Fish, Wildlife and Marine Resources, June 2014)

4.1.2 Site-Specific Construction Health & Safety Plan

The Remedial Engineer (RE) prepared a site-specific CHASP (Appendix D). The CHASP will apply to all remedial and construction-related work on site. The CHASP provides a mechanism for establishing on-site safe working conditions, safety organization, procedures, and PPE requirements during implementation of the remedy. The CHASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65, respectively). The CHASP includes, but is not limited to, the following components:

- Organization and identification of key personnel
- Training requirements
- Medical surveillance requirements
- List of site hazards
- Excavation safety
- Drill rig safety
- Work zone descriptions and monitoring procedures
- Personal safety equipment and PPE requirements
- Decontamination requirements
- Standard operating procedures
- Contingency plan
- CAMP
- Safety data sheets (SDS)

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work are responsible for the preparation of a CHASP and for performance of the work according to the CHASP and applicable laws.

The CHASP and requirements defined in this RAWP pertain to remedial and ground-intrusive work performed at the site until the issuance of a Certificate of Completion. The Site Safety

Coordinator will be William Bohrer, a resume for whom is included in Appendix F. If required, confined space entry will comply with OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.3 Quality Assurance Project Plan

The RE prepared a Quality Assurance Project Plan (QAPP) that describes the quality control components that will ensure that the proposed remedy accomplishes the remedial goals and RAOs and is completed in accordance with the design specifications. The QAPP is provided as Appendix G and includes:

- Responsibilities of key personnel and their organizations for the proposed remedy
- Qualifications of the quality assurance officer
- Sampling requirements including methodologies, quantity, volume, locations, frequency, and acceptance and rejection criteria
- Description of the reporting requirements for quality assurance activities including weekly quality assurance review reports, periodic quality assurance and quality control audits, and other report and data submissions

4.1.4 Construction Quality Assurance Plan

The RE prepared a Construction Quality Assurance Plan (CQAP) that describes the quality control components employed so that the proposed remedy accomplishes the remedial goals and RAOs and is completed in accordance with the design specifications. Because the remedy is being accomplished through building construction, the Contractor and Construction Manager will have the primary responsibility to provide construction quality. The CQAP procedures are discussed below in Section 4.2.1.

4.1.5 Soil/Materials Management Plan

The RE prepared a Soil/Materials Management Plan (SMMP) that includes detailed plans for managing soils/materials that are disturbed at the site, including excavation, handling, storage, transport and disposal. The SMMP also includes controls that will be applied to these efforts to facilitate effective, nuisance-free performance in compliance with applicable federal, state and local laws and regulations (see Section 5.4).

4.1.6 Stormwater Pollution Prevention Plan

Erosion and sediment controls will be implemented as necessary in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment

Control. Best management practices for soil erosion and sediment control will be selected to minimize erosion and sedimentation off-site from the onset of remediation to the completion of development. Stormwater pollution prevention will be implemented as described below in Section 5.4.9. A Stormwater Pollution Prevention Plan (SWPPP) is not necessary because the project will disturb less than one acre, and stormwater discharge will be to a combined sewer in accordance with the New York City generic SPDES permit.

4.1.7 Community Air Monitoring Program

A CAMP was prepared for the site as part of the CHASP (Appendix D of this RAWP). The CAMP is detailed in Section 5.4.11 below.

4.1.8 Contractors Site Operations Plan

The RE will review plans and submittals for this remedial project (including those listed above and contractor and subcontractor document submittals) and will confirm that plans and submittals are in compliance with this RAWP. The RE is responsible to ensure that later document submittals for this remedial project, including contractor and sub-contractor document submittals, are in compliance with this RAWP. Remedial documents, including contractor and subcontractor document submittals, will be submitted to the NYSDEC and NYSDOH in a timely manner and prior to the start of work associated with the remedial document.

4.1.9 Citizen Participation Plan

Fact Sheets describing the Remedial Action proposed in the RAWP will be distributed through DEC Delivers, the NYSDEC's email listserv service. Additional Fact Sheets will be distributed to announce 1) the completion of the Remedial Action with a summary of the FER and 2) the issuance of the Certificate of Completion for the site.

No changes will be made to the approved Fact Sheets authorized for release by the NYSDEC without written consent of the NYSDEC. Other information, such as brochures and flyers, will not be included with the Fact Sheet mailing. The approved CPP for this project is included in Appendix E.

Document repositories were established at the following locations and contain the applicable project documents:

Queens Community Board 1
Attn: Marie Torniali, Chairperson

45-02 Ditmars Boulevard
Queens, NY 11106
Phone: (718) 626-1021

Queens Library at Long Island City
37-44 21st Street
Queens, NY 11101
Phone: (718) 752-3700
Hours (Call to verify):

Monday:	9:00 a.m. to 8:00 p.m.
Tuesday:	1:00 p.m. to 6:00 p.m.
Wednesday:	10:00 a.m. to 6:00 p.m.
Thursday:	12:00 p.m. to 8:00 p.m.
Friday:	10:00 a.m. to 6:00 p.m.
Saturday:	10:00 a.m. to 5:00 p.m.
Sunday:	Closed

4.2 General Remedial Construction Information

4.2.1 Project Organization

This section presents the anticipated project organization and associated roles, including key personnel, descriptions of duties, and lines of authority in the management of this RAWP. The following project personnel are anticipated for oversight of the RAWP implementation. Project personnel resumes are provided in Appendix F.

Remediation Engineer:	Jason J. Hayes, P.E.
Project Manager:	Brian Gochenaur, QEP
Langan Health & Safety Manager:	Tony Moffa, CHMM
Health & Safety Officer	William Bohrer, P.G.
Qualified Environmental Professional	Michael Burke, P.G., CHMM
Field Team Leader	Emily Snead, P.G.
Quality Assurance Officer	Robert Harris

A field engineer, scientist, or geologist under the direct supervision of the Qualified Environmental Professional and the RE will be on-site during implementation of the RAWP to monitor particulates and organic vapor in accordance with the CAMP. CAMP results that exceed specified action levels will be reported to the NYSDEC and NYSDOH in daily reports.

A field engineer, scientist, or geologist will meet with the Construction Superintendent on a daily basis to discuss the plans for that day and schedule upcoming activities. The field engineer, scientist, or geologist will document remedial activities in the daily report. This document will be forwarded to the Field Team Leader on a daily basis and to the Qualified Environmental Professional, Project Manager, and the RE on a weekly basis.

A field engineer, scientist, or geologist will screen excavations with a PID during ground-intrusive work. PID readings, including specifically elevated readings, will be recorded in the project field book (or on separate logs) and reported to the NYSDEC and NYSDOH in the daily reports. A field engineer, scientist, or geologist under the direct supervision of the Qualified Environmental Professional will collect confirmation samples from the base of excavation in accordance with this RAWP.

The project field book will be used to document sampling activities and how they correspond to this RAWP. Field observations and laboratory tests will be recorded in the project field book or on separate logs. Recorded field observations may take the form of notes, charts, sketches, and/or photographs. A photo log will be kept to document construction activities during remediation. The photo log may also be used to document those activities recorded in the daily reports.

The Field Team Leader will maintain the current field book and original field paperwork during performance of the remedy. Remedial activities will be documented in the monthly BCP progress reports. The Project Manager will maintain the field paperwork after completion and will maintain submittal document files.

4.2.2 Remediation Engineer

The RE for this project will be Jason J. Hayes, P.E. The RE is a registered professional engineer licensed by the State of New York. The RE will have primary direct responsibility for implementation of the remedial program at the site. The RE will certify in the FER that the remedial activities were observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in this RAWP and any other relevant provisions of ECL 27-1419 have been achieved in accordance with the RAWP.

The RE will document the work of other contractors and subcontractors involved in aspects of the remedial construction, including soil excavation, stockpiling, confirmation sample collection, air monitoring, emergency spill response services, import of backfill, and management of waste transport and disposal. The RE will be responsible for appropriate communication with the NYSDEC and NYSDOH.

The RE will review the pre-remedial plans submitted by contractors and subcontractors for compliance with this RAWP and will certify compliance in the FER. The RE will provide the certifications listed below in Section 8.1.

4.2.3 Remedial Action Construction Schedule

The remedial action construction schedule is discussed below in Section 9.0 and included in Appendix H. The NYSDEC will be promptly notified of proposed changes, delays, and/or deviations to the schedule.

4.2.4 Work Hours

The hours for operation of remedial construction will either conform to the requirements of the New York City Department of Buildings (NYCDOB) construction code or to a site-specific variance issued by the NYCDOB. The NYSDEC will be notified by the Volunteer of any variances issued by the NYCDOB. The NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

The site perimeter will be secured with gated, signed, plywood fencing with restricted points of entry in accordance with the NYCDOB and NYCDOT permits and requirements. The purpose of the fencing is to limit site access to authorized personnel, protect pedestrians from site activities, and maintain site security.

4.2.6 Traffic Control

Site traffic will be controlled through designated points of access along 37th Avenue and 30th Street. Access points will be continuously monitored and if necessary, a flagging system will be used to protect workers, pedestrians, and authorized guests. Traffic will also adhere to applicable local, state, and federal laws.

4.2.7 Contingency Plan

Contingency plans, as described below, have been developed to effectively deal with potential unexpected discovery of additional contaminated media or USTs.

<u>Discovery of Additional Contaminated Soil</u>

During remediation and construction, soil will be continuously monitored by the RE's field representatives via visual, olfactory, and instrumental field screening techniques to identify additional soil that may not be suitable for disposal at the NYSDEC-approved disposal facility. If such soil is identified, the suspected impacts will be confirmed by collecting and analyzing samples in accordance with the NYSDEC-approved facility's requirements. If the previously approved facility is not permitted to receive the impacted soil, the soil will be excavated to the extent practicable and disposed of off-site at a permitted facility that can receive the material based on the characterization data.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive site work will be promptly communicated by phone and email to the NYSDEC Project Manager. These findings will be detailed in the daily reports and the subsequent monthly BCP progress report.

Discovery of USTs

If USTs are encountered during remedial activities, they will be decommissioned in accordance with 6 NYCRR Part 612.2 and 613.9 and NYSDEC DER-10 Section 5.5. Once the tank, its contents, and associated piping are removed, post-excavation soil samples will be collected per NYSDEC DER-10 requirements. If encountered, petroleum-impacted soils will be excavated, stockpiled separately, and disposed of off-site at a permitted facility in accordance with applicable regulations. UST closure documentation, including contractor affidavits, bills of lading for sludge disposal, and tank disposal receipts, will be included as appendices to the FER (see Section 8.0). NYSDEC PBS registration requirements will be complied with as necessary based on the type, number, and capacity of the discovered USTs.

If other previously unidentified contaminant sources are found during on-site remedial excavation or development-related construction, sampling will be performed on product, if encountered, and surrounding subsurface materials (e.g., soil, stone, etc.). Chemical analyses will include Part 375 VOCs, SVOCs, PCBs, pesticides, cyanide, and metals including trivalent and hexavalent chromium. Analyses will not be otherwise limited without NYSDEC approval.

If USTs are encountered during ground-intrusive site work, the findings will be promptly communicated by phone to the NYSDEC Project Manager, as well as, detailed in the appropriate daily report. These findings will also be included in the monthly BCP progress reports.

4.2.8 Worker Training and Monitoring

Worker training and monitoring will be conducted in accordance with the site-specific CHASP, which is included in Appendix D.

4.2.9 Agency Approvals

The applicant has addressed all State Environmental Quality Review Act (SEQRA) requirements for this site. Permits or government approvals required for remedial construction will be obtained prior to the start of remedial construction. The planned end use for the site conforms to current zoning for the property as determined by New York City Department of City Planning. A

Certificate of Completion will not be issued for the project unless conformance with the zoning designation is demonstrated. A portion of the site, Block 372, Lot 21, is E-Designated for hazardous materials and noise (E-218 and CEQR No. 08DCP021Q). The NYC OER protocols and approvals must be satisfied prior to redevelopment and new building occupancy. The E-Designation addresses environmental requirements for hazmat and noise (window wall attenuation and alternative means of ventilation) during development. Local, regional, and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work will be acquired prior to the start of remediation.

A list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work is provided below:

- NYCDOB Demolition Permit (NYC Building Code) – NYCDOB: 212-566-5000
- NYCDOB New Building Permit (NYC Building Code) – NYCDOB: 212-566-5000

This list includes a citation of the law, statute or code to be complied with, the originating agency and phone number in that agency. Considering the system is online, direct contacts of reviewers are not provided. This list will be updated in the Final Engineering Report.

No remedial or construction work will be conducted in regulated wetlands or adjacent areas.

4.2.10 Pre-Construction Meeting with the NYSDEC

Prior to the start of remedial construction, a meeting will be held between the NYSDEC, RE, Volunteer, Construction Manager, and remediation contractor to discuss project roles, responsibilities, and expectations associated with this RAWP.

4.2.11 Emergency Contact Information

An emergency contact sheet that defines the specific project contacts (with names and phone numbers) for use by NYSDEC and NYSDOH in the case of an emergency (day or night) is included in the CHASP (Appendix D).

4.2.12 Remedial Action Costs

The total estimated cost of the Track 1 Remedial Action is $5.4 million. An itemized and detailed summary of estimated costs for the remedy is provided in Table 1.

4.3 Site Preparation

4.3.1 Mobilization

Prior to commencing remedial construction, the remediation contractor will mobilize to the site and prepare for remedial activities. Mobilization and site preparation activities may include the following:

- Identifying the location of aboveground and underground utilities (e.g., power, gas, water, sewer, and telephone), equipment, and structures as necessary to implement remediation
- Mobilizing necessary remediation personnel, equipment, and materials to the site
- Constructing one or more stabilized construction entrances consisting of non-hazardous material at or near the site exit, which takes into consideration the site setting and site perimeter
- Constructing an equipment decontamination pad for trucks, equipment, and personnel that come into contact with impacted materials during remediation
- Installing temporary fencing or other temporary barriers to limit unauthorized access to areas where remediation will be conducted

4.3.2 Monitoring Well Decommissioning

Existing groundwater monitoring wells were properly decommissioned, in accordance with NYSDEC CP-43, on December 17, 2018. Well decommissioning was performed by an experienced driller (AARCO) and logged by the driller and a Langan field scientist. Decommissioning documentation will be provided in the FER.

4.3.3 Erosion and Sedimentation Controls

Since the planned earthwork activities will be below the adjacent sidewalk grade, full-time erosion and sedimentation measures are not anticipated. Best management practices for soil erosion will be selected and implemented, as needed, to minimize erosion and sedimentation off site.

4.3.4 Temporary Stabilized Construction Entrance(s)

Temporary stabilized construction entrances will be installed at the existing curb cuts along 30th Street and 37th Avenue. The entrances will be covered with gravel or RCA and graded so that runoff water will be directed on site. Vehicles exiting construction areas will be cleaned using clean water or dry brushing, as needed, to remove site soil from the tires and undercarriages.

The contractor will protect and maintain the existing sidewalks and roadways at both site access points.

4.3.5 Utility Marker and Easements Layout

The Volunteer and its contractors are solely responsible for the identification of utilities and/or easements that might be affected by work under this RAWP and implementation of the required, appropriate, or necessary health and safety measures during performance of the work under this RAWP. The Volunteer and its contractors are solely responsible for safe execution of the work performed under this RAWP. The Volunteer and its contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Approval of this RAWP by the NYSDEC does not constitute satisfaction of these requirements.

4.3.6 Sheeting and Shoring

Appropriate management of the structural stability of on-site or off-site structures during site activities is the sole responsibility of the Volunteer and its contractors. The Volunteer and its contractors are solely responsible for the safe execution of the work performed under this RAWP. The Volunteer and its contractors must obtain the necessary local, state, and/or federal permits or approvals that may be required to perform the work detailed in this RAWP. Additionally, the Volunteer and its contractors are solely responsible for the implementation of the required, appropriate, or necessary health and safety measures during performance of work conducted under this RAWP.

4.3.7 Equipment and Material Staging

The Contractor will notify the RE and the Volunteer, in writing with receipt confirmed, at least 30 calendar days in advance of pending site work mobilization. During mobilization, construction equipment will be delivered to the site, temporary facilities constructed, and temporary utilities installed. The Contractor will place and maintain temporary toilet facilities within the work areas for usage by all site personnel.

4.3.8 Decontamination Area

The contractor will construct decontamination pads at each site entrance/exit planned for construction vehicle usage. The location of decontamination pads may change periodically to accommodate the contractor's sequencing of work. The pads will be constructed by the contractor to collect wastewater for off-site disposal or treatment and discharge, if generated during decontamination activities. The design will consider adequate space to decontaminate equipment and vehicles, and sloping and liners to facilitate collection of wastewater. Collected decontamination wastewater shall be either discharged in accordance with the contractor's New York City Department of Environmental Protection (NYCDEP) permit or tested and transported to an off-site disposal facility that is permitted to accept this waste, in accordance with applicable local, state and federal regulations.

If the contractor uses high pressure washing methods, the contractor shall provide splash protection around the vehicle decontamination facility. Splash protection shall minimize potential contamination from splatter and mist movement off site during the vehicle decontamination process. Splash protection shall be temporary and stable and capable of being dismantled in the event of high winds.

Accumulated truck rinsate and decontamination materials will be collected and commingled with other waste streams for discharge or disposal, as appropriate. The contractor will maintain the decontamination pad(s) throughout the duration of the remediation. Prior to demobilization, the contractor will deconstruct the pads and dispose of materials as required.

4.3.9 Site Fencing

The site perimeter will be secured with gated, signed, plywood fencing maintained by the Contractor. The purpose of the fencing is to limit site access to authorized personnel, protect pedestrians from site activities, and maintain site security.

4.3.10 Demobilization

After remediation and construction is completed, the Contractor will be responsible for demobilizing labor, equipment, and materials not designated for off-site disposal. The RE will document that the Contractor performs follow-up coordination and maintenance for the following activities:

- Removal of sediment and erosion control measures and disposal of materials in accordance with applicable rules and regulations
- Removal of remaining contaminated material or waste
- Equipment decontamination
- General refuse disposal

4.4 Reporting

Periodic reports and a FER will be required to document the remedial action. The RE responsible for certifying the reports will be an individual licensed to practice engineering in the State of New York; Jason J. Hayes, P.E. of Langan will have this responsibility. Should Mr. Hayes become unable to fulfill this responsibility, another suitably qualified NYS Professional Engineer will take his place. Daily and monthly reports will be included as appendices to the FER. In addition to the periodic reports and the FER, copies of the relevant contractor documents will be submitted to the NYSDEC.

4.4.1 Daily Reports

Daily reports will be submitted to the NYSDEC and NYSDOH Project Managers by the end of each day, or at a frequency acceptable to them, following the reporting period and will include:

- An update of progress made during the reporting day including a photograph log
- Locations of work and quantities of material imported and exported from the site
- References to an alpha-numeric map for site activities
- A summary of complaints with relevant details (names, phone numbers)
- A summary of CAMP findings, including exceedances
- An explanation of notable site conditions

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

4.4.2 Monthly Reports

Monthly reports will be submitted to the NYSDEC and NYSDOH Project Managers by the tenth of the month following the reporting period. The monthly reports will include the following information, as well as, any additional information required by the BCA:

- 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
- 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 of remedial activities will be taken and submitted to the NYSDEC in digital (JPEG) format. Photographs will illustrate the remedial program elements and will be of acceptable quality. Representative photographs of the site will be provided. Field photographs will be included in daily and monthly reports, as necessary, and a comprehensive photograph log will be included in the FER. Upon request, photographs will be submitted to the NYSDEC and NYSDOH Project Managers on CD or other acceptable electronic media. CDs will have a label and a general file inventory structure that separates photographs into directories and sub-directories according to logical Remedial Action components. A photograph log keyed to photo file ID numbers will be prepared to provide explanation for all representative photographs.

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 will be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

The management plan for documenting complaints is detailed below.

Item	Description
Approach	Complaints regarding remediation or construction activities/operations to be minimized and mitigation measures implemented to reduce the incidence of complaints
Objective	Manage environmental complaints from the community regarding remediation
Implementation Strategy/Mitigation Measures	Complaints will be documented on a complaint register. The register will be maintained as an ongoing record. Each entry will include the following information: • Time, date, and nature of complaint • Type of communication (telephone, letter, personal, etc.) • Name, contact address, and contact number • Response and investigation undertaken as a result of the complaint including action taken and signature of the responsible person Each complaint will be investigated as soon as practicable in relation to the requirements.
Monitoring	A representative from the Volunteer will follow up on the complaint within two weeks of receipt to ensure it is resolved.

Item	Description
Reporting	Upon receipt and following complaint investigation and resolution, the NYSDEC will be notified. Complaint resolutions will be documented in daily reports and the monthly BCP progress report.
Corrective Action	Should an incident of failure to comply occur in relation to the management of environmental complaints, one or more of the following corrective actions will be undertaken as appropriate: • Conduct additional training of staff to handle environmental complaints • Investigate why the environmental complaint was not addressed within the specified time frame • Investigate complaint and action follow-up according to results of investigation

4.4.5 Deviations from the RAWP

Necessary deviations from the RAWP will be coordinated with the NYSDEC in advance. Notification will be provided to the NYSDEC by telephone/email for conditions requiring immediate action (e.g., conditions judged to be a danger to the surrounding community). Based on the significance of the deviation, an addendum to this RAWP may be necessary and will include:

- Reasons for deviating from the approved RAWP
- Approval process to be followed for changes/editions to the RAWP
- Effect of the deviations on the overall remedy

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Remediation will include the following material removal tasks:

1. Excavation of historic fill and soil that exceeds Track 1 UU SCOs from surface grade to elevations ranging from el 26.5 to 29.5 (15 feet below sidewalk grade) across the site footprint.
2. Excavation and disposal of hazardous chromium hotspot to a depth of up to eight feet bgs. This area covers a roughly 18-foot by 15-foot region in the northeast part of the 3-story vacant warehouse building.
3. Decommissioning and removal of one unregistered suspect UST on Lot 8 and any additional USTs identified during earthwork

5.1 Soil Cleanup Objectives

A Track 1 remediation is proposed; therefore, the SCOs are the NYSDEC UU SCOs listed in 6 NYCRR Part 375-6.8(a).

Soil and materials management on- and off-site will be conducted in accordance with the Soil/Materials Management Plan as described below (Section 5.4). UST closures will conform to the criteria defined in 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements including and DER-10 Section 5.5.

5.2 Remedial Performance Evaluation (Confirmation Sampling)

5.2.1 Soil Sampling Frequency

One confirmation soil sample will be collected for every 900 square feet of excavation base in accordance with NYSDEC DER-10. Sidewall samples will not be collected from the site perimeter because excavation will extend site-wide and excavation support (e.g., sheeting, lagging) or adjoining building foundations would preclude the collection of the sidewall samples. An estimated 30 confirmation soil samples, plus QA/QC samples, will be collected to confirm remedial performance.

5.2.2 Methodology

Confirmation soil samples will be collected from the base of the remedial excavation in accordance with NYSDEC DER-10 to confirm remedial performance and will be analyzed for the Part 375 list of VOCs, SVOCs, PCBs, pesticides, cyanide, and metals including hexavalent and trivalent chromium.

Additional sampling may be required should the excavation area be over-excavated. Should additional soil sampling be deemed necessary (e.g., additional tank closure, unknown environmental condition through visual evidence of a remaining source, over-excavation of failed confirmation sample), confirmation sampling will be conducted in accordance with NYSDEC DER-10.

5.2.3 QA/QC

Quality control procedures for confirmation soil sampling are included in the QAPP (refer to Appendix G). Confirmation analytical results will be provided in the NYSDEC's electronic data deliverable (EDD) format for EQuIS™. Guidance on the sampling frequency is presented in NYSDEC DER-10 Section 5.4.

The QA/QC procedures required by the NYSDEC Analytical Services Protocol (ASP) and SW-846 methods will be followed. This will include instrument calibration, standard compound spikes, surrogate compound spikes, and analysis of quality control samples. The laboratory will provide sample bottles, which will be pre-cleaned and preserved. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP will take precedence.

5.2.4 DUSR

ASP Category B deliverables will be prepared for all remedial performance samples collected during implementation of this RAWP. Data Usability Summary Reports (DUSR) will be prepared by a qualified data validator and the findings will be reported in the FER.

5.2.5 Reporting

Analytical laboratories that analyze confirmation soil samples, prepare results, and perform contingency sampling will be NYSDOH ELAP-certified laboratories.

5.3 Estimated Material Removal Quantities

The estimated volume of soil requiring removal and off-site disposal for a Track 1 cleanup is about 15,000 cubic yards. Over-excavated areas will require backfill meeting UU SCOs. It is not anticipated that any soil will be imported for backfill.

5.4 Soil/Materials Management Plan

This section presents the approach to management, disposal, and reuse of soil, fill, and materials excavated from the site. This plan is based on the current knowledge of site conditions and will be augmented, as necessary, using additional data collected during remediation. A field engineer, scientist, or geologist, under the direction of the RE will monitor and document the handling and transport of contaminated material removed from the site for disposal as a regulated solid waste. A field engineer, scientist, or geologist, under the direction of the RE, will assist the remediation contractor in identifying impacted materials during remediation, determining materials suitable for direct load out versus temporary on-site stockpiling, selection of samples for waste characterization, if necessary, and determining the proper off-site disposal facility. Separate stockpile areas will be constructed as needed for the various materials to be excavated or generated, with the intent to most efficiently manage and characterize the materials and to avoid comingling impacted materials with non-impacted soil.

5.4.1 Soil Screening Methods

Visual, olfactory, and instrumental soil screening and assessment will be performed by an engineer, geologist, or scientist under the direction of the RE during remediation and development-related excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy and during the development phase, such as excavations for foundations and utility work, prior to issuance of the Certificate of Completion.

Resumes will be provided for personnel responsible for field screening (i.e., those representing the RE) the excavation and other ground-intrusive work performed during remediation and development.

5.4.2 Stockpile Methods

Stockpiles will be constructed as necessary to separate and stage excavated material pending loading or characterization sampling. Separate stockpile areas will be constructed to avoid comingling materials of differing waste types. Stockpile areas will meet the following minimum requirements:

- Excavated soil will be placed onto a minimum thickness of 6 mil low-permeability liner of sufficient strength and thickness to prevent puncture during use; separate stockpiles will be created where material types are different (e.g., petroleum-impacted material stockpiled in a contaminated soil area). The use of multiple layers of thinner liners is permissible.
- Equipment and procedures will be used to place and remove the soil that will minimize the potential to jeopardize the integrity of the liner.
- Stockpiles will be covered at the designated times (see below) with minimum 6-mil plastic sheeting or tarps which will be securely anchored to the ground. Stockpiles will be routinely inspected and broken sheeting covers will be promptly replaced.

- Stockpiles will be covered upon reaching their capacity (i.e., about 1,000 cubic yards) until ready for loading. Stockpiles that have not reached their capacity, whether active or inactive, will be covered at the end of each workday.
- Each stockpile will be encircled with silt fences and hay bales, as needed, to contain and filter particulates from rainwater that has drained off the soils and to mitigate the potential for surface water run-off.
- Stockpiles will be inspected at a minimum of once daily and after every storm event. Results of inspections will be recorded in a logbook, maintained at the site, and made available for inspection by the NYSDEC.

5.4.3 Materials Excavation and Load Out

A field engineer, scientist, or geologist under the supervision of the RE will monitor ground-intrusive work and the excavation and load-out of excavated material.

The Volunteer and its contractors are solely responsible for safe execution of ground-intrusive and other remedial work performed under this RAWP. The Volunteer and its contractors are solely responsible for the identification of utilities and/or easements that might be affected by the work conducted under this RAWP.

Loaded vehicles leaving the site will be appropriately lined, securely covered, manifested, and placarded in accordance with the appropriate federal, state, and local requirements, including applicable transportation requirements (i.e., New York State Department of Transportation [NYSDOT] and NYCDOT requirements). Trucks hauling historic fill material will not be lined unless free liquids are present or the material is grossly impacted.

A truck wash will be operated on site. The RE will be responsible for documenting that outbound trucks will be washed at the truck wash, as necessary, before leaving the site until the remedial construction is complete. Locations where vehicles enter or exit the site will be inspected daily for evidence of off-site sediment tracking.

The RE will be responsible for documenting that egress points for truck and equipment transport from the site will be clean of dirt and other materials derived from the site during remediation and development. The remediation contractor will clean adjacent streets as necessary to maintain a clean condition with respect to site-derived materials.

The Volunteer and associated parties preparing the remedial documents submitted to New York State, and the parties performing this work, are responsible for the safe performance of 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 Volunteer and associated parties will ensure that site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this RAWP.

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 RAWP.

Mechanical processing of historic fill and contaminated soil on-site is prohibited unless otherwise approved by NYSDEC.

Primary contaminant sources (including, but not limited to, tanks and hotspots) identified during site characterization, the RI, and implementation of the remedy 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 included with the FER. No survey will be required if a Track 1 cleanup is achieved. If the site fails to meet Track 1 cleanup requirements, the final excavation subgrade will be surveyed under the Track 2 cleanup requirements.

5.4.4 Materials Transport Off-Site

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 headed to disposal facilities will travel east on 37th Avenue to Northern Boulevard, west on Northern Boulevard to Jackson Avenue, and southwest on Jackson Avenue to Interstate 495, or other routes approved by NYSDEC. Truck transport routes are shown on Figure 9.

Trucks loaded with site materials will exit the vicinity of the site using approved truck routes. These routes are the most appropriate routes to and from the site and take into account:

- Limiting transport through residential areas and past sensitive sites
- Use of city mapped truck routes
- Prohibiting off-site queuing of trucks entering the facility
- Limiting total distance to major highways
- Promoting safety in access to highways
- Overall safety in transport
- Community input (where necessary)

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

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

To the extent possible, queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be minimized.

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.

5.4.5 Materials Disposal Off-Site

Disposal facilities will be determined at a later date and will be reported to the NYSDEC Project Manager prior to off-site transport and disposal of excavated material. About 15,000 cubic yards of historic fill and native soil that exceeds UU SCOs is expected to be disposed off-site. 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 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 UU SCOs is prohibited from being taken to a New York State recycling facility (6 NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the RE for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the site conforms to applicable laws:

(1) A letter from the RE or Volunteer to the receiving facility describing the material to be disposed of and requesting formal written acceptance of the material. This letter will state that material to be disposed of is contaminated material generated at an environmental remediation site located in New York State. The letter will provide the project identity and the name and phone number of the RE. The letter will include as an attachment a summary of chemical data for the material being transported (including waste characterization and RI data); and

(2) A letter from each receiving facility stating that it is in receipt of the correspondence (above) and acceptance of the material is approved.

These documents will be included in the FER.

Non-hazardous historic fill material and contaminated soil transported off-site will be handled, at a minimum, as a solid waste per 6 NYCRR Part 360. Historic fill and contaminated soil excavated from the site are prohibited from being disposed of at Part 360 Registration Facilities (also known as Soil Recycling Facilities).

Soil that is contaminated but non-hazardous and is removed from the site is considered by the NYSDEC Division of Materials Management (DMM) to be construction and demolition (C&D) materials with contamination not typical of virgin soils. Soil not meeting Restricted Use Residential SCOs will be considered a solid waste unless a Beneficial Use Determination (BUD) is processed stating otherwise. This soil may be sent to a permitted Part 360 landfill in New York or other appropriate out-of-state disposal facility permitted to accept contaminated soil from a brownfield site. This soil may be sent to a permitted C&D processing facility without permit modifications only upon prior notification of NYSDEC. This material is prohibited from being sent or redirected to a New York Part 360 Registration Facility. In this case, as dictated by DMM, special procedures will include, at a minimum, a letter to the C&D facility that provides a detailed explanation that the material is derived from an NYSDEC DER remediation site, that the material is contaminated, and that the material 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 RE. The letter will include as an attachment a summary of chemical data for the material being transported.

The FER will include an accounting of the destination of material removed from the site during implementation of the remedy, including excavated soil, contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of each material type must also include records and approvals for receipt of the material. This information will also be presented in a table to be included in the FER.

A "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 FER. Hazardous wastes derived from the site, if any, will be stored, transported, and disposed of in full compliance with applicable local, state, and federal regulations.

Appropriately licensed haulers, in compliance with applicable local, state, and federal regulations, will be used to transport the material removed from this site.

Waste characterization has been 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 results will be reported in the FER. Data available for excavated material to be disposed of 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

Reuse of site soil is note anticipated as part of the Track 1 remedy. Soil excavated during the remedy may be reused on site if the requirements in this section are met. Grossly-impacted soil will not be reused. Reused soil must be non-hazardous and must meet the Track 1 SCOs (refer to Table 3). Soil removed during implementation of the remedy or 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. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site is prohibited for reuse on-site. Reuse of soil will be coordinated in advance with the NYSDEC Project Manager. Material deemed unfit for reuse will be transported for off-site disposal.

5.4.7 Fluids Management

Liquids to be removed from the site, including dewatering fluids (although not anticipated), will be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP. Based on depth-to-groundwater observed during previous investigations, dewatering is not expected to be required to facilitate excavation of material that exceeds UU SCOs and construction of foundation components. If necessary, a dewatering and treatment system will be designed by the Remediation Contractor's NYS-licensed Professional Engineer. For the remedy, dewatering is considered a remedial component inasmuch as it is necessary to facilitate excavation of contaminated material.

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

5.4.8 Backfill from Off-Site Sources

Materials proposed for import onto the site will be approved by the RE and will be in compliance with the provisions in this RAWP prior to receipt at the site. Imported soil for backfill must meet the requirements of 6 NYCRR Part 375-6.7(d) and NYSDEC DER-10 Section 5.4(e), Table 5.4(e)10. Material from industrial sites, spill sites, other environmental remediation sites, or other potentially contaminated sites will not be imported to the site. Solid waste will not be imported onto the site.

The FER will include the following certification by the RE: "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 RAWP".

Backfill material will consist of clean fill (as described in the following paragraph) or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the site, it will be from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require chemical testing, unless required by the NYSDEC under the terms for operation of the facility. RCA imported to the site must be derived from recognizable and uncontaminated concrete, with no more than 10% by weight passing through a No. 80 sieve. RCA is not acceptable for and will not be used as cover or drainage material.

Imported soil (i.e., clean fill) will meet the Track 1 SCOs. Non-compliant soils will not be imported to the site. Clean fill will be segregated at a source/facility that is free of environmental contaminants. Qualified environmental personnel will collect representative samples at a frequency consistent with NYSDEC CP-51. The samples will be analyzed for Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, cyanide, and metals including trivalent and hexavalent chromium by a NYSDOH ELAP-certified laboratory. Upon meeting these criteria, the certified-clean fill will be transported to the site and segregated from impacted material, as necessary, on plastic sheeting until it is used as backfill.

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 the NYSDEC. The contents of this RAWP and NYSDEC approval of this RAWP should not be construed as an approval for this purpose.

Trucks entering the site with imported soils will be secured with tight fitting covers.

5.4.9 Stormwater Pollution Prevention

Silt fence or hay bales will be installed around the perimeter of the remedial construction area, as required. 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 maintained at the site and available for inspection by the NYSDEC. Necessary repairs to silt fence and/or hay bales will be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate materials. Manufacturer's recommendations will be followed for replacing silt fence damaged due to weathering. Erosion and sediment control measures identified in the RAWP will be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they will be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to the sewer system.

5.4.10 Contingency Plan

As discussed above in Section 4.2.7, if USTs or other previously unidentified contaminant sources are found during on-site remedial excavation or development-related construction, sampling will be performed on product, if encountered, and surrounding subsurface materials (e.g., soil, stone, etc.). Chemical analyses will be for full scan parameters (Part 375 VOCs, SVOCs, PCBs, pesticides, and metals). Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will also be detailed in the daily reports and the subsequent monthly BCP progress report.

5.4.11 Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the NYSDOH Generic CAMP outlined below.

The CAMP will include real-time monitoring for VOCs and particulates at the downwind perimeter of each designated work area when ground-intrusive work is in progress. Continuous monitoring will be required for all ground-intrusive work. Ground-intrusive work includes, but is not limited to, soil/fill excavation and handling and utility trenching. Periodic monitoring for VOCs may be required during non-intrusive work such as the collection of soil samples. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location and taking a reading prior to leaving a sample location.

CAMP monitoring of total VOC levels will be conducted using PIDs, and monitoring for particulates will be conducted using particulate sensors equipped with filters that can detect airborne particulates less than 10 microns in diameter (PM10). Monitoring for particulates and odors will be conducted during ground-intrusive work by a field engineer, scientist, or geologist under the supervision of the RE. The work zone is defined as the general area in which machinery is operating in support of remediation. A portable PID will be used to monitor the work zone and for periodic monitoring of total VOC levels during work such as soil sampling. The site perimeter will be visually monitored for fugitive dust emissions.

At least two days prior to implementation of the CAMP during intrusive activities, background VOC and particulate readings will be collected continuously at the site perimeter (three air monitoring stations). This background air quality data will be provided to NYSDOH and NYSDEC.

The following actions will be taken based on total VOC levels measured:

- If total VOC levels exceed 5 parts per million (ppm) above background for the 15-minute average at the perimeter, work will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the work zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work will resume provided that the total VOC level 200 feet downwind of the hot 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 above background for the 15-minute average
- If the total VOC level is above 25 ppm at the perimeter of the hot zone, work will be shut down.

The following actions will be taken based on visual dust observations:

- If the downwind particulate level is 100 µg/m³ greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that concentrations at the sensitive receptor and downwind PM10 levels do not exceed 150 µg/m³ above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m³ above the background 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 PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.

Sustained concentrations of VOCs or PM10 will be reported to the NYSDEC and NYSDOH Project Managers and included in the daily report. In addition, a map showing the location of the downwind and upwind CAMP stations will be included in the daily report.

5.4.12 Odor, Dust and Nuisance Control Plan

Dust, odor, and nuisance controls will be accomplished by the remediation contractor as described in this section. The FER will include the following certification by the RE: "I certify that ground-intrusive work during remediation and development-related construction was conducted in accordance with dust and odor suppression methodology defined in the RAWP."

Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off site. Specific odor control methods to be used if needed will include application of foam suppressants or tarps over the odor or VOC source areas. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until nuisance odors have been abated. The NYSDEC and NYSDOH will be notified of odor events and of other complaints about the project. Implementation of odor controls is the responsibility of the Contractor. Monitoring odor emission, including the halt of work, will be the responsibility of the RE, who is responsible for certifying the FER.

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

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

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 water distribution system, on-site water truck for road wetting, or an alternate source with suitable supply and pressure for use in dust control.
- Gravel will be used for on-site roads 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.

Other Nuisances

A plan for rodent control will be developed and used by the remediation contractor during site preparation (including clearing and grubbing) and during remedial work.

A plan for noise control will be developed and used by the remediation contractor during site preparation and remedial work and will conform, at a minimum, to the NYCDEP noise control standards.

5.5 In-Situ Groundwater Treatment

Groundwater localized to the SB04/MW04 area of the site (central-east portion) will be treated in-situ through ISCR via temporary injection points. Many hexavalent chromium compounds are highly soluble and exist in solution as hydrochromate, chromate, and dichromate ions. The goal of the in-situ groundwater treatment is to reduce the soluble and mobile hexavalent chromium to the less toxic and less mobile trivalent chromium, which forms minimally soluble precipitates. Hexavalent chromium can be removed from groundwater through precipitated solid phase chromium hydroxide. Upon establishing reducing conditions in groundwater, the hexavalent chromium is electrochemically reduced to trivalent chromium. Trivalent chromium has limited solubility in water and precipitates as insoluble chromium hydroxide. It is anticipated that ISCR would be applied to the central-east portion of the excavation in the vicinity of RI boring SB04/MW04 (about 2,700 square feet).

Reducing conditions can be attained by injecting an organic electron donor such as 3-D Microemulsion. A stronger reducing environment can be established quickly if a more robust reductant such as S-MicroZVI is also applied. S-MicroZVI is a colloidal suspension of micron scale ZVI in glycerol. This allows for application via temporary injection wells or direct push injections.

A technical memorandum will be prepared to describe the proposed treatment and will be presented to NYSDEC for review prior to implementation of the in-situ groundwater treatment program. The technical memorandum will include a summary of the following:

- Site Background
- Technology Description
- Remediation Recommendations
- In-Situ Remedy Implementation

Groundwater samples will be collected to document groundwater quality following application of the selected in-situ remediation technology. The samples will be submitted to an NYSDOH ELAP-accredited laboratory for analysis of total, hexavalent and trivalent chromium (total and dissolved analysis). Depending on the groundwater monitoring results, additional applications may be warranted. Based on groundwater sample results showing remediation and declining trend in dissolved concentrations of hexavalent chromium impacts, a request would be made to NYSDEC to discontinue sampling and consider the groundwater remedy complete.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Residual contaminated soil and groundwater will not exist beneath the development footprint after the Track 1 remedy is complete; therefore, engineering and institutional controls will not be required to protect human health and the environment. If a Track 1 cleanup is not achieved, residual contamination will be managed in place using engineering controls (i.e., vapor barrier / waterproofing membrane).

7.0 ENGINEERING CONTROLS

Following completion of the remedy, it is anticipated that the site will meet Track 1 SCOs; therefore, neither engineering controls (e.g., sub-membrane depressurization system or waterproofing/vapor barrier membrane) nor institutional controls (e.g., EE, SMP) will be required as part of the remedial action. In the event that a Track 1 cleanup is not achieved, but a Track 2 cleanup is achieved, it will be determined if implementation of engineering and institutional controls, including a vapor barrier and EE, is required.

The entire cellar level, including mechanical and amenity rooms and a parking garage, will be mechanically ventilated. Although not considered an engineering control, this ventilation system, along with the waterproofing/vapor barrier installed beneath the reinforced concrete slab, will mitigate any potential soil vapor effect on the proposed development of the site.

8.0 FINAL ENGINEERING REPORT

A FER will be submitted to the NYSDEC following implementation of the remedy defined in this RAWP. The FER will be prepared in conformance with NYSDEC DER-10 and will include the following:

- Documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan
- A comprehensive account of the locations and characteristics of material removed from the site including the surveyed map(s) of each source, as necessary
- As-built drawings for constructed elements, certifications, manifests, and bills of lading
- A description of the changes to the remedy from the elements provided in the RAWP and associated design documents, if any
- A tabular summary of performance evaluation sampling results and material characterization results and other sampling and chemical analyses performed as part of the remedy
- Written and photographic documentation of remedial work performed under this remedy
- A description of the in-situ groundwater remediation and documentation groundwater analytical results post-implementation.
- Sufficient information to show that remaining soil left on-site meets the Track 1 SCOs.
- If necessary, a thorough summary of remaining contamination that exceeds the Track 1 SCOs and an explanation for why the material was not removed as part of the remedy. A table and a map that shows remaining contamination in excess of the Track 1 SCOs will also be included.
- An accounting of the destination of material removed from the site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with the disposal of material must also include records and approvals for receipt of the material.
- An accounting of the origin and chemical quality of each material type imported onto the site.

Before approval of the FER and issuance of a Certificate of Completion, the daily reports and monthly BCP progress reports must be submitted in digital form on electronic media (i.e., PDF).

8.1 Certifications

The following certification will appear in front of the FER Executive Summary. The certification will be signed by the RE, Jason J. Hayes, who is a NYS-licensed Professional Engineer. The certification will be appropriately signed and stamped. The certification will include the following statements:

I, ________________________, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 37-11 30th Street site (NYSDEC Brownfield Cleanup Agreement Index No. C241211-05-18, Site No. C241211).

I certify that the site description presented in this Final Engineering Report is identical to the site descriptions presented in the Brownfield Cleanup Agreement for the 37-11 30th Street site.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my 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.

I certify that the export of contaminated soil, fill, water, or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all federal, state, and local laws.

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

I certify that ground-intrusive work during remediation and development-related construction was conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan.

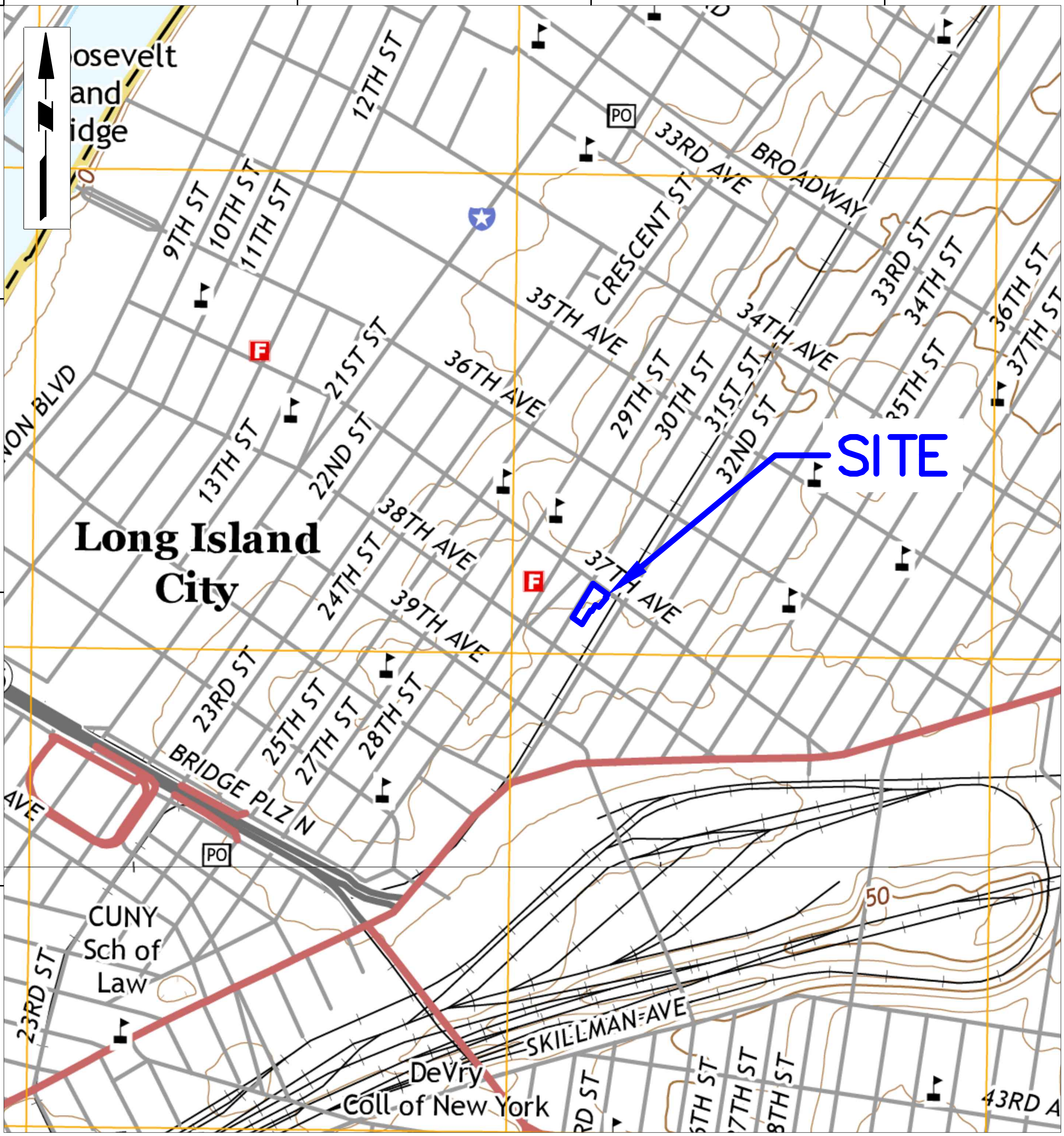
I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

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.

9.0 SCHEDULE

Mobilization for implementation of the RAWP is expected to take about one to two weeks. Once mobilization is complete, remediation of the site will continue. The remedy, which will be implemented in accordance with this RAWP, is anticipated to take about 6 months to complete. After completion of the remedy, a FER will be submitted to the NYSDEC for review and approval. A detailed project schedule is included in Appendix H.

FIGURES



NOTE:

BASE MAPS ADAPTED FROM UNITED STATES GEOLOGICAL SURVEY (USGS) 7.5-MINUTE CENTRAL PARK AND BROOKLYN TOPOGRAPHIC QUADRANGLES, DATED 2016.

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SCALE IN FEET

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Project	Figure Title	Project No.	Figure No.
37-11 30TH STREET BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21 QUEENS NEW YORK	SITE LOCATION MAP	170512301 Date: 10/03/2018 Drawn By: NEK Checked By: ES	1 Sheet 1 of 9

LEGEND:

BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY

APPROXIMATE BUILDING FOOTPRINT

NOTES:

1. BASE MAP TAKEN FROM http://maps.nyc.gov/taxmap/map.htm ACCESSED ON JANUARY 16, 2019.

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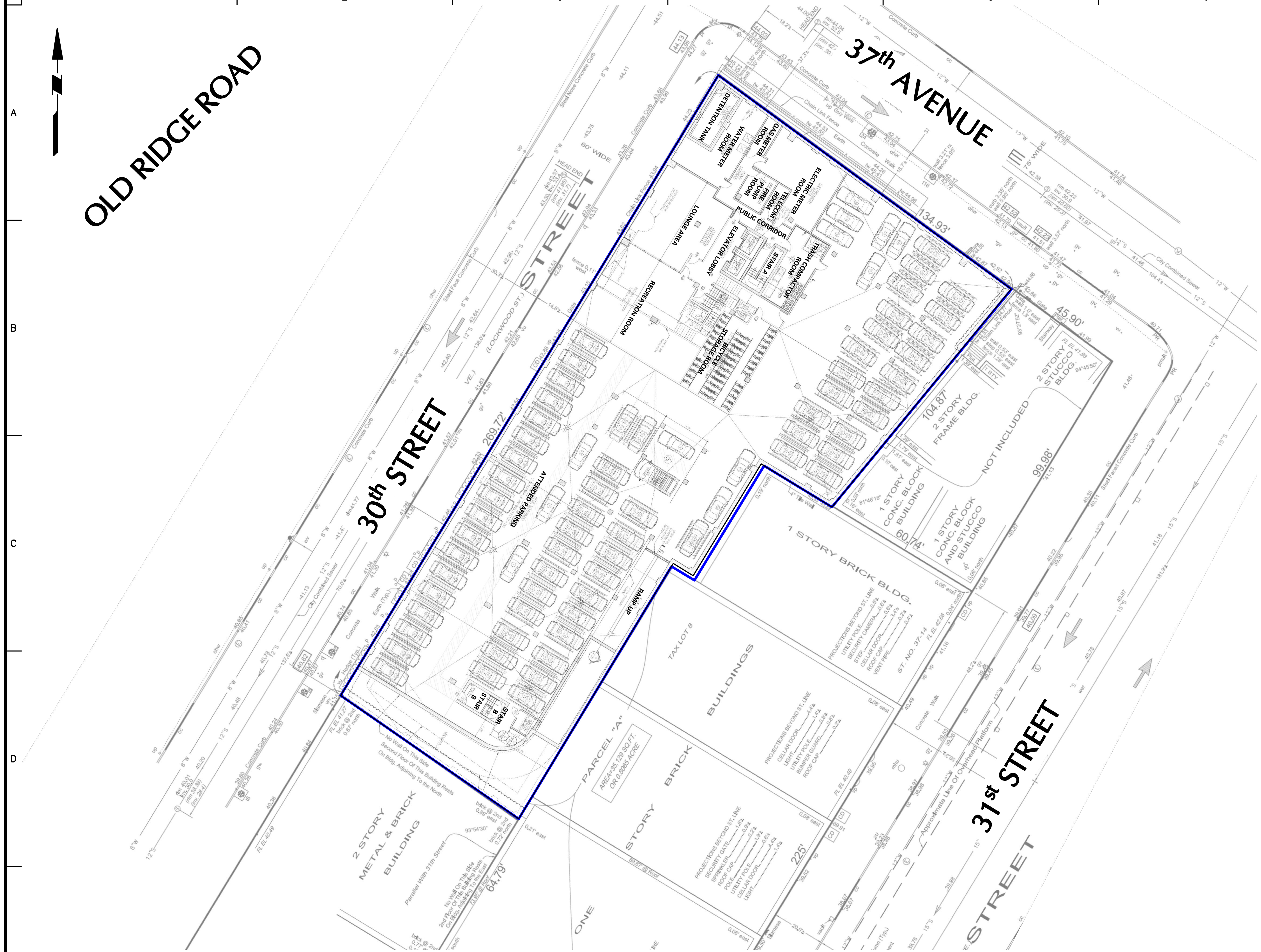
LANGAN Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. 21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com	Project 37-11 30TH STREET BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21 QUEENS NEW YORK	Figure Title SITE PLAN	Project No. 170512301 Date 01/16/2019 Drawn By NEK Checked By ELS	Figure No. 2 Sheet 2 of 9

Filename: \\langan.com\data\NYC\data3\170512301\Project Data\CAD\01\SheetFiles\RAWP\Figure 2 - Site Plan.dwg Date: 1/22/2019 Time: 15:15 User: nkung Style Table: Langan.stb Layout: Figure 2



LEGEND:

BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY NO. 41176-8, PREPARED BY MONTROSE SURVEYING CO., LLP., DATED JULY 26, 2017.
2. THE PROPOSED DEVELOPMENT BASE MAP IS TAKEN FROM THE 95% PROGRESS BID SET - CELLAR FLOOR PLAN, DRAWING A-100.00, PREPARED BY AUFGANG ARCHITECTS, DATED SEPTEMBER 14, 2018.
3. ELEVATIONS REFERENCE THE UNITED STATES GEOLOGICAL SURVEY (USGS) NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

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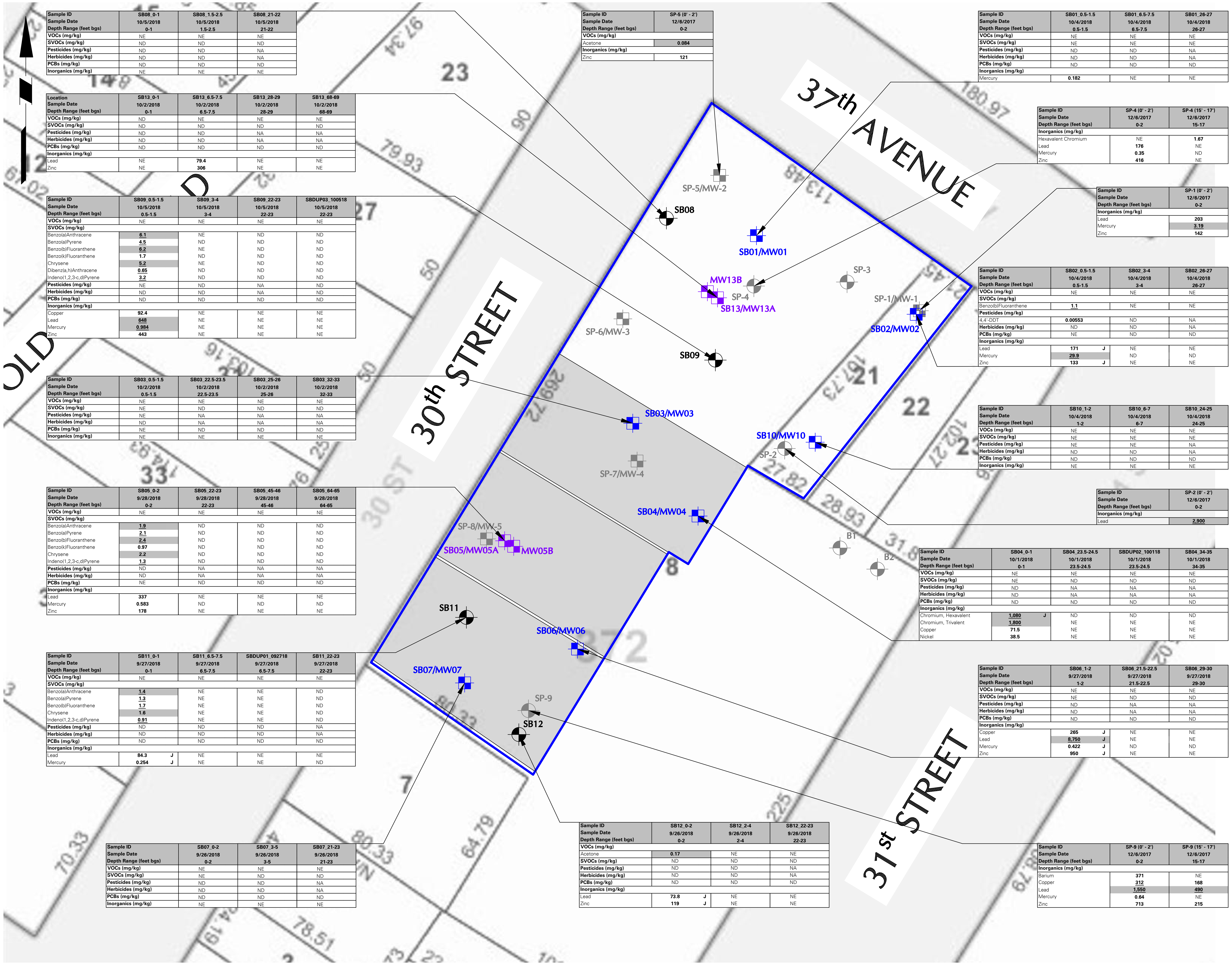
Project	Figure Title	Project No. 170512301	Figure No.
37-11 30TH STREET BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21 QUEENS NEW YORK	PROPOSED CELLAR PLAN	Date 01/16/2019 Drawn By NEK Checked By ELS	3 Sheet 3 of 9

Filename: \\langan.com\data\NYC\data3\170512301\Project Data\CAD\01\SheetFiles\RAWP\Figure 3 - Proposed Development Plan.dwg Date: 1/31/2019 Time: 17:07 User: nkung Style Table: Langan.stb Layout: Figure 2



Sample ID	SB08_0-1	SB08_1.5-2.5	SB08_21-22
Sample Date	10/5/2018	10/5/2018	10/5/2018
Depth Range (feet bgs)	0-1	1.5-2.5	21-22
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)	ND	ND	ND
Pesticides (mg/kg)	ND	ND	NA
Herbicides (mg/kg)	ND	ND	NA
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)	NE	NE	NE

Location	SB13_0-1	SB13_6.5-7.5	SB13_28-29	SB13_68-69
Sample Date	10/2/2018	10/2/2018	10/2/2018	10/2/2018
Depth Range (feet bgs)	0-1	6.5-7.5	28-29	68-69
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)	ND	ND	ND	ND
Pesticides (mg/kg)	ND	ND	NA	NA
Herbicides (mg/kg)	ND	ND	NA	NA
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Lead	NE	79.4	NE	NE
Zinc	NE	306	NE	NE

Sample ID	SB09_0.5-1.5	SB09_3-4	SB09_22-23	SBDUP03_100518
Sample Date	10/5/2018	10/5/2018	10/5/2018	10/5/2018
Depth Range (feet bgs)	0.5-1.5	3-4	22-23	22-23
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	6.1	NE	ND	ND
Benzo(a)Pyrene	4.5	ND	ND	ND
Benzo(b)Fluoranthene	6.2	NE	ND	ND
Benzo(k)Fluoranthene	1.7	ND	ND	ND
Chrysene	5.2	NE	ND	ND
Dibenz(a,h)Anthracene	0.65	ND	ND	ND
Indeno(1,2,3-c,d)Pyrene	3.2	ND	ND	ND
Pesticides (mg/kg)	NE	ND	NA	ND
Herbicides (mg/kg)	ND	ND	NA	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Copper	92.4	NE	NE	NE
Lead	648	NE	NE	NE
Mercury	0.984	NE	NE	NE
Zinc	443	NE	NE	NE

Sample ID	SB03_0.5-1.5	SB03_22.5-23.5	SB03_25-26	SB03_32-33
Sample Date	10/2/2018	10/2/2018	10/2/2018	10/2/2018
Depth Range (feet bgs)	0.5-1.5	22.5-23.5	25-26	32-33
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)	NE	ND	ND	ND
Pesticides (mg/kg)	NE	NA	NA	NA
Herbicides (mg/kg)	ND	NA	NA	NA
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)	NE	NE	NE	NE

Sample ID	SB05_0-2	SB05_22-23	SB05_45-46	SB05_64-65
Sample Date	9/28/2018	9/28/2018	9/28/2018	9/28/2018
Depth Range (feet bgs)	0-2	22-23	45-46	64-65
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	1.9	ND	ND	ND
Benzo(a)Pyrene	2.1	ND	ND	ND
Benzo(b)Fluoranthene	2.4	ND	ND	ND
Benzo(k)Fluoranthene	0.97	ND	ND	ND
Chrysene	2.2	ND	ND	ND
Indeno(1,2,3-c,d)Pyrene	1.3	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA	NA
Herbicides (mg/kg)	ND	NA	NA	NA
PCBs (mg/kg)	NE	ND	ND	ND
Inorganics (mg/kg)				
Lead	337	NE	NE	NE
Mercury	0.583	ND	ND	ND
Zinc	178	NE	NE	NE

Sample ID	SB11_0-1	SB11_6.5-7.5	SBDUP01_092718	SB11_22-23
Sample Date	9/27/2018	9/27/2018	9/27/2018	9/27/2018
Depth Range (feet bgs)	0-1	6.5-7.5	6.5-7.5	22-23
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	1.4	NE	NE	ND
Benzo(a)Pyrene	1.3	NE	NE	ND
Benzo(b)Fluoranthene	1.7	NE	NE	ND
Chrysene	1.6	NE	NE	ND
Indeno(1,2,3-c,d)Pyrene	0.91	NE	NE	ND
Pesticides (mg/kg)	ND	ND	ND	NA
Herbicides (mg/kg)	ND	ND	ND	NA
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Lead	84.3 J	NE	NE	NE
Mercury	0.254 J	NE	NE	ND

Sample ID	SB07_0-2	SB07_3-5	SB07_21-23
Sample Date	9/26/2018	9/26/2018	9/26/2018
Depth Range (feet bgs)	0-2	3-5	21-23
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)	NE	ND	ND
Pesticides (mg/kg)	ND	ND	NA
Herbicides (mg/kg)	ND	ND	NA
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)	NE	NE	NE

Sample ID	SP-5 (0' - 2')
Sample Date	12/6/2017
Depth Range (feet bgs)	0-2
VOCs (mg/kg)	
Acetone	0.084
Inorganics (mg/kg)	
Zinc	121

Sample ID	SB12_0-2	SB12_2-4	SB12_22-23
Sample Date	9/26/2018	9/26/2018	9/26/2018
Depth Range (feet bgs)	0-2	2-4	22-23
VOCs (mg/kg)			
Acetone	0.17	NE	NE
SVOCs (mg/kg)	ND	ND	ND
Pesticides (mg/kg)	ND	ND	NA
Herbicides (mg/kg)	ND	ND	NA
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Lead	73.8 J	NE	NE
Zinc	119 J	NE	NE

Sample ID	SB01_0.5-1.5	SB01_6.5-7.5	SB01_26-27
Sample Date	10/4/2018	10/4/2018	10/4/2018
Depth Range (feet bgs)	0.5-1.5	6.5-7.5	26-27
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)	ND	ND	NA
Herbicides (mg/kg)	ND	ND	NA
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Mercury	0.182	NE	NE

Sample ID	SP-4 (0' - 2')	SP-4 (15' - 17')
Sample Date	12/6/2017	12/6/2017
Depth Range (feet bgs)	0-2	15-17
Inorganics (mg/kg)		
Hexavalent Chromium	NE	1.67
Lead	176	NE
Mercury	0.35	ND
Zinc	416	NE

Sample ID	SP-1 (0' - 2')
Sample Date	12/6/2017
Depth Range (feet bgs)	0-2
Inorganics (mg/kg)	
Lead	203
Mercury	3.19
Zinc	142

Sample ID	SB02_0.5-1.5	SB02_3-4	SB02_26-27
Sample Date	10/4/2018	10/4/2018	10/4/2018
Depth Range (feet bgs)	0.5-1.5	3-4	26-27
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)			
Benzo(b)Fluoranthene	1.1	NE	NE
Pesticides (mg/kg)			
4,4'-DDT	0.00553	ND	NA
Herbicides (mg/kg)	ND	ND	NA
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Lead	171 J	NE	NE
Mercury	29.9	ND	ND
Zinc	133 J	NE	NE

Sample ID	SB10_1-2	SB10_6-7	SB10_24-25
Sample Date	10/4/2018	10/4/2018	10/4/2018
Depth Range (feet bgs)	1-2	6-7	24-25
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)	NE	NE	NA
Herbicides (mg/kg)	ND	ND	NA
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)	NE	NE	NE

Sample ID	SP-2 (0' - 2')
Sample Date	12/6/2017
Depth Range (feet bgs)	0-2
Inorganics (mg/kg)	
Lead	2,900

Sample ID	SB04_0-1	SB04_23.5-24.5	SBDUP02_100118	SB04_34-35
Sample Date	10/1/2018	10/1/2018	10/1/2018	10/1/2018
Depth Range (feet bgs)	0-1	23.5-24.5	23.5-24.5	34-35
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)	NE	ND	ND	ND
Pesticides (mg/kg)	ND	NA	NA	NA
Herbicides (mg/kg)	ND	NA	NA	NA
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Chromium, Hexavalent	1,080 J	ND	ND	ND
Chromium, Trivalent	1,800	NE	NE	NE
Copper	71.5	NE	NE	NE
Nickel	38.5	NE	NE	NE

Sample ID	SB06_1-2	SB06_21.5-22.5	SB06_29-30
Sample Date	9/27/2018	9/27/2018	9/27/2018
Depth Range (feet bgs)	1-2	21.5-22.5	29-30
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)	NE	ND	ND
Pesticides (mg/kg)	ND	NA	NA
Herbicides (mg/kg)	ND	NA	NA
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Copper	265 J	NE	NE
Lead	8,750 J	NE	NE
Mercury	0.422 J	ND	ND
Zinc	950 J	NE	NE

Sample ID	SP-9 (0' - 2')	SP-9 (15' - 17')
Sample Date	12/6/2017	12/6/2017
Depth Range (feet bgs)	0-2	15-17
Inorganics (mg/kg)		
Barium	371	NE
Copper	312	168
Lead	1,550	490
Mercury	0.64	NE
Zinc	713	215

LEGEND:

- BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- SB01 — SOIL SAMPLE LOCATION (OCTOBER 2018 REMEDIAL INVESTIGATION)
- SB02/MW02 — SHALLOW GROUNDWATER/SOIL SAMPLE LOCATION (OCTOBER 2018 REMEDIAL INVESTIGATION)
- SB01/MW01A — DEEP GROUNDWATER/SOIL SAMPLE LOCATION WITH COUPLED SHALLOW MONITORING WELLS (OCTOBER 2018 REMEDIAL INVESTIGATION)
- APPROXIMATE BUILDING FOOTPRINT
- SP-8/MW-5 — GROUNDWATER/SOIL SAMPLE LOCATION, INSTALLED BY HYDRO TECH IN DECEMBER 2017
- B1 — SOIL SAMPLE LOCATION, INSTALLED BY MERRITT IN JUNE 2014
- SP-9 — SOIL SAMPLE LOCATION, INSTALLED BY HYDRO TECH IN DECEMBER 2017

NOTES:

1. BASEMAP ACCESSED FROM GIS.NYC.GOV/TAXMAP ON JANUARY 17, 2018.
2. SAMPLE LOCATIONS ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS.
3. SAMPLE LOCATIONS ARE TAKEN FROM THE DECEMBER 2017 LIMITED SUBSURFACE SITE INVESTIGATION, PREPARED BY HYDRO TECH ENVIRONMENTAL CORP. (HYDRO TECH) AND THE JUNE 2014 LIMITED SUBSURFACE INVESTIGATION REPORT, PREPARED BY MERRITT ENVIRONMENTAL CORP. (MERRITT). ALL SAMPLE LOCATIONS ARE APPROXIMATE.
4. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 375 UNRESTRICTED USE, RESTRICTED USE - PROTECTION OF GROUNDWATER, AND RESTRICTED USE RESTRICTED - RESIDENTAL SOIL CLEANUP OBJECTIVES (SCOs).
5. ONLY COMPOUNDS DETECTED AT CONCENTRATIONS ABOVE THEIR RESPECTIVE SCOs ARE SHOWN.
6. FOR SAMPLES COLLECTED BY OTHERS IN 2014 AND 2017, ONLY COMPOUNDS DETECTED AT CONCENTRATIONS ABOVE THE COMPARISON CRITERIA ARE SHOWN.
7. ANALYTES DETECTED WITH CONCENTRATIONS ABOVE UNRESTRICTED USE SCOs ARE BOLDED.
8. ANALYTES DETECTED WITH CONCENTRATIONS ABOVE RESTRICTED USE - PROTECTION OF GROUNDWATER SCOs ARE SHADED.
9. ANALYTES DETECTED WITH CONCENTRATIONS ABOVE RESTRICTED USE RESTRICTED - RESIDENTIAL ARE UNDERLINED.
10. SAMPLE SBDUP02_100118 IS A DUPLICATE SAMPLE OF SB04_23.5-24.5; SAMPLE SBDUP03_100518 IS A DUPLICATE SAMPLE OF SB09_22-23; AND SAMPLE SBDUP01_092718 IS A DUPLICATE SAMPLE OF SB11_6.5-7.5.
11. VOCs = VOLATILE ORGANIC COMPOUNDS
12. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
13. PCBs = POLYCHLORINATED BIPHEYNYLS
14. mg/kg = MILLIGRAM PER KILOGRAM
15. bgs = BELOW GRADE SURFACE
16. ND = NOT DETECTED
17. NE = NO EXCEEDANCE
18. NA = NOT ANALYZED
19. J =THE ANALYTE WAS POSITIVELY IDENTIFIED AND THE ASSOCIATED NUMERICAL VALUE IS THE APPROXIMATE CONCENTRATION OF THE ANALYTE IN THE SAMPLE.

Analyte	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use - Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use - Restricted Residential SCOs
VOCs (mg/kg)			
Acetone	0.05	0.05	100
SVOCs (mg/kg)			
Benzo(a)Anthracene	1	1	1
Benzo(a)Pyrene	1	22	1
Benzo(b)Fluoranthene	1	1.7	1
Benzo(k)Fluoranthene	0.8	1.7	3.9
Chrysene	1	1	3.9
Dibenz(a,h)Anthracene	0.33	1,000	0.33
Indeno(1,2,3-c,d)Pyrene	0.5	8.2	0.5
Pesticides (mg/kg)			
4,4'-DDT	0.0033	136	7.9
Inorganics (mg/kg)			
Barium	350	820	400
Chromium, Hexavalent	1	19	110
Chromium, Trivalent	30	~	180
Copper	50	1,720	270
Lead	63	450	400
Mercury	0.18	0.73	0.81
Nickel	30	130	310
Zinc	109	2,480	10,000

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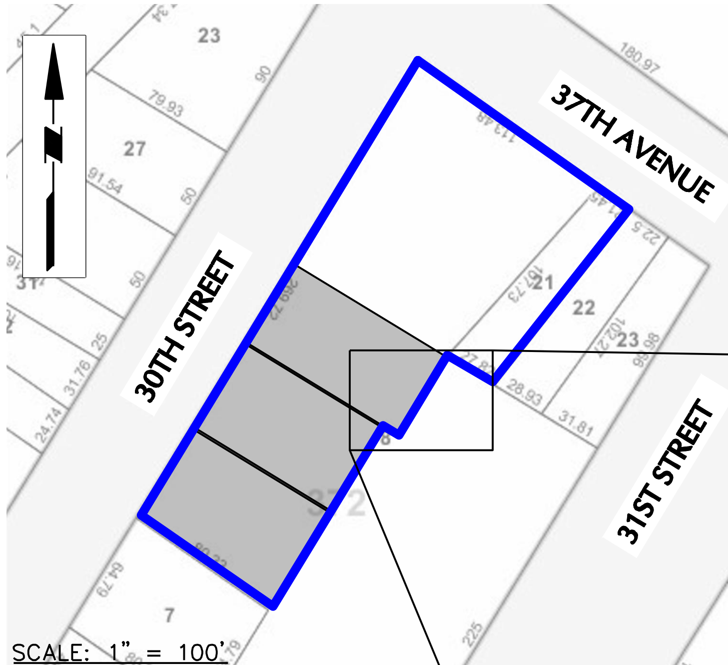
Project
37-11 30TH STREET
BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21
QUEENS NEW YORK

Figure Title
SOIL ANALYTICAL RESULTS MAP

Project No. 170512301
Date 04/02/2019
Drawn By NEK
Checked By ELS
Figure No. 4A
Sheet 4A of 9

PROJECT NO. 170512301

Filename: \\langan.com\data\NYC\data3\170512301\Project Data\CAD\01\SheetFiles\RIR\Figure 7 - Soil Analytical Results Map.dwg Date: 4/3/2019 Time: 14:03 User: nkung Style Table: Langan.stb Layout: RAWP - Figure 4A



100 0 50 100

SCALE IN FEET

NOTES:

1. BASEMAP ACCESSED FROM GIS.NYC.GOV/TAXMAP ON JANUARY 17, 2018.
2. SAMPLE LOCATIONS BASED ON FIELD MEASUREMENTS.
3. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE 6 NEW YORK CODES, RULES AND REGULATIONS (NYCRR) PART 371.3 AND 40 CFR 261 SUBPART C AND TABLE 1 OF 40 CFR 261.24 - ENVIRONMENTAL PROTECTION AGENCY (EPA) RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) CHARACTERISTIC OF HAZARDOUS WASTE.
4. ANALYTES DETECTED WITH CONCENTRATIONS ABOVE RCRA MAXIMUM CONCENTRATION OF CONTAMINANTS FOR THE TOXICITY CHARACTERISTIC ARE SHADED AND BOLDED.
5. mg/kg = MILLIGRAM PER KILOGRAM
6. mg/L = MILLIGRAM PER LITER
7. bgs = BELOW GRADE SURFACE
8. TCLP = TOXICITY CHARACTERISTIC LEACHING PROCEDURE
9. NE = ANALYTE CONCENTRATION DID NOT THE COMPARISON CRITERIA
10. ND = NOT DETECTED
11. NA = NOT ANALYZED

LEGEND:

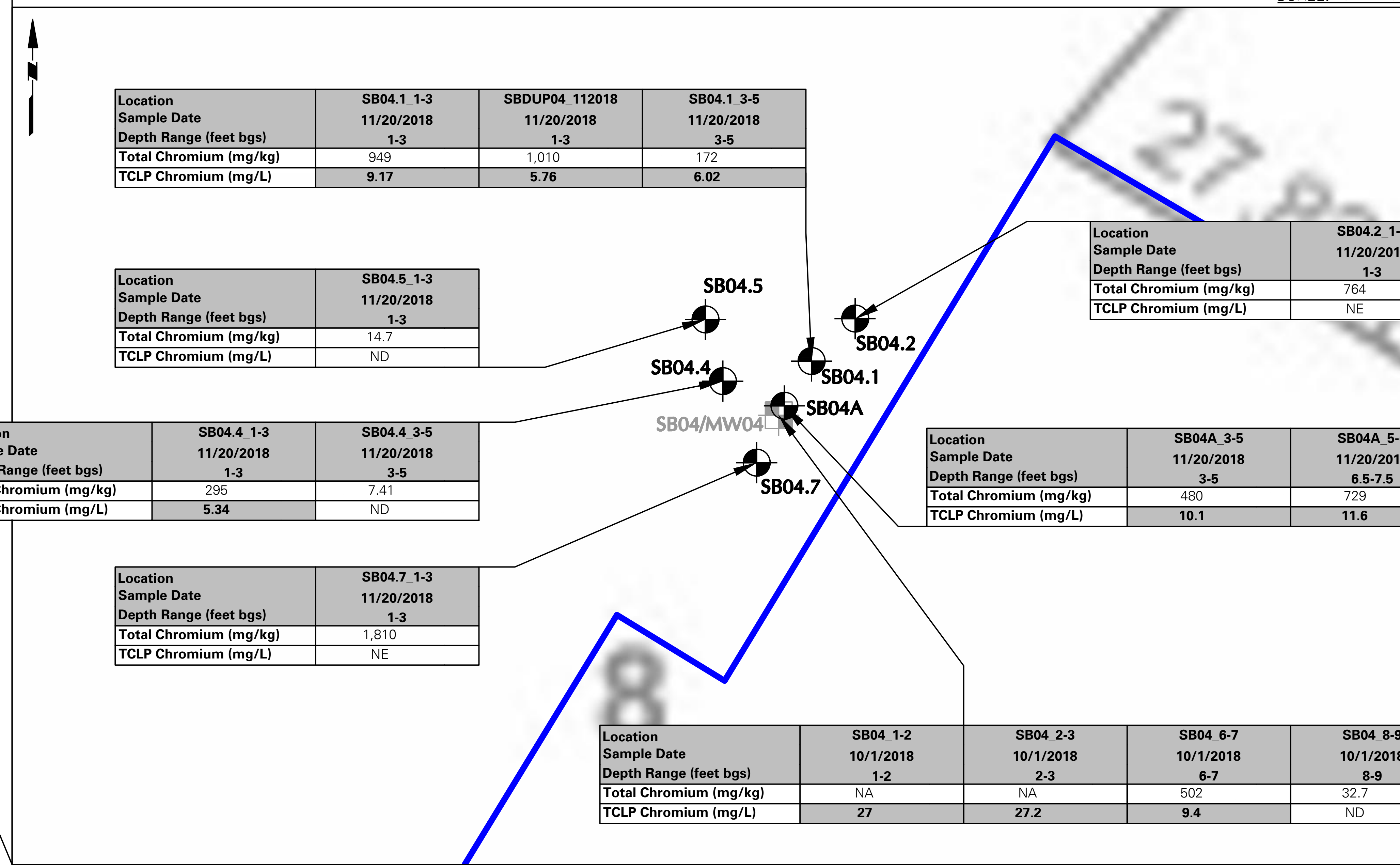
BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY

SB04/MW04 LOCATION OF FORMER REMEDIAL INVESTIGATION / WASTE CHARACTERIZATION SOIL BORING WITH OVERBURDEN MONITORING WELL

APPROXIMATE BUILDING BOUNDARY

SB04A LOCATION OF CHROMIUM DELINEATION SOIL BORING

INSET MAP: SCALE: 1" = 10'



Location	SB04.1_1-3	SBDUP04_112018	SB04.1_3-5
Sample Date	11/20/2018	11/20/2018	11/20/2018
Depth Range (feet bgs)	1-3	1-3	3-5
Total Chromium (mg/kg)	949	1,010	172
TCLP Chromium (mg/L)	**9.17**	**5.76**	**6.02**

Location	SB04.2_1-3
Sample Date	11/20/2018
Depth Range (feet bgs)	1-3
Total Chromium (mg/kg)	764
TCLP Chromium (mg/L)	NE

Location	SB04.5_1-3
Sample Date	11/20/2018
Depth Range (feet bgs)	1-3
Total Chromium (mg/kg)	14.7
TCLP Chromium (mg/L)	ND

Location	SB04.4_1-3	SB04.4_3-5
Sample Date	11/20/2018	11/20/2018
Depth Range (feet bgs)	1-3	3-5
Total Chromium (mg/kg)	295	7.41
TCLP Chromium (mg/L)	**5.34**	ND

Location	SB04A_3-5	SB04A_5-6
Sample Date	11/20/2018	11/20/2018
Depth Range (feet bgs)	3-5	6.5-7.5
Total Chromium (mg/kg)	480	729
TCLP Chromium (mg/L)	**10.1**	**11.6**

Location	SB04.7_1-3
Sample Date	11/20/2018
Depth Range (feet bgs)	1-3
Total Chromium (mg/kg)	1,810
TCLP Chromium (mg/L)	NE

Location	SB04_1-2	SB04_2-3	SB04_6-7	SB04_8-9
Sample Date	10/1/2018	10/1/2018	10/1/2018	10/1/2018
Depth Range (feet bgs)	1-2	2-3	6-7	8-9
Total Chromium (mg/kg)	NA	NA	502	32.7
TCLP Chromium (mg/L)	**27**	**27.2**	**9.4**	ND

Analyte	RCRA Maximum Concentration of Contaminants for the Toxicity Characteristic
TCLP Chromium (mg/L)	5

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Project

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BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21

QUEENS NEW YORK

Figure Title

CHROMIUM DELINEATION ANALYTICAL RESULTS MAP

Project No. 170512301

Date 12/06/2018

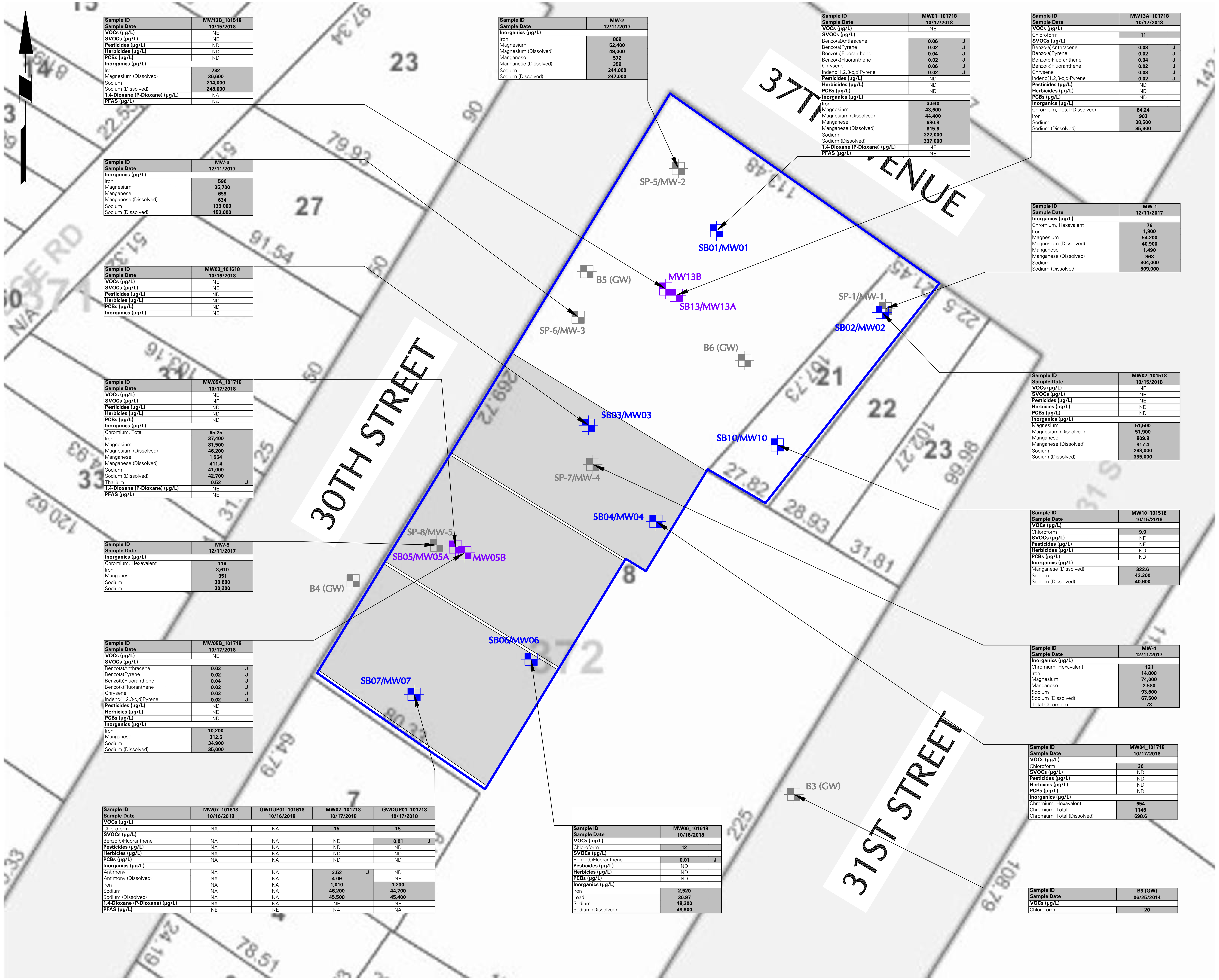
Drawn By NEK

Checked By ELS

Figure No. 4B

Sheet 4B of 9

Filename: \\langan.com\data\NYC\data3\170512301\Project Data\CAD\01\SheetFiles\RIR\Figure 10 - Chromium Delineation Soil Boring Location and Results Plan.dwg Date: 4/2/2019 Time: 16:40 User: nkung Style Table: Langan.stb Layout: RAWP - Figure 4B



Sample ID / Sample Date	MW13B_101518 10/15/2018
VOCs (µg/L)	NE
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	732
Magnesium (Dissolved)	36,600
Sodium	214,000
Sodium (Dissolved)	248,000
1,4-Dioxane (P-Dioxane) (µg/L)	NA
PFAS (µg/L)	NA

Sample ID / Sample Date	MW-3 12/11/2017
Inorganics (µg/L)	
Iron	590
Magnesium	35,700
Manganese	659
Manganese (Dissolved)	634
Sodium	139,000
Sodium (Dissolved)	153,000

Sample ID / Sample Date	MW03_101618 10/16/2018
VOCs (µg/L)	NE
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicies (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	NE

Sample iD / Sample Date	MW05A_101718 10/17/2018
VOCs (µg/L)	NE
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicies (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Chromium, Total	65.25
Iron	37,400
Magnesium	81,500
Magnesium (Dissolved)	46,200
Manganese	1,554
Manganese (Dissolved)	411.4
Sodium	41,000
Sodium (Dissolved)	42,700
Thallium	0.52 J
1,4-Dioxane (P-Dioxane) (µg/L)	NE
PFAS (µg/L)	NE

Sample ID / Sample Date	MW-5 12/11/2017
Inorganics (µg/L)	
Chromium, Hexavalent	119
Iron	3,610
Manganese	951
Sodium	30,600
Sodium	30,200

Sample ID / Sample Date	MW05B_101718 10/17/2018
VOCs (µg/L)	NE
SVOCs (µg/L)	
Benzo(a)Anthracene	0.03 J
Benzo(a)Pyrene	0.02 J
Benzo(b)Fluoranthene	0.04 J
Benzo(k)Fluoranthene	0.02 J
Chrysene	0.03 J
Indeno(1,2,3-c,d)Pyrene	0.02 J
Pesticides (µg/L)	ND
Herbicies (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	10,200
Manganese	312.5
Sodium	34,900
Sodium (Dissolved)	35,000

Sample ID / Sample Date	MW07_101618 10/16/2018	GWDUP01_101618 10/16/2018	MW07_101718 10/17/2018	GWDUP01_101718 10/17/2018
VOCs (µg/L)				
Chloroform	NA	NA	15	15
SVOCs (µg/L)				
Benzo(b)Fluoranthene	NA	NA	ND	0.01 J
Pesticides (µg/L)	NA	NA	ND	ND
Herbicies (µg/L)	NA	NA	ND	ND
PCBs (µg/L)	NA	NA	ND	ND
Inorganics (µg/L)				
Antimony	NA	NA	3.52 J	ND
Antimony (Dissolved)	NA	NA	4.09	NE
Iron	NA	NA	1,010	1,230
Sodium	NA	NA	46,200	44,700
Sodium (Dissolved)	NA	NA	45,500	45,400
1,4-Dioxane (P-Dioxane) (µg/L)	NA	NA	NE	NE
PFAS (µg/L)	NE	NE	NA	NA

Sample ID / Sample Date	MW-2 12/11/2017
Inorganics (µg/L)	
Iron	809
Magnesium	52,400
Magnesium (Dissolved)	49,000
Manganese	572
Manganese (Dissolved)	359
Sodium	244,000
Sodium (Dissolved)	247,000

Sample ID / Sample Date	MW01_101718 10/17/2018
VOCs (µg/L)	NE
SVOCs (µg/L)	
Benzo(a)Anthracene	0.06 J
Benzo(a)Pyrene	0.02 J
Benzo(b)Fluoranthene	0.04 J
Benzo(k)Fluoranthene	0.02 J
Chrysene	0.06 J
Indeno(1,2,3-c,d)Pyrene	0.02 J
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	3,640
Magnesium	43,600
Magnesium (Dissolved)	44,400
Manganese	680.8
Manganese (Dissolved)	615.6
Sodium	322,000
Sodium (Dissolved)	337,000
1,4-Dioxane (P-Dioxane) (µg/L)	NE
PFAS (µg/L)	NE

Sample ID / Sample Date	MW13A_101718 10/17/2018
VOCs (µg/L)	
Chloroform	11
SVOCs (µg/L)	
Benzo(a)Anthracene	0.03 J
Benzo(a)Pyrene	0.02 J
Benzo(b)Fluoranthene	0.04 J
Benzo(k)Fluoranthene	0.02 J
Chrysene	0.03 J
Indeno(1,2,3-c,d)Pyrene	0.02 J
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Chromium, Total (Dissolved)	64.24
Iron	903
Sodium	38,500
Sodium (Dissolved)	35,300

Sample ID / Sample Date	MW-1 12/11/2017
Inorganics (µg/L)	
Chromium, Hexavalent	76
Iron	1,800
Magnesium	54,200
Magnesium (Dissolved)	40,900
Manganese	1,490
Manganese (Dissolved)	968
Sodium	304,000
Sodium (Dissolved)	309,000

Sample ID / Sample Date	MW02_101518 10/15/2018
VOCs (µg/L)	NE
SVOCs (µg/L)	NE
Pesticides (µg/L)	NE
Herbicies (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Magnesium	51,500
Magnesium (Dissolved)	51,900
Manganese	809.8
Manganese (Dissolved)	817.4
Sodium	298,000
Sodium (Dissolved)	335,000

Sample ID / Sample Date	MW10_101518 10/15/2018
VOCs (µg/L)	
Chloroform	9.9
SVOCs (µg/L)	NE
Pesticides (µg/L)	NE
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Manganese (Dissolved)	322.6
Sodium	42,300
Sodium (Dissolved)	40,600

Sample ID / Sample Date	MW-4 12/11/2017
Inorganics (µg/L)	
Chromium, Hexavalent	121
Iron	14,800
Magnesium	74,000
Manganese	2,580
Sodium	93,600
Sodium (Dissolved)	67,500
Total Chromium	73

Sample ID / Sample Date	MW04_101718 10/17/2018
VOCs (µg/L)	
Chloroform	36
SVOCs (µg/L)	ND
Pesticides (µg/L)	ND
Herbicies (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Chromium, Hexavalent	654
Chromium, Total	1146
Chromium, Total (Dissolved)	698.6

Sample ID / Sample Date	MW06_101618 10/16/2018
VOCs (µg/L)	
Chloroform	12
SVOCs (µg/L)	
Benzo(b)Fluoranthene	0.01 J
Pesticides (µg/L)	ND
Herbicies (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	2,520
Lead	36.97
Sodium	48,200
Sodium (Dissolved)	48,900

Sample ID / Sample Date	B3 (GW) 06/25/2014
VOCs (µg/L)	
Chloroform	20

LEGEND:

- BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- SB02/MW02 — SHALLOW GROUNDWATER/SOIL SAMPLE LOCATION (OCTOBER 2018 REMEDIAL INVESTIGATION)
- SB01/MW01A — DEEP GROUNDWATER/SOIL SAMPLE LOCATION WITH COUPLED SHALLOW MONITORING WELLS (OCTOBER 2018 REMEDIAL INVESTIGATION)
- APPROXIMATE BUILDING FOOTPRINT
- SP-8/MW-5 — GROUNDWATER/SOIL SAMPLE LOCATION, INSTALLED BY HYDRO TECH IN DECEMBER 2017
- B6(GW) — GROUNDWATER/SOIL SAMPLE LOCATION, INSTALLED BY MERRITT IN JUNE 2014

NOTES:

1. BASEMAP ACCESSED FROM GIS.NYC.GOV/TAXMAP ON JANUARY 17, 2018.
2. MONITORING WELL LOCATIONS ARE APPROXIMATE AND BASED ON FIELD MEASUREMENTS.
3. SAMPLE LOCATIONS ARE TAKEN FROM THE DECEMBER 2017 LIMITED SUBSURFACE SITE INVESTIGATION, PREPARED BY HYDRO TECH ENVIRONMENTAL CORP. (HYDRO TECH) AND THE JUNE 2014 LIMITED SUBSURFACE INVESTIGATION REPORT, PREPARED BY MERRITT ENVIRONMENTAL CORP. (MERRITT). ALL SAMPLE LOCATIONS ARE APPROXIMATE.
4. GROUNDWATER SAMPLE RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES, AND REGULATIONS (NYCRR) PART 703.5 AND THE NYSDEC TECHNICAL OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES FOR CLASS GA WATER (NYSDEC SGVs).
5. REGULATORY CRITERIA DO NOT EXIST FOR PERFLUORINATED AND POLYFLUORINATED ALKYL SUBSTANCES (PFAS) AND 1,4-DIOXANE IN NEW YORK STATE. PFAS AND 1,4-DIOXANE ARE COMPARED TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) HEALTH ADVISORY LEVEL.
6. ONLY ANALYTICAL RESULTS DETECTED AT CONCENTRATIONS ABOVE THEIR RESPECTIVE NYSDEC SGVs ARE SHOWN.
6. FOR SAMPLES COLLECTED BY OTHERS IN 2014 AND 2017, ONLY COMPOUNDS DETECTED AT CONCENTRATIONS ABOVE THE COMPARISON CRITERIA ARE SHOWN.
7. ANALYTES DETECTED WITH CONCENTRATIONS ABOVE NYSDEC SGVs ARE BOLDED AND SHADED.
8. SAMPLE GWDUP01_101618 IS A DUPLICATE SAMPLE OF MW07_101618 AND SAMPLE GWDUP01_101718 IS A DUPLICATE SAMPLE OF MW07_101718.
9. VOCs = VOLATILE ORGANIC COMPOUNDS
7. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
8. PCBs = POLYCHLORINATED BIPHENYLS
9. PFAS = PER AND POLYFLUOROALKYL SUBSTANCES
10. µg/L = MICROGRAMS PER LITER
11. NE = NO EXCEEDANCE
12. ND = NOT DETECTED
13. NA = NOT ANALYZED
14. J = THE ANALYTE WAS POSITIVELY IDENTIFIED AND THE ASSOCIATED NUMERICAL VALUE IS THE APPROXIMATE CONCENTRATION OF THE ANALYTE IN THE SAMPLE.

Analyte	NYSDEC SGVs
VOCs (µg/L)	
Chloroform	7
SVOCs (µg/L)	
Benzo(a)Anthracene	0.002
Benzo(a)Pyrene	0
Benzo(b)Fluoranthene	0.002
Benzo(k)Fluoranthene	0.002
Chrysene	0.002
Indeno(1,2,3-c,d)Pyrene	0.002
Inorganics (µg/L)	
Antimony	3
Chromium, Hexavalent	50
Chromium, Total	50
Iron	300
Lead	25
Magnesium	35,000
Manganese	300
Sodium	20,000
Thallium	0.5

Analyte	USEPA Health Advisory Level
PFAS (µg/L)	
Perfluorooctanesulfonic acid	0.07
Perfluorooctanoic acid	0.07

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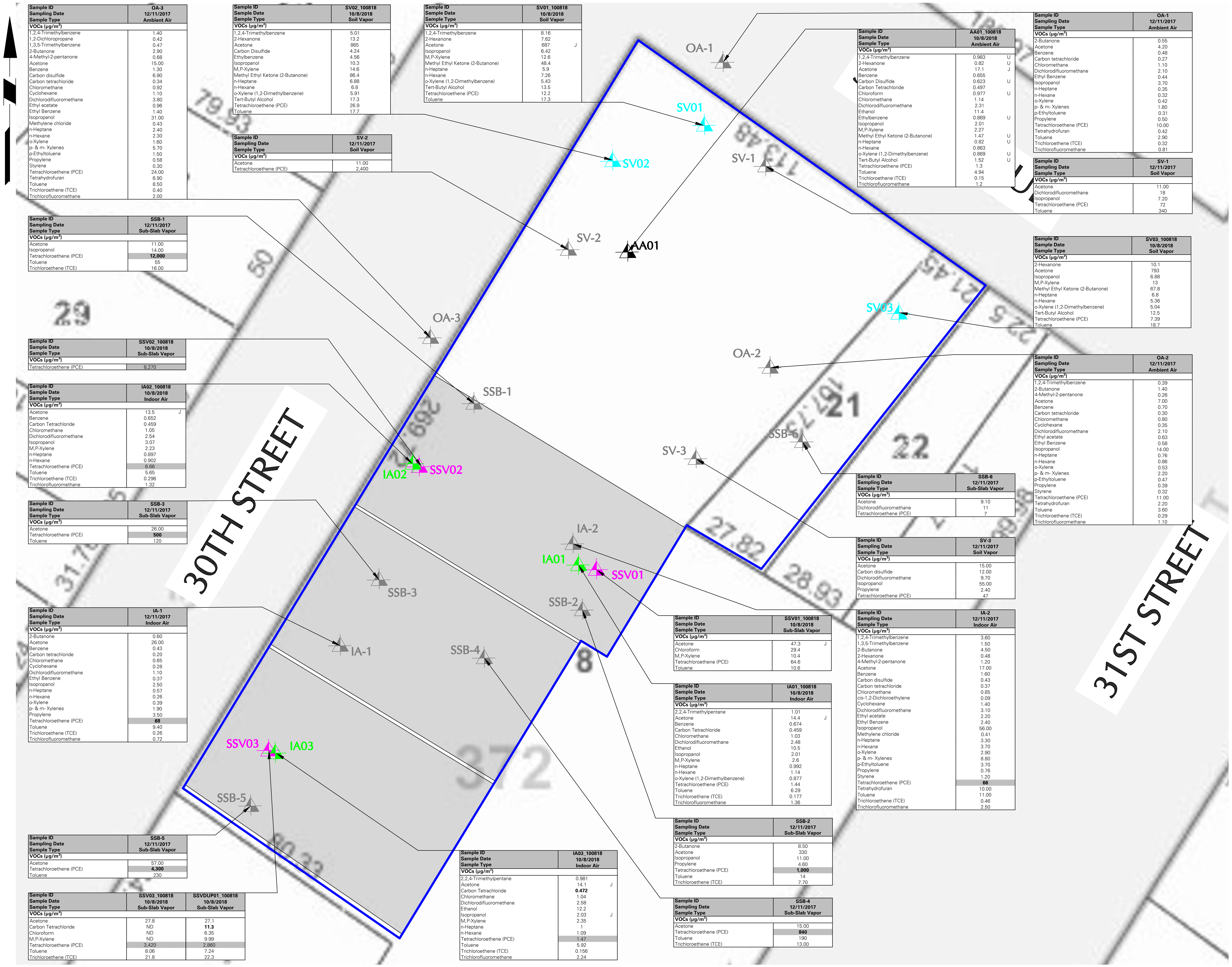
Project: 37-11 30TH STREET
BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21
QUEENS NEW YORK

Figure Title: GROUNDWATER ANALYTICAL RESULTS MAP

Project No.	170512301
Date	04/02/2019
Drawn By	NEK
Checked By	ELS
Figure No.	5
Sheet	5 of 9

PROJECT NO. 170512301

Filename: \\langan.com\data\NYC\data3\170512301\Project Data\CAD\01\SheetFiles\RIR\Figure 8 - Groundwater Sample Location and Analytical Results Map.dwg Date: 4/3/2019 Time: 14:39 User: nkung Style Table: Langan.stb Layout: RAWP - Figure 5



Sample ID Sampling Date Sample Type	OA-3 12/11/2017 Ambient Air
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	1.40
1,2-Dichloropropane	0.42
1,3,5-Trimethylbenzene	0.47
2-Butanone	2.90
4-Methyl-2-pentanone	0.68
Acetone	15.00
Benzene	1.30
Carbon disulfide	6.90
Carbon tetrachloride	0.34
Chloromethane	0.92
Cyclohexane	1.10
Dichlorodifluoromethane	3.80
Ethyl acetate	0.96
Ethyl Benzene	1.40
Isopropanol	31.00
Methylene chloride	0.43
n-Heptane	2.40
n-Hexane	2.30
o-Xylene	1.60
p- & m- Xylenes	5.70
p-Ethyltoluene	1.50
Propylene	0.58
Styrene	0.30
Tetrachloroethene (PCE)	24.00
Tetrahydrofuran	6.90
Toluene	8.50
Trichloroethene (TCE)	0.40
Trichlorofluoromethane	2.00

Sample ID Sample Date Sample Type	SV02_100818 10/8/2018 Soil Vapor
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	5.01
2-Hexanone	13.2
Acetone	865
Carbon Disulfide	4.24
Ethylbenzene	4.56
Isopropanol	10.3
M,P-Xylene	14.6
Methyl Ethyl Ketone (2-Butanone)	86.4
n-Heptane	6.88
n-Hexane	6.8
o-Xylene (1,2-Dimethylbenzene)	5.91
Tert-Butyl Alcohol	17.3
Tetrachloroethene (PCE)	26.9
Toluene	17.7

Sample ID Sample Date Sample Type	SV01_100818 10/8/2018 Soil Vapor	
VOCs (µg/m³)		
1,2,4-Trimethylbenzene	8.16	
2-Hexanone	7.62	
Acetone	687	J
Isopropanol	6.42	
M,P-Xylene	12.6	
Methyl Ethyl Ketone (2-Butanone)	48.4	
n-Heptane	5.9	
n-Hexane	7.26	
o-Xylene (1,2-Dimethylbenzene)	5.43	
Tert-Butyl Alcohol	13.5	
Tetrachloroethene (PCE)	12.2	
Toluene	17.3	

Sample ID Sampling Date Sample Type	SV-2 12/11/2017 Soil Vapor
VOCs (µg/m³)	
Acetone	11.00
Tetrachloroethene (PCE)	2,400

Sample ID Sample Date Sample Type	AA01_100818 10/8/2018 Ambient Air	
VOCs (µg/m³)		
1,2,4-Trimethylbenzene	0.983	U
2-Hexanone	0.82	U
Acetone	17.1	J
Benzene	0.655	
Carbon Disulfide	0.623	U
Carbon Tetrachloride	0.497	
Chloroform	0.977	U
Chloromethane	1.14	
Dichlorodifluoromethane	2.31	
Ethanol	11.4	
Ethylbenzene	0.869	U
Isopropanol	2.01	
M,P-Xylene	2.27	
Methyl Ethyl Ketone (2-Butanone)	1.47	U
n-Heptane	0.82	U
n-Hexane	0.863	
o-Xylene (1,2-Dimethylbenzene)	0.869	U
Tert-Butyl Alcohol	1.52	U
Tetrachloroethene (PCE)	1.3	
Toluene	4.94	
Trichloroethene (TCE)	0.15	
Trichlorofluoromethane	1.2	

Sample ID Sampling Date Sample Type	OA-1 12/11/2017 Ambient Air
VOCs (µg/m³)	
2-Butanone	0.55
Acetone	4.20
Benzene	0.48
Carbon tetrachloride	0.27
Chloromethane	1.10
Dichlorodifluoromethane	2.10
Ethyl Benzene	0.44
Isopropanol	3.70
n-Heptane	0.35
n-Hexane	0.32
o-Xylene	0.42
p- & m- Xylenes	1.80
p-Ethyltoluene	0.31
Propylene	0.50
Tetrachloroethene (PCE)	10.00
Tetrahydrofuran	0.42
Toluene	2.90
Trichloroethene (TCE)	0.32
Trichlorofluoromethane	0.81

Sample ID Sampling Date Sample Type	SV-1 12/11/2017 Soil Vapor
VOCs (µg/m³)	
Acetone	11.00
Dichlorodifluoromethane	18
Isopropanol	7.20
Tetrachloroethene (PCE)	72
Toluene	340

Sample ID Sampling Date Sample Type	SSB-1 12/11/2017 Sub-Slab Vapor
VOCs (µg/m³)	
Acetone	11.00
Isopropanol	14.00
Tetrachloroethene (PCE)	**12,000**
Toluene	55
Trichloroethene (TCE)	16.00

Sample ID Sample Date Sample Type	SV03_100818 10/8/2018 Soil Vapor
VOCs (µg/m³)	
2-Hexanone	10.1
Acetone	793
Isopropanol	6.88
M,P-Xylene	13
Methyl Ethyl Ketone (2-Butanone)	67.8
n-Heptane	6.8
n-Hexane	5.36
o-Xylene (1,2-Dimethylbenzene)	5.04
Tert-Butyl Alcohol	12.5
Tetrachloroethene (PCE)	7.39
Toluene	18.7

Sample ID Sample Date Sample Type	SSV02_100818 10/8/2018 Sub-Slab Vapor
VOCs (µg/m³)	
Tetrachloroethene (PCE)	8,270

Sample ID Sampling Date Sample Type	OA-2 12/11/2017 Ambient Air
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	0.39
2-Butanone	1.40
4-Methyl-2-pentanone	0.26
Acetone	7.00
Benzene	0.70
Carbon tetrachloride	0.30
Chloromethane	0.80
Cyclohexane	0.35
Dichlorodifluoromethane	2.10
Ethyl acetate	0.63
Ethyl Benzene	0.58
Isopropanol	14.00
n-Heptane	0.76
n-Hexane	0.86
o-Xylene	0.53
p- & m- Xylenes	2.20
p-Ethyltoluene	0.47
Propylene	0.39
Styrene	0.32
Tetrachloroethene (PCE)	11.00
Tetrahydrofuran	2.20
Toluene	3.60
Trichloroethene (TCE)	0.29
Trichlorofluoromethane	1.10

Sample ID Sample Date Sample Type	IA02_100818 10/8/2018 Indoor Air	
VOCs (µg/m³)		
Acetone	13.5	J
Benzene	0.652	
Carbon Tetrachloride	0.459	
Chloromethane	1.05	
Dichlorodifluoromethane	2.54	
Isopropanol	3.07	
M,P-Xylene	2.23	
n-Heptane	0.897	
n-Hexane	0.902	
Tetrachloroethene (PCE)	6.66	
Toluene	5.65	
Trichloroethene (TCE)	0.296	
Trichlorofluoromethane	1.32	

Sample ID Sampling Date Sample Type	SSB-6 12/11/2017 Sub-Slab Vapor
VOCs (µg/m³)	
Acetone	9.10
Dichlorodifluoromethane	11
Tetrachloroethene (PCE)	7

Sample ID Sampling Date Sample Type	SSB-3 12/11/2017 Sub-Slab Vapor
VOCs (µg/m³)	
Acetone	26.00
Tetrachloroethene (PCE)	**500**
Toluene	120

Sample ID Sampling Date Sample Type	SV-3 12/11/2017 Soil Vapor
VOCs (µg/m³)	
Acetone	15.00
Carbon disulfide	12.00
Dichlorodifluoromethane	9.70
Isopropanol	55.00
Propylene	2.40
Tetrachloroethene (PCE)	47

Sample ID Sampling Date Sample Type	IA-1 12/11/2017 Indoor Air
VOCs (µg/m³)	
2-Butanone	0.60
Acetone	26.00
Benzene	0.43
Carbon tetrachloride	0.20
Chloromethane	0.65
Cyclohexane	0.28
Dichlorodifluoromethane	1.10
Ethyl Benzene	0.37
Isopropanol	2.50
n-Heptane	0.57
n-Hexane	0.26
o-Xylene	0.39
p- & m- Xylenes	1.90
Propylene	3.50
Tetrachloroethene (PCE)	**68**
Toluene	9.40
Trichloroethene (TCE)	0.26
Trichlorofluoromethane	0.72

Sample ID Sample Date Sample Type	SSV01_100818 10/8/2018 Sub-Slab Vapor	
VOCs (µg/m³)		
Acetone	47.3	J
Chloroform	29.4	
M,P-Xylene	10.4	
Tetrachloroethene (PCE)	64.6	
Toluene	10.6	

Sample ID Sampling Date Sample Type	IA-2 12/11/2017 Indoor Air
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	3.60
1,3,5-Trimethylbenzene	1.50
2-Butanone	4.50
2-Hexanone	0.48
4-Methyl-2-pentanone	1.20
Acetone	17.00
Benzene	1.60
Carbon disulfide	0.43
Carbon tetrachloride	0.37
Chloromethane	0.85
cis-1,2-Dichloroethylene	0.09
Cyclohexane	1.40
Dichlorodifluoromethane	3.10
Ethyl acetate	2.20
Ethyl Benzene	2.40
Isopropanol	56.00
Methylene chloride	0.41
n-Heptane	3.30
n-Hexane	3.70
o-Xylene	2.90
p- & m- Xylenes	8.80
p-Ethyltoluene	3.70
Propylene	0.76
Styrene	1.20
Tetrachloroethene (PCE)	**66**
Tetrahydrofuran	10.00
Toluene	11.00
Trichloroethene (TCE)	0.46
Trichlorofluoromethane	2.50

Sample ID Sample Date Sample Type	IA01_100818 10/8/2018 Indoor Air	
VOCs (µg/m³)		
2,2,4-Trimethylpentane	1.01	
Acetone	14.4	J
Benzene	0.674	
Carbon Tetrachloride	0.459	
Chloromethane	1.03	
Dichlorodifluoromethane	2.48	
Ethanol	10.5	
Isopropanol	2.01	
M,P-Xylene	2.6	
n-Heptane	0.992	
n-Hexane	1.14	
o-Xylene (1,2-Dimethylbenzene)	0.877	
Tetrachloroethene (PCE)	1.44	
Toluene	6.29	
Trichloroethene (TCE)	0.177	
Trichlorofluoromethane	1.36	

Sample ID Sampling Date Sample Type	SSB-2 12/11/2017 Sub-Slab Vapor
VOCs (µg/m³)	
2-Butanone	8.50
Acetone	330
Isopropanol	11.00
Propylene	4.60
Tetrachloroethene (PCE)	**1,000**
Toluene	14
Trichloroethene (TCE)	7.70

Sample ID Sampling Date Sample Type	SSB-4 12/11/2017 Sub-Slab Vapor
VOCs (µg/m³)	
Acetone	15.00
Tetrachloroethene (PCE)	**840**
Toluene	190
Trichloroethene (TCE)	13.00

Sample ID Sampling Date Sample Type	SSB-5 12/11/2017 Sub-Slab Vapor
VOCs (µg/m³)	
Acetone	57.00
Tetrachloroethene (PCE)	**4,300**
Toluene	230

Sample ID Sample Date Sample Type	SSV03_100818 10/8/2018 Sub-Slab Vapor	SSVDUP01_100818 10/8/2018 Sub-Slab Vapor
VOCs (µg/m³)		
Acetone	27.8	27.1
Carbon Tetrachloride	ND	**11.3**
Chloroform	ND	6.35
M,P-Xylene	ND	9.99
Tetrachloroethene (PCE)	3,420	2,860
Toluene	8.06	7.24
Trichloroethene (TCE)	21.8	22.3

Sample ID Sample Date Sample Type	IA03_100818 10/8/2018 Indoor Air	
VOCs (µg/m³)		
2,2,4-Trimethylpentane	0.981	
Acetone	14.1	J
Carbon Tetrachloride	**0.472**	
Chloromethane	1.04	
Dichlorodifluoromethane	2.58	
Ethanol	12.2	
Isopropanol	2.03	J
M,P-Xylene	2.35	
n-Heptane	1	
n-Hexane	1.09	
Tetrachloroethene (PCE)	1.47	
Toluene	5.92	
Trichloroethene (TCE)	0.156	
Trichlorofluoromethane	2.24	

LEGEND:

- BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- SSV01 — SUB-SLAB SOIL VAPOR SAMPLE LOCATION (OCTOBER 2018 REMEDIAL INVESTIGATION)
- IA01 — INDOOR AIR SAMPLE LOCATION (OCTOBER 2018 REMEDIAL INVESTIGATION)
- AA01 — AMBIENT AIR SAMPLE LOCATION (OCTOBER 2018 REMEDIAL INVESTIGATION)
- SV01 — SOIL VAPOR SAMPLE LOCATION (OCTOBER 2018 REMEDIAL INVESTIGATION)
- APPROXIMATE BUILDING FOOTPRINT
- SSB-3 — SUB-SLAB SOIL VAPOR LOCATION, INSTALLED BY HYDRO TECH IN DECEMBER 2017
- IA-2 — INDOOR AIR LOCATION, INSTALLED BY HYDRO TECH IN DECEMBER 2017
- SV-3 — SOIL VAPOR LOCATION, INSTALLED BY HYDRO TECH IN DECEMBER 2017
- OA-2 — AMBIENT AIR SAMPLE, INSTALLED BY HYDRO TECH IN DECEMBER 2017

NOTES:

1. BASEMAP ACCESSED FROM GIS.NYC.GOV/TAXMAP ON JANUARY 17, 2018.
2. SOIL VAPOR LOCATIONS AND PROPERTY BOUNDARIES ARE APPROXIMATE.
3. SAMPLE LOCATIONS ARE TAKEN FROM THE DECEMBER 2017 LIMITED SUBSURFACE SITE INVESTIGATION, PREPARED BY HYDRO TECH ENVIRONMENTAL CORP. (HYDRO TECH) AND THE JUNE 2014 LIMITED SUBSURFACE INVESTIGATION REPORT, PREPARED BY MERRITT ENVIRONMENTAL CORP. (MERRITT). ALL SAMPLE LOCATIONS ARE APPROXIMATE.
4. SOIL VAPOR SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE AMBIENT AIR (AA) SAMPLES.
5. SUB-SLAB SOIL VAPOR SAMPLE AND INDOOR AIR SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE MINIMUM SOIL VAPOR CONCENTRATIONS RECOMMENDING MITIGATION AS SET FORTH IN THE NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) OCTOBER 2006 GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK DECISION MATRICES FOR SUB-SLAB VAPOR AND INDOOR AIR AND SUBSEQUENT UPDATES (2017).
6. FOR SAMPLES COLLECTED BY OTHERS IN 2014 AND 2017, ONLY COMPOUNDS DETECTED AT CONCENTRATIONS ABOVE THE COMPARISON CRITERIA ARE SHOWN.
7. DETECTED SOIL VAPOR SAMPLE ANALYTICAL RESULTS COMPOUNDS ARE SHOWN.
8. INDOOR AIR AND SUB-SLAB SOIL VAPOR SAMPLE COMPOUNDS DETECTED AT CONCENTRATIONS ABOVE THE MINIMUM SOIL VAPOR CONCENTRATIONS RECOMMENDING MONITORING ARE BOLDED.
9. INDOOR AIR AND SUB-SLAB SOIL VAPOR SAMPLE COMPOUNDS DETECTED AT CONCENTRATIONS ABOVE THE MINIMUM SOIL VAPOR CONCENTRATIONS RECOMMENDING MITIGATION ARE SHADED.
10. VOC = VOLATILE ORGANIC COMPOUND
11. µg/m³ = MICROGRAM PER METER CUBED
12. ND = NOT DETECTED
13. NE = NO EXCEEDANCE
14. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL), BUT BELOW THE REPORTING LIMIT (RL); THEREFORE, THE RESULT IS AN ESTIMATED CONCENTRATION.
15. SAMPLE SSVDUP01_100818 IS A DUPLICATE OF PARENT SAMPLE SSV03_100818.

Analyte	NYSDOH Decision Matrix	NYSDOH AGVs
VOCs (µg/m³)		
Carbon Tetrachloride	A	~
Tetrachloroethene (PCE)	B	30
Trichloroethene (TCE)	A	2

SCALE IN FEET: 15 0 7.5 15

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Project: 37-11 30TH STREET
BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21
QUEENS NEW YORK

Figure Title: SOIL VAPOR ANALYTICAL RESULTS MAP

Project No. 170512301
Date 04/02/2019
Drawn By NEK
Checked By ELS
Figure No. 6
Sheet 6 of 9

LANGAN
PROJECT NO. 170512301

Filename: \\langan.com\data\NYC\data3\170512301\Project Data\CAD\01\SheetFiles\RIR\Figure 9 - Soil Vapor Sample Map.dwg Date: 7/11/2019 Time: 15:05 User: nkung Style Table: Langan.stb Layout: RAWP - Figure 6

LEGEND:

- BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY
- APPROXIMATE EXTENT OF REMEDIAL EXCAVATION TO ABOUT 15 FEET BGS (ABOUT ELEVATION 26.5 TO 29.5 NAVD88)
- APPROXIMATE EXTENTS OF HAZARDOUS CHROMIUM EXCAVATION TO 8 FEET BGS
- APPROXIMATE BUILDING FOOTPRINT

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY NO. 41176-8, PREPARED BY MONTROSE SURVEYING CO., LLP., DATED JULY 26, 2017.
2. THE PROPOSED DEVELOPMENT BASE MAP IS TAKEN FROM THE 95% PROGRESS BID SET - CELLAR FLOOR PLAN, DRAWING A-100.00, PREPARED BY AUFGANG ARCHITECTS, DATED SEPTEMBER 14, 2018.
3. ELEVATIONS REFERENCE THE UNITED STATES GEOLOGICAL SURVEY (USGS) NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. BGS = BELOW GRADE SURFACE
5. EXCAVATION DEPTHS ARE BASED ON THE PROPOSED DEVELOPMENT OF THE SITE AND HAZARDOUS CHROMIUM IMPACTS IDENTIFIED DURING THE NOVEMBER 2018 HAZARDOUS CHROMIUM DELINEATION.
6. UNDER ALTERNATIVE I, TRACK 1 REMEDY, THIS SITE WILL BE EXCAVATED TO ABOUT 15 FEET BGS (ABOUT ELEVATION 26.5 TO 29.5 NAVD88).

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Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. 21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com	37-11 30TH STREET BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21 QUEENS NEW YORK	ALTERNATIVE I - TRACK 1 CLEANUP	Project No. 170512301 Date 01/16/2019 Drawn By EB Checked By ELS	7 Sheet 7 of 9

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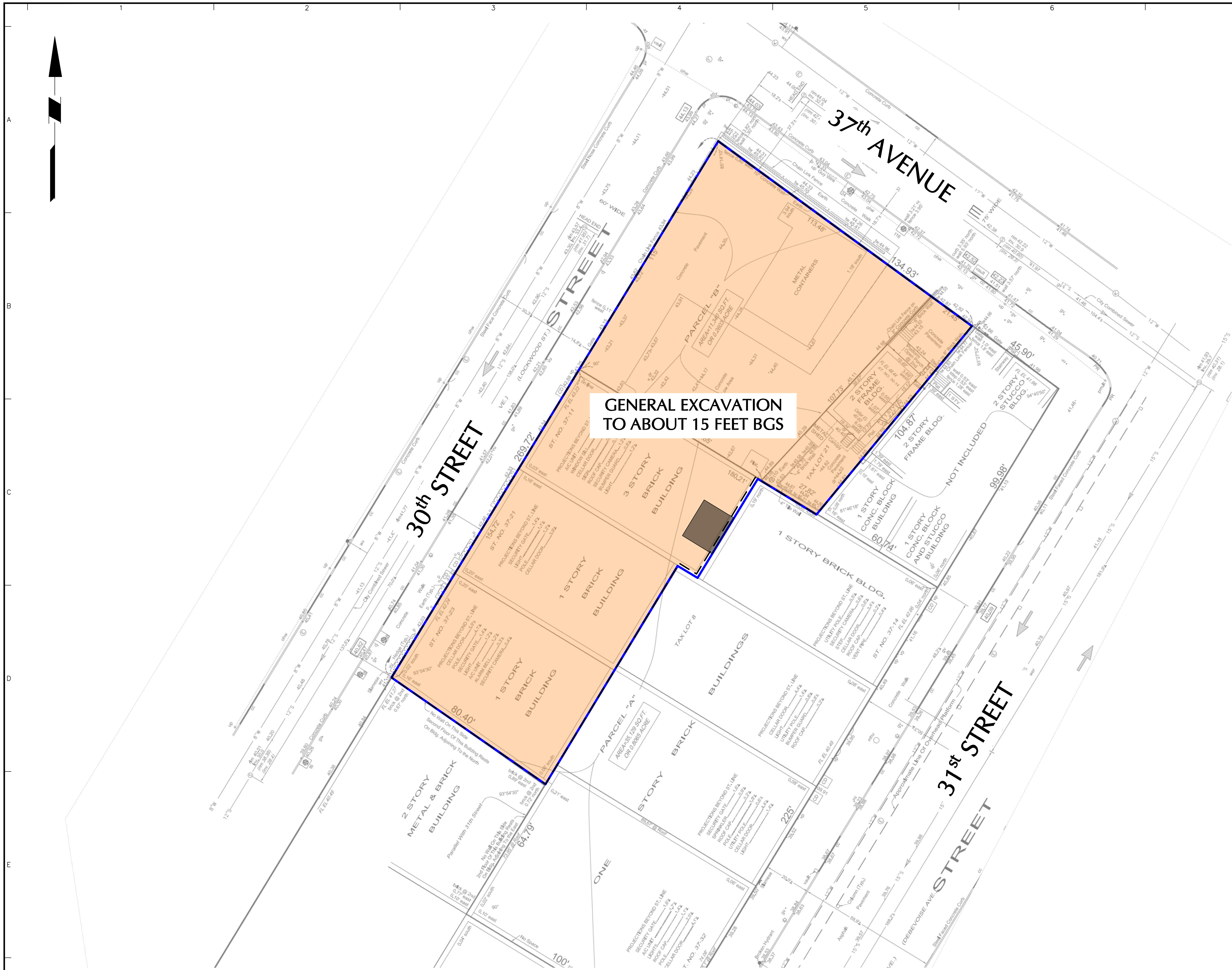
LANGAN PROJECT NO. 170512301



LEGEND:

BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY

APPROXIMATE EXTENT OF WATERPROOFING / VAPOR BARRIER MEMBRANE

APPROXIMATE EXTENTS OF HAZARDOUS CHROMIUM EXCAVATION TO 8 FEET BGS

APPROXIMATE BUILDING FOOTPRINT

NOTES:

1. BASE MAP TAKEN FROM ARCHITECTURAL SURVEY NO. 41176-8, PREPARED BY MONTROSE SURVEYING CO., LLP., DATED JULY 26, 2017.
2. THE PROPOSED DEVELOPMENT BASE MAP IS TAKEN FROM THE 95% PROGRESS BID SET - CELLAR FLOOR PLAN, DRAWING A-100.00, PREPARED BY AUFGANG ARCHITECTS, DATED SEPTEMBER 14, 2018.
3. ELEVATIONS REFERENCE THE UNITED STATES GEOLOGICAL SURVEY (USGS) NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. BGS = BELOW GRADE SURFACE
5. EXCAVATION DEPTHS ARE BASED ON THE PROPOSED DEVELOPMENT OF THE SITE AND HAZARDOUS CHROMIUM IMPACTS IDENTIFIED DURING THE NOVEMBER 2018 HAZARDOUS CHROMIUM DELINEATION.
6. UNDER THE ALTERNATIVE II, TRACK 2 REMEDY, THE SITE WILL BE EXCAVATED TO ABOUT 15 FEET BGS (ABOUT ELEVATION 26.5 TO 29.5 NAVD88)

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PROJECT NO. 170512301

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Project
37-11 30TH STREET
BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21
QUEENS NEW YORK

Figure Title
ALTERNATIVE II - TRACK 2 CLEANUP

Project No.	170512301
Date	01/16/2019
Drawn By	NEK
Checked By	ELS
Figure No.	8
Sheet	8 of 9

4000 0 2000 4000
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100 0 50 100
SCALE IN FEET

LEGEND

BROWNFIELD CLEANUP PROGRAM SITE BOUNDARY

CONSTRUCTION ENTRANCE

TRUCK ROUTE

Legend

Local Truck Route
Trucks with an origin or destination for the purpose of delivery, loading or servicing within the respective Borough, shall only operate on designated local routes, except that an operator may operate on a non-designated street for the purpose of arriving at his/her destination. This shall be accomplished by leaving a designated truck route at the intersection that is nearest to their destination, proceeding by the most direct route, and then returning to the nearest designated truck route by the most direct route. If the operator has additional destinations in the same general area, he/she may proceed by the most direct route to his/her next destination without returning to a designated truck route, provided that the operator's next destination does not require that he/she cross a designated truck route.

Through Truck Route
Trucks having neither an origin nor a destination within the respective Borough shall restrict the operation of such vehicles to those street segments designated as Through Truck Routes.

Through Truck Route on Expressway

Through Truck Route on Tunnel

Exception 53' Trailers Allowed
For definition see information on reverse side.

Industrial Business Zones (IBZ)

Parks and Open Spaces

29A Highway Exit

Commercial Vehicles Prohibited

Low Vertical Clearance Area

GENERAL NOTES

1. TRUCK ROUTE MAP ADAPTED FROM THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION 2015 TRUCK ROUTE MAP.
2. AERIAL IMAGE TAKEN FROM http://maps.nyc.gov/taxmap/map.htm ACCESSED ON JANUARY 16, 2019.
3. LOCATION OF CONSTRUCTION ENTRANCES ARE SUBJECT TO CHANGE PENDING CONSTRUCTION LOGISTICS.

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Project	Figure Title	Project No. 170512301	Figure No.
37-11 30TH STREET BLOCK No. 372, P/O LOT No. 8 AND LOT NO. 21 QUEENS NEW YORK	**TRUCK ROUTE MAP**	Date 01/16/2019 Drawn By NEK Checked By ELS	**9** Sheet 9 of 9

TABLES

TABLE 1
PRELIMINARY ENVIRONMENTAL REMEDIATION ESTIMATE - ALTERNATIVE I
37-11 30th STREET
QUEENS, NEW YORK
NYSDEC BCP SITE NO. C241211
LANGAN PROJECT NO. 170512301
LAST REVISED: APRIL 8, 2019

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	ABSOLUTE COST
CONTRACTOR FEES					
1	Remediation Facilities, Mobilization, Demobilization, and Site Maintenance - Remediation and decontamination facilities, site fencing, trailer, truck cleaning facilities, etc.		Lump Sum		$ 100,000
2	Management and Handling of Excavated Materials (Contaminated and Hazardous Materials)	15,000	CY	$ 25	$ 375,000
3	Building Demolition and Abatement		Lump Sum		$ 300,000
4	Perimeter Support of Excavation ([SOE] Soldier Piles and Lagging)	12,000	SF	$ 200	$ 2,400,000
5	Off-Site Transport and Disposal of Historic Fill Material	12,000	Ton	$ 40	$ 480,000
6	Off-Site Transport and Disposal of Hazardous Chromium-Impacted Historic Fill Material	120	Ton	$ 185	$ 22,200
7	Underground Storage Tank (UST) contingency (assumes registration, cleaning, removal and disposal)	6	Each	$ 10,000	$ 60,000
8	Dust, Odor, and Vapor Control	6	Months	$ 10,000	$ 60,000
9	Remedial Investigation, Waste Characterization, and Chromium Delineation Subcontractors (Drilling Contractor, Laboratory Contractor, Geophysical Survey, etc.)		Lump Sum		$ 142,000
10	In-Situ Groundwater Treatment (includes cost of injections, labor, Langan oversight and treatment compounds)		Lump Sum		$ 250,000
				CONTRACTOR FEES	*$ 4,189,200*
				(20% CONTINGENCY OF CONTRACTOR FEE SUBTOTAL)	*$ 837,840*
ENGINEERING FEES					
11	Waste Characterization and Hazardous Chromium Delineation		Lump Sum		$ 17,000
12	Remedial Investigation, Remedial Investigation Report, Remedial Action Work Plan		Lump Sum		$ 123,000
13	Treatability Technical Memorandum		Lump Sum		$ 10,000
14	Bid Support and Construction Administration		Lump Sum		$ 25,000
15	Construction Environmental Monitoring (includes community air monitoring program [CAMP] equipment rental)	6	Months	$ 40,000	$ 240,000
16	Endpoint Sampling (to document residual site conditions following source material removal)	35	Samples	$ 1,000	$ 35,000
17	Install Groundwater Monitoring Wells	3	Each	$ 4,250	$ 12,750
18	Quarterly Groundwater Sampling (assume quarterly monitoring over 2 years)	8	Event	$ 10,000	$ 80,000
19	Regulatory Agency Required Reporting (periodic progress reports, Final Engineering Report [FER], Data Validation & EQuIS Submittals, CPP and fact sheets)		Lump Sum		$ 100,000
				ENGINEERING FEE SUBTOTAL:	*$ 642,750*
				(20% CONTINGENCY OF CONTRACTOR FEE SUBTOTAL):	*$ 128,550*
				ESTIMATED ABSOLUTE COSTS - rounded:	**$ 5,800,000**

GENERAL NOTES AND ASSUMPTIONS

General Assumptions

- The density used for conversion from cubic yards (CY) to tons is 1.5 tons/CY.
- The site has a footprint of about 26,978 square feet. Assumes site-wide excavation to 15 feet below grade surface (bgs) for a total of about 15,000 cubic yards (22,500 tons) of soil/fill material removal.
- Assumes soil remaining in place meets the Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs).
- Assumes site-wide dewatering will not be required.
- Costs provided are estimates.
- This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.

- Costs do not include new building construction.
- Estimate excludes soft costs, legal fees, insurance, general consulting, etc.
- Assumes duration of remediation oversight will be 6 months.

Item No.

1 Includes mobilization and demobilization of equipment and materials necessary to excavate, transport, and dispose the targeted soil per the Remedial Action Work Plan. Also includes labor and any project related permit or regulation fees (excludes potential hazardous waste fees).

2 Management and handling of contaminated and potentially hazardous material assumes 15% increase in labor costs for OSHA trained labor. Baseline labor fees assumes $25 per cubic yard. Soil handling includes excavation for off-site disposal. Assumes excavation of historic contaminated fill observed from about 0 to 8 feet bgs across the site, in addition to hazardous material.

4 Perimeter support assumes that soldier pile and lagging and underpinning will be necessary along the Site extents where applicable. Square footage based on depth of remedial cut of 15 feet bgs. Remedial excavations along site boundaries cannot be sloped and thus require excavation support. Historic Fill was observed between about surface grade to 8 feet bgs.

5-6 The estimated volumes for the differing types of materials are based on the sampling results of the September to October 2018 Remedial Investigation and Waste Characterization performed by Langan. Assumes excavation of historic fill in addition to hazardous material to development grade.

7 Based on previous investigations in 2018, there may be one UST at the site within the loading dock. For this estimate, we assume that up to 6 USTs will be decommissioned.

8 Dust, odor and vapor control will be required throughout the duration of soil excavation. This cost estimate includes incremental costs associated with equipment and material necessary to monitor and mitigate vapor/odor emission.

9 Includes estimated contractor fees associated with performing the Remedial Investigation (RI): Drilling, laboratory, geophysical survey, site survey contractors.

10 Includes estimated fees associated with performing the In-Situ Groundwater Treatment.

11 Includes reporting of waste characterization results for disposal-related requirements.

12 Cost based on Langan's experience and includes engineering fees for the RI, Remedial Investigation Report (RIR), and preparation of a Remedial Action Work Plan (RAWP).

13 Langan will prepare a technical memorandum to describe the proposed treatment and will present to NYSDEC for review prior to implementation of the in-situ groundwater treatment program.

14 Remediation Engineer will field contractor questions related to remediation during the bidding process and support the current site owner, as necessary, during the bid leveling process. Includes submittal review, responses to Requests for Information (RFI), and coordination with development team and the architect.

15 Estimate includes, but is not limited to, implementation of a CAMP as required by the NYSDEC, the presence of an on-site engineer throughout remediation, remediation health and safety including purchase and maintenance of appropriate personal protective equipment (PPE), periodic office reporting to the regulatory agency and attendance of at least two site meetings per month.

16 Sampling frequency based on total square footage of the building area at a rate of one sample per 900 square feet of base, plus QA/QC samples, in accordance with NYSDEC DER-10 requirements.

17 Costs for installation of groundwater monitoring wells include drilling costs, field engineer oversight and project management, and well development.

18 Estimated fees associated with labor and subcontractor expenses for quarterly groundwater sampling and reporting to NYSDEC.

19 Costs are based on Langan's experience with regulatory programs and includes the preparation of a Final Engineering Report (FER), Community Participation Plans (CPP) and periodic daily and monthly reporting.

TABLE 2
PRELIMINARY ENVIRONMENTAL REMEDIATION ESTIMATE - ALTERNATIVE II
37-11 30th STREET
QUEENS, NEW YORK
LANGAN PROJECT NO. 170512301
LAST REVISED: APRIL 8, 2019

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT COST	ABSOLUTE COST
CONTRACTOR FEES					
1	Remediation Facilities, Mobilization, Demobilization, and Site Maintenance - Remediation and decontamination facilities, site fencing, trailer, truck cleaning facilities, etc.		Lump Sum		$ 100,000
2	Management and Handling of Excavated Materials (Contaminated and Hazardous Materials)	15,000	CY	$ 25	$ 375,000
3	Building Demolition and Abatement		Lump Sum		$ 300,000
4	Perimeter Support of Excavation ([SOE] Soldier Piles and Lagging)	12,000	SF	$ 200	$ 2,400,000
5	Off-Site Transport and Disposal of Historic Fill Material	12,000	Ton	$ 40	$ 480,000
6	Off-Site Transport and Disposal of Hazardous Chromium-Impacted Historic Fill Material	120	Ton	$ 185	$ 22,200
7	Soil Vapor Mitigation (Vapor Barrier Membrane)	38,000	SF	$ 10	$ 380,000
8	Underground Storage Tank (UST) contingency (assumes registration, cleaning, removal and disposal)	6	Each	$ 10,000	$ 60,000
9	Dust, Odor, and Vapor Control	6	Months	$ 10,000	$ 60,000
10	Remedial Investigation, Waste Characterization, and Chromium Delineation Subcontractors (Drilling Contractor, Laboratory Contractor, Geophysical Survey, etc.)		Lump Sum		$ 142,000
11	In-Situ Groundwater Treatment (includes cost of injections, labor, Langan oversight and treatment compounds)		Lump Sum		$ 250,000
				CONTRACTOR FEES	*$ 4,569,200*
				(20% CONTINGENCY OF CONTRACTOR FEE SUBTOTAL)	*$ 913,840*
ENGINEERING FEES					
12	Waste Characterization and Hazardous Chromium Delineation		Lump Sum		$ 17,000
13	Remedial Investigation, Remedial Investigation Report, Remedial Action Work Plan		Lump Sum		$ 123,000
14	Treatability Technical Memorandum		Lump Sum		$ 10,000
15	Bid Support and Construction Administration		Lump Sum		$ 25,000
16	Construction Environmental Monitoring (includes community air monitoring program [CAMP] equipment rental)	6	Months	$ 40,000	$ 240,000
17	Post Remediation Site Inspections (assumes annual monitoring over 5 years)	5	Years	$ 5,000	$ 25,000
18	Endpoint Sampling (to document residual site conditions following source material removal)	35	Samples	$ 1,000	$ 35,000
19	Install Groundwater Monitoring Wells	2	Each	$ 4,250	$ 8,500
20	Quarterly Groundwater Sampling (assume quarterly monitoring over 2 years)	8	Event	$ 3,000	$ 24,000
21	Annual Inspection and Periodic Review Reporting	2	Years	$ 15,000	$ 30,000
22	Regulatory Agency Required Reporting (periodic progress reports, Final Engineering Report [FER], Site Management Plan [SMP], Data Validation & EQuIS Submittals, CPP and fact sheets)		Lump Sum		$ 100,000
				ENGINEERING FEE SUBTOTAL:	*$ 637,500*
				(20% CONTINGENCY OF CONTRACTOR FEE SUBTOTAL):	*$ 127,500*
				ESTIMATED ABSOLUTE COSTS - rounded:	**$ 6,250,000**

GENERAL NOTES AND ASSUMPTIONS

General Assumptions

- The density used for conversion from cubic yards (CY) to tons is 1.5 tons/CY.
- The site has a footprint of about 26,978 square feet. Assumes site-wide excavation to 15 feet below grade surface (bgs) for a total of about 15,000 cubic yards (22,500 tons) of soil/fill material removal.
- Assumes soil remaining in place meets the Track 2 Restricted Residential Soil Cleanup Objectives (SCOs).
- Assumes site-wide dewatering will not be required.
- Costs provided are estimates.
- This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
- Costs do not include new building construction.
- Estimate excludes soft costs, legal fees, insurance, general consulting, etc.
- Assumes duration of remediation oversight will be 6 months.

Item No.

1	Includes mobilization and demobilization of equipment and materials necessary to excavate, transport, and dispose the targeted soil per the Remedial Action Work Plan. Also includes labor and any project related permit or regulation fees (excludes potential hazardous waste fees).
2	Management and handling of contaminated and potentially hazardous material assumes 15% increase in labor costs for OSHA trained labor. Baseline labor fees assumes $25 per cubic yard. Soil handling includes excavation for off-site disposal. Assumes excavation of historic contaminated fill observed from about 0 to 8 feet bgs across the site, in addition to hazardous material.
4	Perimeter support assumes that soldier pile and lagging and underpinning will be necessary along the Site extents where applicable. Square footage based on depth of remedial cut of 15 feet bgs. Remedial excavations along Site boundaries cannot be sloped and thus require excavation support. Assumes 33% of total estimate will count toward the BCP Tax Credits for Site Prep. Historic Fill was
5-6	The estimated volumes for the differing types of materials are based on the sampling results of the September to October 2018 Remedial Investigation and Waste Characterization performed by Langan. Assumes excavation of historic fill in addition to hazardous material to development grade.
7	Assumes waterproofing/vapor barrier will be installed beneath the building footprint of approximately 26,978 square feet and will extent 15 feet along the cellar level sidewalls.
8	Based on previous investigations in 2018, there may be one UST at the site within the loading dock. For this estimate, we assume that up to 6 USTs will be decommissioned.
9	Dust, odor and vapor control will be required throughout the duration of soil excavation. This cost estimate includes incremental costs associated with equipment and material necessary to monitor and mitigate vapor/odor emission.
10	Includes estimated contractor fees associated with performing the Remedial Investigation (RI): Drilling, laboratory, geophysical survey, site survey contractors.
11	Includes estimated fees associated with performing the In-Situ Groundwater Treatment: Field engineer oversight, drilling, real time monitoring for potential contaminant migration, daily collection of well headspace readings and depth to groundwater measurements.
12	Includes reporting of waste characterization results for disposal-related requirements.
13	Cost based on Langan's experience and includes engineering fees for the RI, Remedial Investigation Report (RIR), and preparation of a Remedial Action Work Plan (RAWP).
14	Langan will prepare a technical memorandum to describe the proposed treatment and will present to NYSDEC for review prior to implementation of the in-situ groundwater treatment program.
15	Remediation Engineer will field contractor questions related to remediation during the bidding process and support the current site owner, as necessary, during the bid leveling process. Includes submittal review, responses to Requests for Information (RFI), and coordination with development team and the architect.
16	Estimate includes, but is not limited to, implementation of a CAMP as required by the NYSDEC, the presence of an on-site engineer throughout remediation, remediation health and safety including purchase and maintenance of appropriate personal protective equipment (PPE), periodic office reporting to the regulatory agency and attendance of at least two site meetings per month.
17	Cost based on Langan's experience. Post-remediation monitoring for up to 5 years.
18	Sampling frequency based on total square footage of the building area at a rate of one sample per 900 square feet of base, plus QA/QC samples, in accordance with NYSDEC DER-10 requirements.
19	Costs for installation of groundwater monitoring wells include drilling costs, field engineer oversight and project management, and well development.
20	Estimated fees associated with labor and subcontractor expenses for quarterly groundwater sampling and reporting to NYSDEC.
21	Operation and maintenance costs are associated with annual certifications, engineering controls and inspections. Well installation and subsequent quarterly groundwater gauging/monitoring and reporting for two years to confirm effectiveness of treatment.
22	Costs are based on Langan's experience with regulatory programs and includes the preparation of a Final Engineering Report (FER), Site Management Plan [SMP], Community Participation Plans (CPP) and periodic daily and monthly reporting.

TABLE 3
TRACK 1 SOIL CLEANUP OBJECTIVES
37-11 30th STREET
QUEENS, NEW YORK
NYSDEC BCP SITE NO. C241211
LANGAN PROJECT NO. 170512301

VOCs (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethylene	0.33
1,2,4-Trimethylbenzene	3.6
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,3,5-Trimethylbenzene	8.4
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
2-Butanone	0.12
Acetone	0.05
Benzene	0.06
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
cis-1,2-Dichloroethylene	0.25
Ethyl Benzene	1
Methyl tert-butyl ether (MTBE)	0.93
Methylene chloride	0.05
n-Butylbenzene	12
n-Propylbenzene	3.9
sec-Butylbenzene	11
tert-Butylbenzene	5.9
Tetrachloroethylene	1.3
Toluene	0.7
trans-1,2-Dichloroethylene	0.19
Trichloroethylene	0.47
Vinyl Chloride	0.02
Xylenes, Total	0.26

Metals (mg/kg)	
Arsenic	13
Barium	350
Beryllium	7.2
Cadmium	2.5
Chromium, hexavalent	1
Chromium, trivalent	30
Copper	50
Cyanide	27
Lead	63
Manganese	1,600
Mercury	0.18
Nickel	30
Selenium	3.9
Silver	2
Zinc	109

SVOCs (mg/kg)	
Acenaphthene	20
Acenaphthylene	100
Anthracene	100
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(g,h,i)perylene	100
Benzo(k)fluoranthene	0.8
Chrysene	1
Dibenzo(a,h)anthracene	0.33
Fluoranthene	100
Fluorene	30
Indeno(1,2,3-cd)pyrene	0.5
m-Cresol	0.33
Naphthalene	12
o-Cresol	0.33
p-Cresol	0.33
Pentachlorophenol	0.8
Phenanthrene	100
Phenol	0.33
Pyrene	100

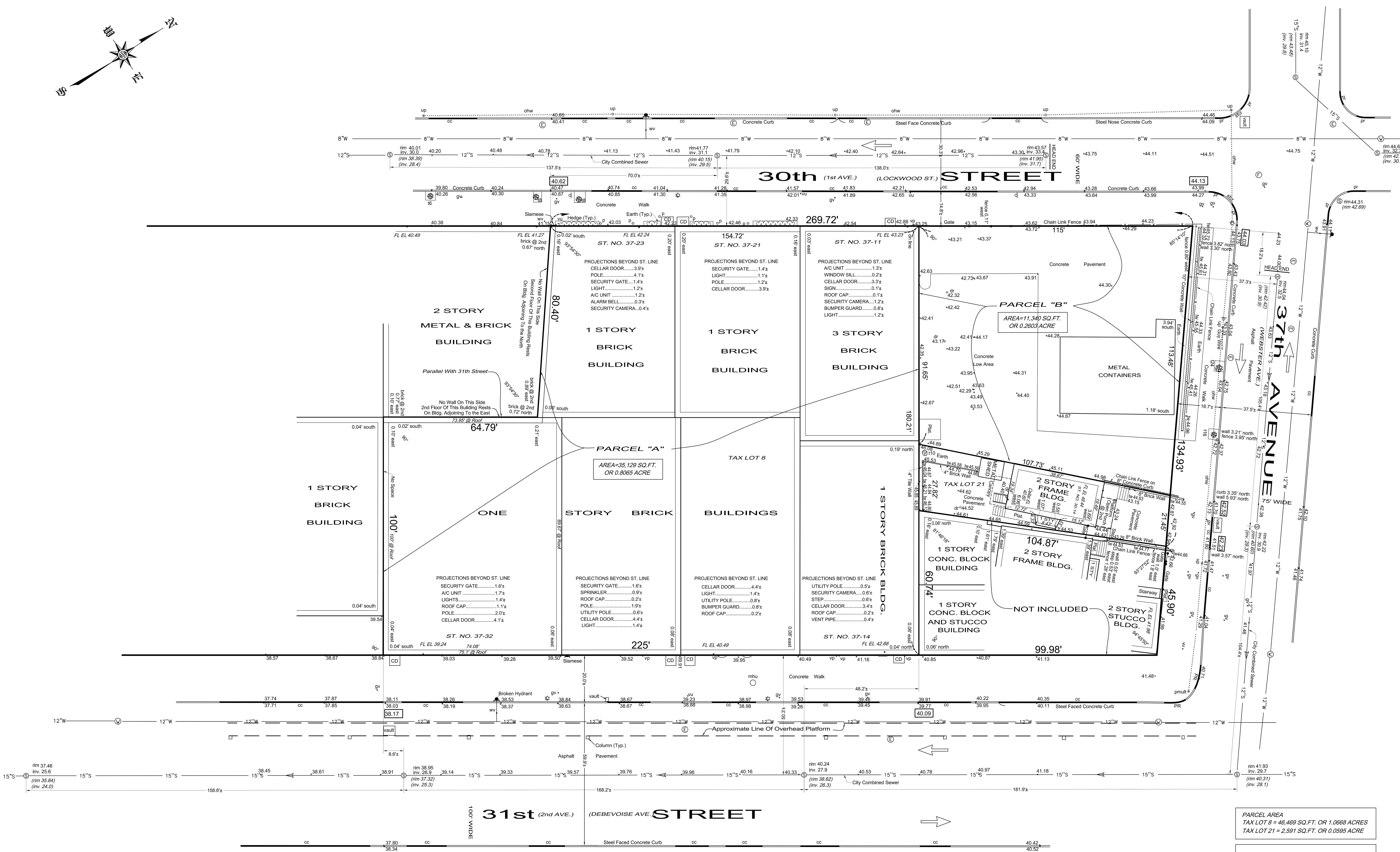
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	0.0033
4,4'-DDT	0.0033
4,4'-DDD	0.0033
Aldrin	0.005
alpha-BHC	0.02
beta-BHC	0.036
Chlordane (alpha)	0.094
delta-BHC	0.04
Dibenzofuran	7
Dieldrin	0.005
Endosulfan I	2.4
Endosulfan II	2.4
Endosulfan sulfate	2.4
Endrin	0.014
Heptachlor	0.042
Lindane	0.1
Polychlorinated biphenyls	0.1

Notes:
1. The above criteria are the Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 375 Unrestricted Use Soil Cleanup Objectives (i.e., the Track 1 soil cleanup objectives).
2. VOC: volatile organic compound
3. SVOC: semivolatile organic compound
4. PCBs: polychlorinated biphenyls
5. mg/kg: milligram per kilogram

APPENDIX A
BOUNDARY SURVEY

SURVEY No. 41176-8

41176-8.DWG
41176001.CRD
57887001.CRD
41176-8.CRD



LEGEND

ASPH.......ASPHALT	PR........PEDESTRIAN RAMP
BK..........BRICK	RET......RETAINING
BSMT.......BASEMENT	RIM.......RIM ELEVATION SEWER MANHOLE
CC..........CURB CUT	SFCR....STEEL FACED CURB ROUND
CCR........CONCRETE CURB ROUND	STY.......STORY
CD..........CELLAR DOOR	TB........TOP OF BANK ELEVATION
CLF.........CHAIN LINK FENCE	........TRAFFIC LIGHT
CO..........CATCH BASIN CLEAN OUT	TEL.......TELEPHONE
CONC......CONCRETE	TP........TREE PIT
CRF.........CHAIN ROPE FENCE	.......TRAFFIC SIGN
CWA........CELLAR WINDOW AREA	TW........ELEVATION AT TOP OF WALL
DR..........DRAIN	UP........UTILITY POLE
EL...........ELEVATION	VU.........VALVE UNKNOWN
FAB.........FIRE ALARM BOX	VLTU......VAULT UNKNOWN
FC..........FILL CAP	VP.........VENT PIPE
FL EL.....FLOOR ELEVATION	WV.........WATER VALVE
GP..........GUARD POLE	12"G......GAS MAIN WITH SIZE
GV..........GAS VALVE	12"S......SEWER MAIN WITH SIZE
IF............IRON FENCE	12"W......WATER MAIN WITH SIZE
INL..........CATCH BASIN INLET ELEVATION	....CATCH BASIN
INV.........SEWER INVERT ELEVATION	E E...ELECTRIC MANHOLE / VAULT
L.........LIGHT POLE	F......FIRE MANHOLE
MB..........MAIL BOX	G......GAS MANHOLE
MHU........UNKNOWN MANHOLE	S......SEWER MANHOLE
OF...........OIL FILL	T......TELEPHONE MANHOLE
OHW........OVERHEAD WIRES	W......WATER MANHOLE
P.........POLE	TR.......TRAFFIC VAULT
PAVT......PAVEMENT	.....HYDRANT
PM........PARKING METER	T8.....TREE WITH SIZE
PMULT.....POLE, MULTIPLE USAGE	17.0 ....ESTABLISHED GRADE
	(rim 12.42) (inv 2.6) ......ELEVATIONS IN BOROUGH DATUM

GENERAL NOTES

1. ELEVATIONS AND ESTABLISHED GRADES SHOWN HEREON REFER TO NAVD 1988 WHICH IS 1.625 FEET BELOW THE QUEENS TOPOGRAPHICAL BUREAU DATUM.
2. ESTABLISHED GRADES SHOWN HEREON REFER TO TOP OF CURB. IF ESTABLISHED GRADES VARY SUBSTANTIALLY WITH EXISTING ELEVATIONS CONSULT WITH THE HIGHWAY DEPARTMENT BEFORE DESIGNING IMPROVEMENTS.
3. SIZES AND LOCATIONS OF WATER MAINS SHOWN HEREON AS SUPPLIED BY THE DEPARTMENT OF WATER SUPPLY, BOROUGH OF QUEENS. LOCATIONS OF WATER SUPPLY MANHOLES, HYDRANTS AND WATER VALVES AS OBTAINED FROM FIELD MEASUREMENT.
4. SIZES AND TYPES OF SEWERS SHOWN HEREON AS OBTAINED FROM THE BOROUGH OF QUEENS SEWER DEPARTMENT RECORDS. SEWER MANHOLE RIM AND INVERT ELEVATIONS SHOWN HEREON OBTAINED BY FIELD MEASUREMENTS UNLESS INDICATED (*) WHICH DENOTES INVERT INACCESSIBLE OR MANHOLE NOT FOUND IN FIELD. INFORMATION SHOWN IN THIS MANNER IS AS OBTAINED FROM THE BOROUGH OF QUEENS SEWER DEPARTMENT RECORDS.
5. LOCATIONS OF ALL UTILITIES AND SUBSTRUCTURES ARE APPROXIMATE ONLY. THE INFORMATION GIVEN ON THE SURVEY PERTAINING TO UTILITIES AND SUBSTRUCTURES IS NOT CERTIFIED AS TO ACCURACY OR COMPLETENESS. CONSULT WITH THE APPROPRIATE COMPANY OR AGENCY BEFORE DESIGNING IMPROVEMENTS.
6. THE OWNER, CONTRACTOR AND/OR HIS AGENTS MUST NOTIFY THE APPROPRIATE UTILITY COMPANIES AND/OR AGENCIES AT LEAST 72 HOURS PRIOR TO ANY CONSTRUCTION IN ACCORDANCE WITH INDUSTRIAL CODE RULE 53.
7. NO EVIDENCE OF EXISTING STREAMS, CREEKS, DITCHES OR WATER COURSES ON/OR CROSSING PROPERTY SURVEYED.
8. NOT ALL SUBSURFACE INFORMATION PLOTTED.

PARCEL AREA
TAX LOT 8 = 46,469 SQ.FT. OR 1.0668 ACRES
TAX LOT 21 = 2,591 SQ.FT. OR 0.0595 ACRE

TOTAL PARCEL AREA=49,060 SQ.FT. OR 1.1263 ACRES

QUEENS TOPO DATUM
MEAN SEA LEVEL 0.00 (NAVD 1988)
MEAN SEA LEVEL 0.00 (NGVD1929)
1.625 2.725 1.1
NAVD 1988 DATUM IS 1.625 FEET BELOW THE QUEENS TOPO BUREAU DATUM

FLOOD HAZARD NOTE
THE PARCEL SURVEYED IS COMPRISED OF AREAS DESIGNATED AS ZONE X (LESS THAN 0.2% CHANCE OF FLOODING)
FEDERAL EMERGENCY MANAGEMENT AGENCY
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
COMMUNITY PANEL NUMBER 360497 0093 F
EFFECTIVE DATE SEPTEMBER 5, 2007

20 0 20 40 60
GRAPHIC SCALE – FEET

DRN: K.OP/GP

ESTABLISHED 1876 • SUCCESSOR TO:
B.G. MEINIKHEIM C.S.*C.U. POWELL C.E.,C.S.*L.C.L. SMITH C.S.*NATHAN CAMPBELL C.E.,C.S.*A.U. WHITSON C.E.,C.S.*
WILLIAM L. SAVACOOL C.E.,L.S.,C.S.*A.U. WHITSON INC. C.E.,C.S.*G. WEBER L.S.,C.S.*C. STIDOLPH R.A.,L.S.*WHITSON &
POWELL INC. P.E.,L.S.,C.S.*KELLER & POWELL P.E.,L.S.,C.S.*LOUIS MONTROSE C.E.,L.S.,C.S.*FRED J. POWELL P.E.,L.S.,C.S.*

REV	DATE	DESCRIPTION	ck	dm

REV	DATE	DESCRIPTION	ck	dm
/	07-26-17	ARCHITECTURAL SURVEY		

MONTROSE
SURVEYING CO., LLP.
CITY & LAND SURVEYORS
116 20 METROPOLITAN AVE • RICHMOND HILL NY 11418-1090 • (718) 849-0600

CITY OF NEW YORK
COUNTY OF QUEENS
TAX BLOCK 372
TAX LOTS 8 & 21

SCALE 1" = 20'

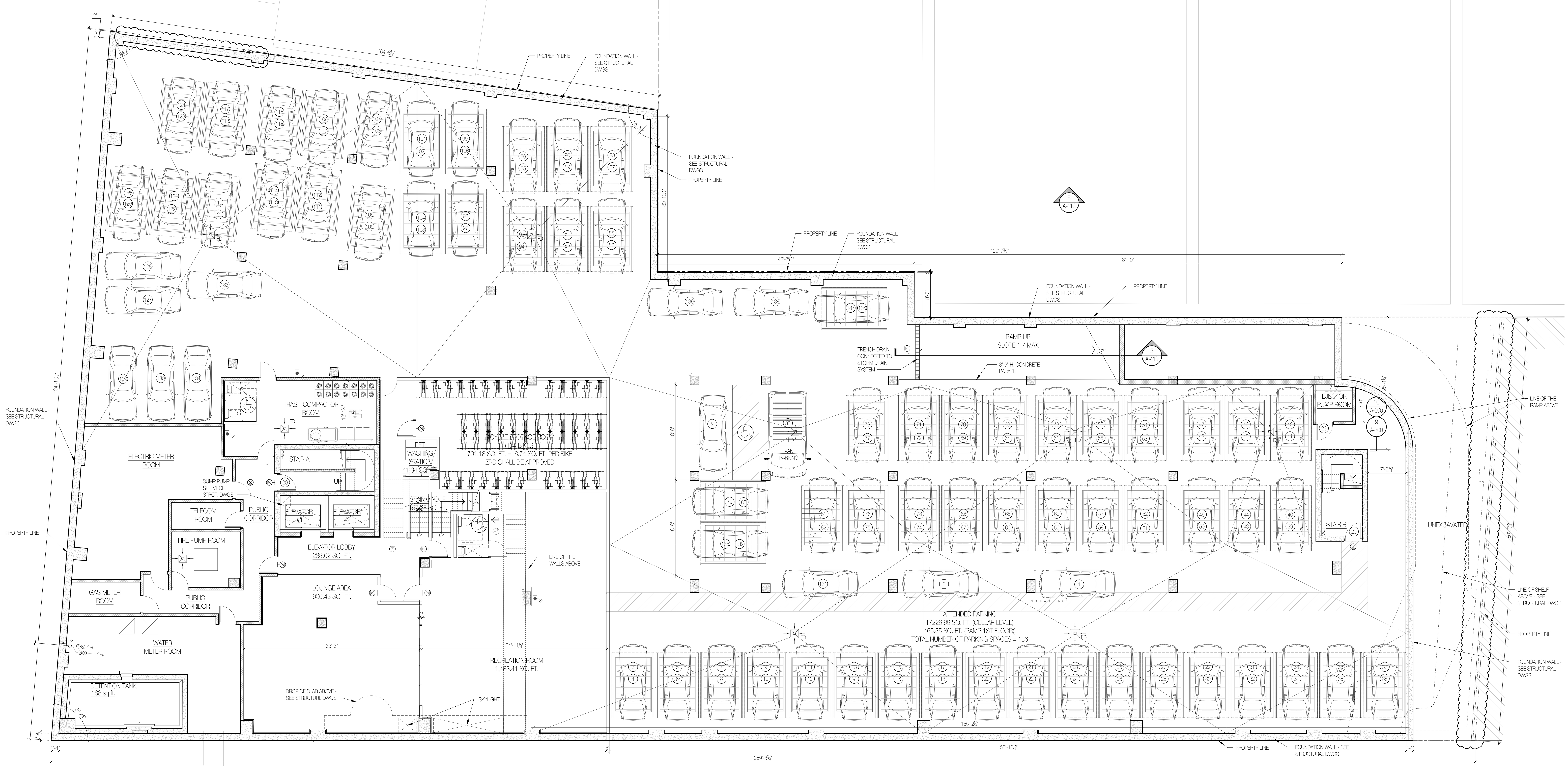
APPENDIX B
PROPOSED DEVELOPMENT PLANS

CONCRETE NOTE:
ALL CONCRETE DETAILS, SECTIONS, AND SIZING ARE SUBJECT TO REVIEW BY CONCRETE CONSULTANT.

REQUIRED PARKING (ATTENDED)				
ZONING SECTION	USE	REQUIREMENT	AREA/D.U.	REQUIRED SPACES
ZR 117-64	COMMERCIAL (1ST & CELLAR LEVEL)	1/400 S.F.	11,010 / 400	28
ZR 86-42/25-23	RESIDENTIAL	50% D.U.	199 D.U.	100
44-21/ 123-71/ 117-64	MANUFACTURING	1/1000 S.F.	10,753 S.F.	11
			TOTAL REQUIRED	139

- THE PAID ATTENDANTS SHALL BE AVAILABLE TO HANDLE THE PARKING AND MOVING AUTOMOBILES AT ALL TIMES
- PARKING LAYOUT CALCULATION HAS BEEN BASE ON CAR LIFT MODEL HS6002L DOB-OTCR #248-98-E

67 STACKERS	134
3 SINGLE SPACES	3
HANDICAP SPACES	1
HANDICAP VAN ACCESSIBLE (1 PER EACH 6)	1
	TOTAL = 139



1 / A-100 CELLAR FLOOR PLAN
SCALE : ⅛" = 1'-0"

WALL TYPE LEGEND:

NON RATED

0-1 FURRING AT INTERIOR CONCRETE/CMU WALL - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD OVER 1½" 'Z' METAL FURRING @ 16" O.C.

0-2 TYPICAL PARTITION - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 2 ½" METAL STUDS @ 16" O.C.

0-3 BATHROOM CHASE WALL PARTITION - (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ONE SIDE OF 3⅝" METAL STUDS @ 16" O.C. *SEE INTERIOR DESIGN DRAWINGS FOR WALL THICKNESSES.

0-4 PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, ON EACH SIDE OF 3 ⅝" METAL STUDS @ 16" O.C. (@ APARTMENT ELECTRICAL PANEL/ NETWORK INTERFACE DEVICE PANEL)

0-5 FURRING AT EXTERIOR CONCRETE/CMU WALL - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON 1 ⅝" GALV. METAL STUDS @ 16 O.C. GYPSUM BOARD OVER VAPOR BARRIER AND 5" CONTINUOUS SEMI-RIGID INSULATION (R 21) APPLIED TO FACE OF CONCRETE WALL. PROVIDE 6" GALVANIZED METAL STUD @ FACE OF WALL

FURRING AT EXTERIOR CMU WALL - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON 1 1/2" GALV. METAL Z FURRING @ 16 O.C.

FURRING AT PARTY WALL - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON 1 1/2" "Z" GALV. METAL Z FURRING @ 16 O.C. W/ CONT. 1 ½" SEMI - RIGID INSULATION ON FACE OF CMU WALL R 2.5 UNFACED

1 HOUR RATED

1-1 TENANT SEPARATION PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD ON (1) SIDE, (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD ON OTHER SIDE OF 3 ⅝" METAL STUDS @ 16" O.C. WITH 3 ½" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYPSUM BOARD UP TO UNDERSIDE OF SLAB & SEAL TIGHT TO UNDERSIDE OF SLAB AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT& FIRESAFING INSULATION (GA FILE #WP-1052) (STC 50-54)

1-2 EXTERIOR NON BEARING PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER 3-5/8" METAL STUDS @ 16" O.C. WITH 3½" BATT INSULATION UNFACED (R-15) (UL #U419) STUD SIZES ARE MINIMUM REQUIRED BY THE UL DESIGN

1-3 TENANT SEPARATION CHASE WALL - 2 ROWS (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 3 ⅝" OR 2 ½" GALV. METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRE SAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQD. PROVIDE HORIZONTAL 2½"MTL STUD BRACING @ 48" O.C. PROVIDE SOUND ATTENUATION INSULATION AS REQUIRED TO ACHIVE A MIN. STC RAITNG OF 50 (UL#V442)

2 HOUR RATED

2-1 INTERIOR PARTITION - (2) LAYERS 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE 3 ⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF CONC. FLOOR DECK OR ROOF DECK. SEAL TIGHT TO DECK W/ CONT. FIRESTOP SEALANT & FIRESAFING INSULATION. (GA FILE #WP-1522 STC 55-59).

2-2 CMU WALL - CMU WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE BLOCK COURSES. SEAL TOP OF CONCRETE/METAL BLOCK WALL TIGHT TO UNDERSIDE OF CONCRETE DECK OR DECK ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXIST. BETWEEN TOP OF WALL AND BOTTOM OF DECK (UL #U906)

2-3 SHAFT WALL - (2) LAYERS OF ½" TYPE "X" GYPSUM BOARD ON ONE SIDE OF 2 ½" METAL C-H STUDS @ 24" O.C. WITH (1) LAYER OF 1" TYPE "X" GYPSUM LINER PANEL ON SHAFT SIDE. W/ 1" MINERAL FIBER INSULATION IN CAVITY SEAL TOP OF WALL TIGHT TO UNDERSIDE OF CONCRETE DECK W/ CONT. FIRESTOP SEALANT. GA FILE #7095 (STC-45-49) (UL #415)

2-4 PLUMBING CHASE WALL - (2) ROWS (2) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 3 ⅝"OR 2 ½" GALV. METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRE SAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQD. PROVIDE HORIZONTAL 2½"MTL STUD BRACING @ 24" O.C. PROVIDE SOUND ATTENUATION INSULATION AS REQUIRED TO ACHIVE MIN. STC RATING OF 50 (UL#V442)

2-5 EXTERIOR NON BEARING PARTITION - (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER METAL STUDS (SEE MTL STUD NOTE FOR SIZING) @ 16" O.C. WITH 3½" BATT INSULATION UNFACED (R-15) (UL #U419) STUD SIZES ARE MINIMUM REQUIRED BY THE UL DESIGN

3 HOUR RATED

3-1 (1) LAYER ½" TYPE "X" GYPSUM BOARD OVER ⅞" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CONCRETE BLOCK WALL WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF CONC. SLAB ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF CONCRETE DECK (UL #U914) (PROVIDE STC RATING OF 50-54 AT COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS) (UL # U914)

GENERAL NOTES:

1. ALL ENLARGED PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.).
2. ALL FINISHES AS PER INTERIOR DESIGN DWGS & FINISH SCHEDULE.
3. PROVIDE ¼" CEMENTITIOUS BACKER BOARD AS A SUBSTRATE FOR SURFACES RECEIVING A TILE FINISH @ SHOWER AREA. THIS IS IN ADDITION TO THE NUMBER OF GYP. BD. LAYERS INDICATED ON THE WALL TYPE LEGEND

LEGEND:

CONCRETE FOUNDATION WALL
CONCRETE BLOCK WALL - 2HR FIRE RATED (U.O.N.)
GYPSUM BOARD PARTITION - SEE PLAN FOR SIZE.
MASONRY VENEER
REMOVABLE KITCHEN BASE CABINET - 2'-6' WIDE x 2'-0" DEEP
PARTITION - SEE WALL TYPE LEGEND

5'-0" DIAMETER CLEAR HANDICAP FLOOR TURNING SPACE.
"T" FLOOR A.D.A. TURNING SPACE
30" x 48" CLEAR A.D.A. FLOOR SPACE
FIRE RATED SHAFT WALL
W WINDOW - SEE WINDOW SCHEDULE ON DWG. A-601
X DOOR & FRAME - SEE DOOR SCHEDULE DRAWING A-600
SCM HARDWIRED CARBON MONOXIDE DETECTOR (BC 907) (NOT MORE THAN 15FT AWAY FROM BEDROOM DOORS @ CORRIDOR SIDE)
EXIT LIGHT AND SIGN - WALL MOUNTED
EXIT LIGHT AND SIGN - CEILING MOUNTED
ELECTRICAL PANEL UNIT - EP
NETWORK INTERFACE DEVICE PANEL - NP

SUSPENDED GYPSUM BOARD
\# APARTMENT DESIGNATION
ALL APARTMENTS SHALL BE ADAPTABLE
PARKING STACKER UNIT

95% PROGRESS
BID SET 09-14-18

METAL STUD NOTE:
G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS SIGNED & SEALED BY ANY LICENSED ENGINEER

FIRE PROTECTION:
ALL EXPOSED STEEL COLUMNS AND BEAMS SHOULD BE PROTECTED WITH 2 HR. FIRE PROOF INTUMESCENT PAINT WHERE SPRAY-ON FIRE PROOFING IS NOT FEASIBLE

SUSPENDED CEILING:
SEE REFLECTED CEILING PLANS AND ON INTERIOR DESIGN DWGS. FOR CEILING FINISH & HEIGHT PENDING FINAL COORDINATION W/ I.D. DWGS.
- EXPOSED CONCRETE SHALL RECEIVE KADEX FINISH & PAINT
- DROPPED GYP BD. PTD. IN ALL NON HABITABLE ROOMS (TYP.)

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

ALCHEMY STUDIO
154 Grand St, NY, NY 10013
+307 760 6454

DATE	SUBMISSIONS / REVISIONS
02-21-18	ISSUED TO DOB FOR REVIEW AND COMMENTS

SHEET TITLE:
CELLAR FLOOR PLAN

SEAL & SIGNATURE

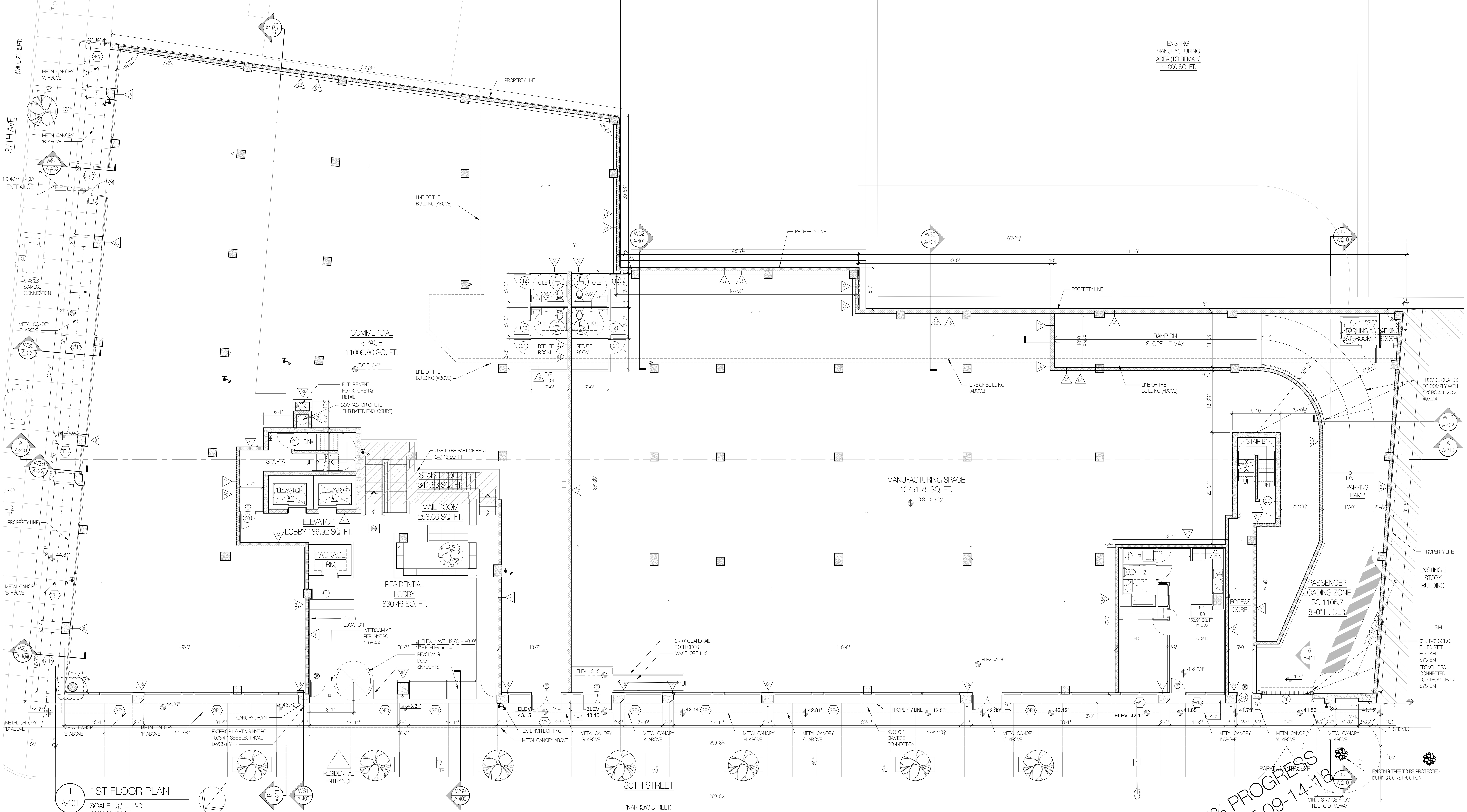
ISSUE DATE:	PROJECT NO: #1723
DRAWN BY: DC	CHECKED BY: AFM
SCALE: 1/8" = 1'-0"	SHEET NO:
DRAWING NO: A-100.00	
NYC DOB NUMBER:	

CONCRETE NOTE:
ALL CONCRETE DETAILS, SECTIONS, AND SIZING ARE SUBJECT TO REVIEW BY CONCRETE CONSULTANT.

* ALL SPACES TO BE FILED UNDER SEPARATE APPLICATION

PLUMBING FIXTURE CALCULATION AS PER NYCPC TABLE 403.1					
SPACE	OCCUPANCY	TOILETS	LAVATORIES	DRINKING FOUNTAIN	SERVICE SINK
COMMERCIAL SPACE	410	2	2	1	1
MANUFACTURING SPACE	54	2	2	1	1

* ALL PLUMBING CALCULATIONS TO BE REVISED AND LOCATIONS DETERMINED DURING TENANT FIT-OUT.



1 A-101 1ST FLOOR PLAN
SCALE : ⅛" = 1'-0"
26711.55 SQ. FT.

95% PROGRESS BID SET 09-14-18

WALL TYPE LEGEND:

NON RATED

0-1 FURRING AT INTERIOR CONCRETE/CMU WALL - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD OVER 1½" 'Z' METAL FURRING @ 16" O.C.

0-2 TYPICAL PARTITION - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 2½" METAL STUDS @ 16" O.C.

0-3 BATHROOM CHASE WALL PARTITION - (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ONE SIDE OF 3⅝" METAL STUDS @ 16" O.C. *SEE INTERIOR DESIGN DRAWINGS FOR WALL THICKNESSES.

0-4 PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, ON EACH SIDE OF 3⅝" METAL STUDS @ 16" O.C. (@ APARTMENT ELECTRICAL PANEL/ NETWORK INTERFACE DEVICE PANEL)

0-5 FURRING AT EXTERIOR CONCRETE/CMU WALL - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON 1⅝" GALV. METAL STUDS @ 16 O.C. GYPSUM BOARD OVER VAPOR BARRIER AND 5" CONTINUOUS SEMI-RIGID INSULATION (R 21) APPLIED TO FACE OF CONCRETE WALL. PROVIDE 6" GALVANIZED METAL STUD @ FACE OF WALL

FURRING AT EXTERIOR CMU WALL - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON 1 1/2" GALV. METAL Z FURRING @ 16 O.C.

FURRING AT PARTY WALL - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON 1 1/2" "Z" GALV. METAL Z FURRING @ 16 O.C. W/ CONT. 1½" SEMI - RIGID INSULATION ON FACE OF CMU WALL R 2.5 UNFACED

1 HOUR RATED

1-1 TENANT SEPARATION PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD ON (1) SIDE, (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD ON OTHER SIDE OF 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYPSUM BOARD UP TO UNDERSIDE OF SLAB & SEAL TIGHT TO UNDERSIDE OF SLAB AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT& FIRESAFING INSULATION (GA FILE #WP-1052) (STC 50-54)

1-2 EXTERIOR NON BEARING PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER 3-5/8" METAL STUDS @ 16" O.C. WITH 3½" BATT INSULATION UNFACED (R-15) (UL #U419) STUD SIZES ARE MINIMUM REQUIRED BY THE UL DESIGN

1-3 TENANT SEPARATION CHASE WALL - 2 ROWS (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 3⅝" OR 2½" GALV. METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRE SAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQD. PROVIDE HORIZONTAL 2½"MTL STUD BRACING @ 48" O.C. PROVIDE SOUND ATTENUATION INSULATION AS REQUIRED TO ACHIVE A MIN. STC RAITNG OF 50 (UL#V442)

2 HOUR RATED

2-1 INTERIOR PARTITION - (2) LAYERS 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF CONC. FLOOR DECK OR ROOF DECK. SEAL TIGHT TO DECK W/ CONT. FIRESTOP SEALANT & FIRESAFING INSULATION. (GA FILE #WP-1522 STC 55-59).

2-2 CMU WALL - CMU WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE BLOCK COURSES. SEAL TOP OF CONCRETE/METAL BLOCK WALL TIGHT TO UNDERSIDE OF CONCRETE DECK OR DECK ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXIST. BETWEEN TOP OF WALL AND BOTTOM OF DECK (UL #U906)

2-3 SHAFT WALL - (2) LAYERS OF ½" TYPE "X" GYPSUM BOARD ON ONE SIDE OF 2½" METAL C-H STUDS @ 24" O.C. WITH (1) LAYER OF 1" TYPE "X" GYPSUM LINER PANEL ON SHAFT SIDE. W/ 1" MINERAL FIBER INSULATION IN CAVITY SEAL TOP OF WALL TIGHT TO UNDERSIDE OF CONCRETE DECK W/ CONT. FIRESTOP SEALANT. GA FILE #7095 (STC-45-49) (UL #415)

2-4 PLUMBING CHASE WALL - (2) ROWS (2) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 3⅝"OR 2½" GALV. METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRE SAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQD. PROVIDE HORIZONTAL 2½"MTL STUD BRACING @ 24" O.C. PROVIDE SOUND ATTENUATION INSULATION AS REQUIRED TO ACHIVE MIN. STC RATING OF 50 (UL#V442)

2-5 EXTERIOR NON BEARING PARTITION - (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER METAL STUDS (SEE MTL STUD NOTE FOR SIZING) @ 16" O.C. WITH 3½" BATT INSULATION UNFACED (R-15) (UL #U419) STUD SIZES ARE MINIMUM REQUIRED BY THE UL DESIGN

3 HOUR RATED

3-1 (1) LAYER ½" TYPE "X" GYPSUM BOARD OVER ⅞" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CONCRETE BLOCK WALL WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF CONC. SLAB ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF CONCRETE DECK (UL #U914) (PROVIDE STC RATING OF 50-54 AT COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS) (UL # U914)

GENERAL NOTES:

1. ALL ENLARGED PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.).
2. ALL FINISHES AS PER INTERIOR DESIGN DWGS & FINISH SCHEDULE.
3. PROVIDE ¼" CEMENTITIOUS BACKER BOARD AS A SUBSTRATE FOR SURFACES RECEIVING A TILE FINISH @ SHOWER AREA. THIS IS IN ADDITION TO THE NUMBER OF GYP. BD. LAYERS INDICATED ON THE WALL TYPE LEGEND

LEGEND:

- CONCRETE FOUNDATION WALL
- CONCRETE BLOCK WALL - 2HR FIRE RATED (U.O.N.)
- GYPSUM BOARD PARTITION - SEE PLAN FOR SIZE.
- MASONRY VENEER
- REMOVABLE KITCHEN BASE CABINET - 2'-6' WIDE x 2'-0" DEEP
- PARTITION - SEE WALL TYPE LEGEND
- 5'-0" DIAMETER CLEAR HANDICAP FLOOR TURNING SPACE.
- "T" FLOOR A.D.A. TURNING SPACE
- 30" x 48" CLEAR A.D.A. FLOOR SPACE
- FIRE RATED SHAFT WALL
- W WINDOW - SEE WINDOW SCHEDULE ON DWG. A-601
- X DOOR & FRAME - SEE DOOR SCHEDULE DRAWING A-600
- SCM HARDWIRED CARBON MONOXIDE DETECTOR (BC 907) (NOT MORE THAN 15FT AWAY FROM BEDROOM DOORS @ CORRIDOR SIDE)
- EXIT LIGHT AND SIGN - WALL MOUNTED
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- ELECTRICAL PANEL UNIT - EP
- NETWORK INTERFACE DEVICE PANEL - NP
- SUSPENDED GYPSUM BOARD
- # APARTMENT DESIGNATION
- ALL APARTMENTS SHALL BE ADAPTABLE
- PARKING STACKER UNIT

METAL STUD NOTE:
G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS SIGNED & SEALED BY ANY LICENSED ENGINEER

FIRE PROTECTION:
ALL EXPOSED STEEL COLUMNS AND BEAMS SHOULD BE PROTECTED WITH 2 HR. FIRE PROOF INTUMESCENT PAINT WHERE SPRAY-ON FIRE PROOFING IS NOT FEASIBLE

SUSPENDED CEILING:
SEE REFLECTED CEILING PLANS AND ON INTERIOR DESIGN DWGS. FOR CEILING FINISH & HEIGHT PENDING FINAL COORDINATION W/ I.D. DWGS.
- EXPOSED CONCRETE SHALL RECEIVE KADEX FINISH & PAINT
- DROPPED GYP BD. PTD. IN ALL NON HABITABLE ROOMS (TYP.)

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

ALCHEMY STUDIO
154 Grand St, NY, NY 10013
+307 760 6454

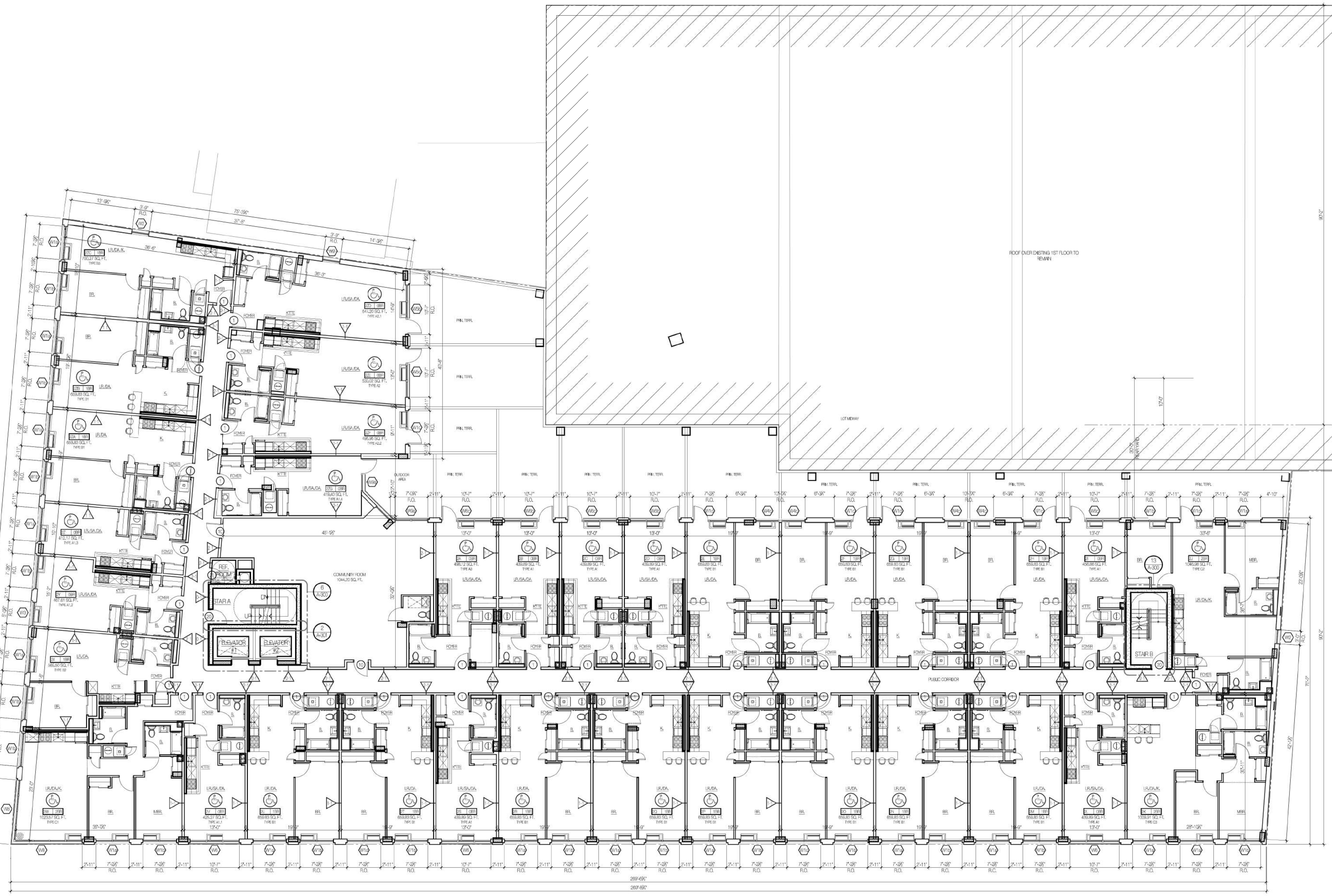
DATE	SUBMISSIONS / REVISIONS
02-21-18	ISSUED TO DOB FOR REVIEW AND COMMENTS

SHEET TITLE:

1ST FLOOR PLAN

SEAL & SIGNATURE

ISSUE DATE:
PROJECT NO: #1723
DRAWN BY: VJ
CHECKED BY: AFM
SCALE: 1/8" = 1'-0"
SHEET NO:
DRAWING NO: A-101.00
NYC DOB NUMBER:



1 / A-102 **2ND FLOOR PLAN**
SCALE : ⅛" = 1'-0"

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
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STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

DATE	SUBMISSIONS / REVISIONS

SHEET TITLE:
2ND FLOOR PLAN

PROGRESS SET
12-18-17

WALL TYPE LEGEND:

NON RATED

- 0-1 FURRING AT INTERIOR CONCRETE WALL - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD OVER 1½" METAL FURRING @ 16" O.C.
- 0-2 TYPICAL PARTITION - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 2½" METAL STUDS @ 16" O.C.
- 0-3 BATHROOM CHASE WALL PARTITION - (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ONE SIDE OF 3⅝" METAL STUDS @ 16" O.C. *SEE INTERIOR DESIGN DRAWINGS FOR WALL THICKNESSES.
- 0-4 PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, ON EACH SIDE OF 3⅝" METAL STUDS @ 16" O.C. (@ APARTMENT ELECTRICAL PANEL/ NETWORK INTERFACE DEVICE PANEL)

1 HOUR RATED

- 1-1 TENANT SEPARATION PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD ON (1) SIDE, (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD ON OTHER SIDE OF 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYPSUM BOARD UP TO UNDERSIDE OF SLAB & SEAL TIGHT TO UNDERSIDE OF SLAB AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT& FIRESAFING INSULATION (GA FILE #WP-1052) (STC 50-54)
- 1-2 EXTERIOR NON BEARING PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER 4" METAL STUDS @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN
- 1-3 TENANT SEPARATION CHASE WALL - (2) ROWS OF (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½" METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2½"MTL. STUD BRACING @ 48" O.C. MAX. (UL#V442) PROVIDE INSULATION AS REQUIRED TO ACHIVE A MIN. STC RAITNG OF 50)

2 HOUR RATED

- 2-1 INTERIOR PARTITION - (2) LAYERS 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF CONC. FLOOR DECK OR ROOF DECK. SEAL TIGHT TO DECK W/ CONT. FIRESTOP SEALANT & FIRESAFING INSULATION. (GA FILE #WP-1522 STC 55-59).
- 2-2 CMU WALL - CMU WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE BLOCK COURSES. SEAL TOP OF CONCRETE/METAL BLOCK WALL TIGHT TO UNDERSIDE OF CONCRETE DECK OR DECK ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXIST. BETWEEN TOP OF WALL AND BOTTOM OF DECK (UL #U906)
- 2-3 SHAFT WALL - (2) LAYERS OF ½" TYPE "X" GYPSUM BOARD ON ONE SIDE OF 2½" METAL C-H STUDS @ 24" O.C. WITH (1) LAYER OF 1" TYPE "X" GYPSUM LINER PANEL ON SHAFT SIDE. W/ 1" MINERAL FIBER INSULATION IN CAVITY SEAL TOP OF WALL TIGHT TO UNDERSIDE OF CONCRETE DECK W/ CONT. FIRESTOP SEALANT. GA FILE #7095 (STC-45-49)
- 2-4 PLUMBING CHASE WALL - (2) ROWS OF (1) LAYERS ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½"METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUD UP TO UNDERSIDE OF CONCRETE SLAB. SEAL TIGHT TO SLAB WITH CONTINUOUS FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONTINUOUS FIRESTOP SEALANT AS REQUIRED PROVIDE HORIZONTAL 2½" MTL. STUD BRACING @ 48" O.C. MAX (UL #V442) (PROVIDED INSULATION AS REQUIRED TO ACHIEVE A MIN. STC RATING OF 50)
- 2-5 EXTERIOR NON BEARING PARTITION - (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER METAL STUDS (SEE MTL STUD NOTE FOR SIZING) @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN

3 HOUR RATED

- 3-1 (1) LAYER ½" TYPE "X" GYPSUM BOARD OVER ⅞" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CONCRETE BLOCK WALL WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF CONC. SLAB ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF CONCRETE DECK (UL #U914) (PROVIDE STC RATING OF 50-54 AT COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS)

GENERAL NOTES:

1. ALL ENLARGED PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.).
2. ALL FINISHES AS PER INTERIOR DESIGN DWGS & FINISH SCHEDULE.

LEGEND:

- CONCRETE FOUNDATION WALL
- CONCRETE BLOCK WALL - 2HR FIRE RATED (U.O.N.)
- GYPSUM BOARD PARTITION - SEE PLAN FOR SIZE.
- MASONRY VENEER
- REMOVABLE KITCHEN BASE CABINET - 2'-6" WIDE x 2'-0" DEEP
- PARTITION - SEE WALL TYPE LEGEND
- HANDICAP ADAPTABLE APARTMENT UNIT
  - A = ACCESSIBLE
  - H.V.I. = HANDICAP VISION IMPAIRMENT
  - I.U. = INCLUSIONARY UNIT
- 5'-0" DIAMETER CLEAR HANDICAP FLOOR TURNING SPACE.
- "T" FLOOR A.D.A. TURNING SPACE
- 30" x 48" CLEAR A.D.A. FLOOR SPACE
- FIRE RATED SHAFT WALL
- W WINDOW - SEE WINDOW SCHEDULE ON DWG. A-601
- X DOOR & FRAME - SEE DOOR SCHEDULE DRAWING A-600
- SCM HARDWIRED CARBON MONOXIDE DETECTOR (BC 907) (NO MORE THAN 15FT AWAY FROM BEDROOM DOORS @ CORRIDOR SIDE)
- EXIT LIGHT AND SIGN - WALL MOUNTED
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- ELECTRICAL PANEL UNIT - EP
- NETWORK INTERFACE DEVICE PANEL - NP
- SUSPENDED GYPSUM BOARD
- # APARTMENT DESIGNATION

MTL STUD NOTE:
G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS

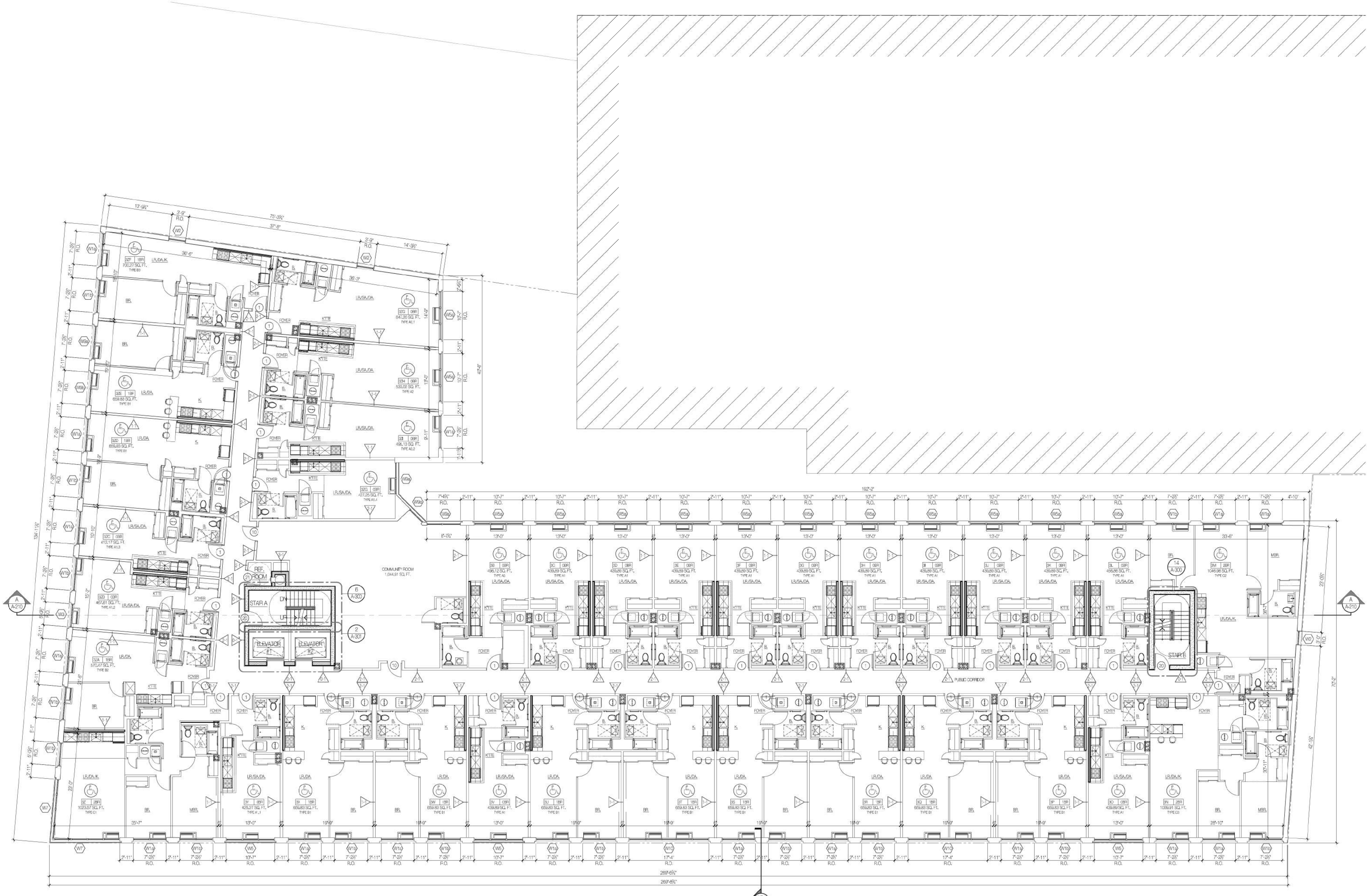
FIRE PROTECTION:
ALL EXPOSED STEEL COLUMNS AND BEAMS SHOULD BE PROTECTED WITH 2 HR. FIRE PROOF INTUMESCENT PAINT WHERE SPRAY-ON FIRE PROOFING IS NOT FEASIBLE

SUSPENDED CEILING:
SEE REFLECTED CEILING PLAN ON INTERIOR DESIGN DWGS. CEILING FINISH & HEIGHT PENDING FINAL COORDINATION W/ I.D. DWGS.
- EXPOSED CONCRETE SHALL RECEIVE KADEX FINISH & PAINT
- DROPPED GYP BD. PTD. IN ALL NON HABITABLE ROOMS (TYP.)

SEAL & SIGNATURE

ISSUE DATE:	PROJECT NO: #1723
DRAWN BY: DC	CHECKED BY: AFM
SCALE: 1/8" = 1'-0"	SHEET NO:
DRAWING NO: A-102.00	

NYC DOB NUMBER:



1
A-103
3RD FLOOR PLAN
SCALE : 1/8" = 1'-0"

WALL TYPE LEGEND:
NON RATED

- 0-1 FURRING AT INTERIOR CONCRETE WALL - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD OVER 1½" METAL FURRING @ 16" O.C.
- 0-2 TYPICAL PARTITION - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 2½" METAL STUDS @ 16" O.C.
- 0-3 BATHROOM CHASE WALL PARTITION - (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ONE SIDE OF 3⅝" METAL STUDS @ 16" O.C. *SEE INTERIOR DESIGN DRAWINGS FOR WALL THICKNESSES.
- 0-4 PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, ON EACH SIDE OF 3⅝" METAL STUDS @ 16" O.C. (@ APARTMENT ELECTRICAL PANEL/ NETWORK INTERFACE DEVICE PANEL)

1 HOUR RATED

- 1-1 TENANT SEPARATION PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD ON 1) SIDE, (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD ON OTHER SIDE OF 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYPSUM BOARD UP TO UNDERSIDE OF SLAB & SEAL TIGHT TO UNDERSIDE OF SLAB AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT& FIRESAFING INSULATION (GA FILE #WP-1052) (STC 50-54)
- 1-2 EXTERIOR NON BEARING PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER 4" METAL STUDS @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN
- 1-3 TENANT SEPARATION CHASE WALL - (2) ROWS OF (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½" METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2½" MTL STUD BRACING @ 48" O.C. MAX. (UL#V442) PROVIDE INSULATION AS REQUIRED TO ACHIVE A MIN. STC RAITNG OF 50)

2 HOUR RATED

- 2-1 INTERIOR PARTITION - (2) LAYERS 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF CONC. FLOOR DECK OR ROOF DECK. SEAL TIGHT TO DECK W/ CONT. FIRESTOP SEALANT & FIRESAFING INSULATION. (GA FILE #WP-1522 STC 55-59).
- 2-2 CMU WALL - CMU WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE BLOCK COURSES. SEAL TOP OF CONCRETE/METAL BLOCK WALL TIGHT TO UNDERSIDE OF CONCRETE DECK OR DECK ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXIST. BETWEEN TOP OF WALL AND BOTTOM OF DECK (UL #U906)
- 2-3 SHAFT WALL - (2) LAYERS OF ½" TYPE "X" GYPSUM BOARD ON ONE SIDE OF 2½" METAL C-H STUDS @ 24" O.C. WITH (1) LAYER OF 1" TYPE "X" GYPSUM LINER PANEL ON SHAFT SIDE, W/ 1" MINERAL FIBER INSULATION IN CAVITY SEAL TOP OF WALL TIGHT TO UNDERSIDE OF CONCRETE DECK W/ CONT. FIRESTOP SEALANT, GA FILE #7095 (STC-45-49)
- 2-4 PLUMBING CHASE WALL - (2) ROWS OF (1) LAYERS ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½"METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUD UP TO UNDERSIDE OF CONCRETE SLAB. SEAL TIGHT TO SLAB WITH CONTINUOUS FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONTINUOUS FIRESTOP SEALANT AS REQUIRED PROVIDE HORIZONTAL 2½" MTL. STUD BRACING @ 48" O.C. MAX (UL #V442) (PROVIDED INSULATION AS REQUIRED TO ACHIEVE A MIN. STC RATING OF 50)
- 2-5 EXTERIOR NON BEARING PARTITION - (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER METAL STUDS (SEE MTL STUD NOTE FOR SIZING) @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN

3 HOUR RATED

- 3-1 (1) LAYER ½" TYPE "X" GYPSUM BOARD OVER ⅞" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CONCRETE BLOCK WALL WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF CONC. SLAB ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF CONCRETE DECK (UL #U914) (PROVIDE STC RATING OF 50-54 AT COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS)

GENERAL NOTES:

1. ALL ENLARGED PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.).
2. ALL FINISHES AS PER INTERIOR DESIGN DWGS & FINISH SCHEDULE.

LEGEND:

- CONCRETE FOUNDATION WALL
- CONCRETE BLOCK WALL - 2HR FIRE RATED (U.O.N.)
- GYPSUM BOARD PARTITION - SEE PLAN FOR SIZE.
- MASONRY VENEER
- REMOVABLE KITCHEN BASE CABINET - 2'-6" WIDE x 2'-0" DEEP
- PARTITION - SEE WALL TYPE LEGEND

- HANDICAP ADAPTABLE APARTMENT UNIT
  - A = ACCESSIBLE
  - H.V.I. = HANDICAP VISION IMPAIRMENT
  - I.U. = INCLUSIONARY UNIT
- 5'-0" DIAMETER CLEAR HANDICAP FLOOR TURNING SPACE.
- "T" FLOOR A.D.A. TURNING SPACE
- 30" x 48" CLEAR A.D.A. FLOOR SPACE
- FIRE RATED SHAFT WALL
- W WINDOW - SEE WINDOW SCHEDULE ON DWG. A-601
- X DOOR & FRAME - SEE DOOR SCHEDULE DRAWING A-600
- SCM HARDWIRED CARBON MONOXIDE DETECTOR (BC 907) (NO MORE THAN 15FT AWAY FROM BEDROOM DOORS @ CORRIDOR SIDE)

- EXIT LIGHT AND SIGN - WALL MOUNTED
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- ELECTRICAL PANEL UNIT - EP
- NETWORK INTERFACE DEVICE PANEL - NP
- SUSPENDED GYPSUM BOARD
- # APARTMENT DESIGNATION

MTL STUD NOTE:
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- DROPPED GYP BD. PTD. IN ALL NON HABITABLE ROOMS (TYP.)

PROGRESS PRINT
12-18-17

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

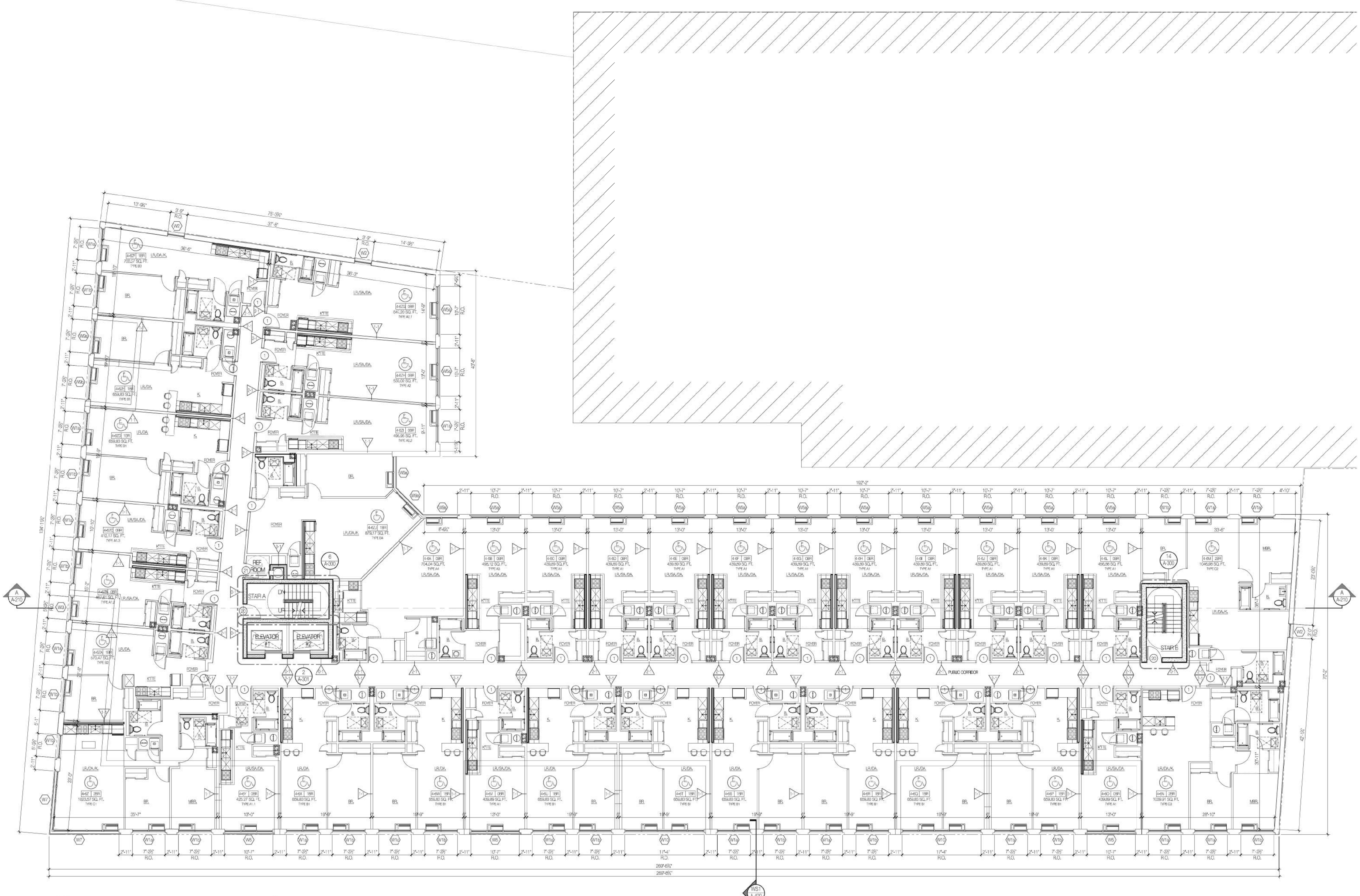
DATE SUBMISSIONS / REVISIONS

SHEET TITLE:
3RD THROUGH 6TH FLOOR PLANS

SEAL & SIGNATURE

ISSUE DATE:		PROJECT NO:	#1723
DRAWN BY:	DC	CHECKED BY:	AFM
SCALE:	1/8" = 1'-0"	SHEET NO:	
DRAWING NO:	A-103.00		

NYC DOB NUMBER:



1 / A-103 — 4TH THROUGH 6TH FLOOR PLAN

SCALE : 1/8" = 1'-0"

WALL TYPE LEGEND:

NON RATED

- 0-1 FURRING AT INTERIOR CONCRETE WALL - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD OVER 1½" METAL FURRING @ 16" O.C.
- 0-2 TYPICAL PARTITION - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 2 ½" METAL STUDS @ 16" O.C.
- 0-3 BATHROOM CHASE WALL PARTITION - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYPSUM BOARD ONE SIDE OF 3⅝" METAL STUDS @ 16" O.C. *SEE INTERIOR DESIGN DRAWINGS FOR WALL THICKNESSES.
- 0-4 PARTITION - (1) LAYER OF 5/8" TYPE "X" GYPSUM BOARD, ON EACH SIDE OF 3 ⅝" METAL STUDS @ 16" O.C. (@ APARTMENT ELECTRICAL PANEL/ NETWORK INTERFACE DEVICE PANEL)

1 HOUR RATED

- 1-1 TENANT SEPARATION PARTITION - (1) LAYER OF 5/8" TYPE "X" GYPSUM BOARD ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYPSUM BOARD ON OTHER SIDE OF 3 ⅝" METAL STUDS @ 16" O.C. WITH 3 ½" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYPSUM BOARD UP TO UNDERSIDE OF SLAB & SEAL TIGHT TO UNDERSIDE OF SLAB AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT& FIRESAFING INSULATION (GA FILE #WP-1052) (STC 50-54)
- 1-2 EXTERIOR NON BEARING PARTITION - (1) LAYER OF 5/8" TYPE "X" GYPSUM BOARD, (INSIDE) 5/8" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER 4" METAL STUDS @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN
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2 HOUR RATED

- 2-1 INTERIOR PARTITION - (2) LAYERS 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE 3 ⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF CONC. FLOOR DECK OR ROOF DECK. SEAL TIGHT TO DECK W/ CONT. FIRESTOP SEALANT & FIRESAFING INSULATION. (GA FILE #WP-1522 STC 55-59).
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- 2-3 SHAFT WALL - (2) LAYERS OF ½" TYPE "X" GYPSUM BOARD ON ONE SIDE OF 2 ½" METAL C-H STUDS @ 24" O.C. WITH (1) LAYER OF 1" TYPE "X" GYPSUM LINER PANEL ON SHAFT SIDE, W/ 1" MINERAL FIBER INSULATION IN CAVITY SEAL TOP OF WALL TIGHT TO UNDERSIDE OF CONCRETE DECK W/ CONT. FIRESTOP SEALANT. GA FILE #7095 (STC-45-49)
- 2-4 PLUMBING CHASE WALL - (2) ROWS OF (1) LAYERS 5/8" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½"METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUD UP TO UNDERSIDE OF CONCRETE SLAB. SEAL TIGHT TO SLAB WITH CONTINUOUS FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONTINUOUS FIRESTOP SEALANT AS REQUIRED PROVIDE HORIZONTAL 2½" MTL. STUD BRACING @ 48" O.C. MAX (UL #V442) (PROVIDED INSULATION AS REQUIRED TO ACHIEVE A MIN. STC RATING OF 50)
- 2-5 EXTERIOR NON BEARING PARTITION - (2) LAYERS OF 5/8" TYPE "X" GYPSUM BOARD, (INSIDE) 5/8" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER METAL STUDS (SEE MTL STUD NOTE FOR SIZING) @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN

3 HOUR RATED

- 3-1 (1) LAYER ½" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CONCRETE BLOCK WALL WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF CONC. SLAB ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF CONCRETE DECK (UL #U914) (PROVIDE STC RATING OF 50-54 AT COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS)

GENERAL NOTES:

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LEGEND:

- CONCRETE FOUNDATION WALL
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- GYPSUM BOARD PARTITION - SEE PLAN FOR SIZE.
- MASONRY VENEER
- REMOVABLE KITCHEN BASE CABINET - 2'-6" WIDE x 2'-0" DEEP
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- "T" FLOOR A.D.A. TURNING SPACE
- 30" x 48" CLEAR A.D.A. FLOOR SPACE
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- W — WINDOW - SEE WINDOW SCHEDULE ON DWG. A-601
- X — DOOR & FRAME - SEE DOOR SCHEDULE DRAWING A-600
- SCM — HARDWIRED CARBON MONOXIDE DETECTOR (BC 907) (NO MORE THAN 15FT AWAY FROM BEDROOM DOORS @ CORRIDOR SIDE)
- EXIT LIGHT AND SIGN - WALL MOUNTED
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- ELECTRICAL PANEL UNIT - EP
- NETWORK INTERFACE DEVICE PANEL - NP
- SUSPENDED GYPSUM BOARD
- # — APARTMENT DESIGNATION

PROGRESS PRINT
12-18-17

MTL STUD NOTE:
G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS

FIRE PROTECTION:
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SUSPENDED CEILING:
SEE REFLECTED CEILING PLAN ON INTERIOR DESIGN DWGS. CEILING FINISH & HEIGHT PENDING FINAL COORDINATION W/ I.D. DWGS.

- EXPOSED CONCRETE SHALL RECEIVE KADEX FINISH & PAINT
- DROPPED GYP BD. PTD. IN ALL NON HABITABLE ROOMS (TYP.)

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

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A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

DATE	SUBMISSIONS / REVISIONS

SHEET TITLE:
3RD THROUGH 6TH FLOOR PLANS

SEAL & SIGNATURE

ISSUE DATE:		PROJECT NO:	#1723
DRAWN BY:	DC	CHECKED BY:	AFM
SCALE:	1/8" = 1'-0"	SHEET NO:	
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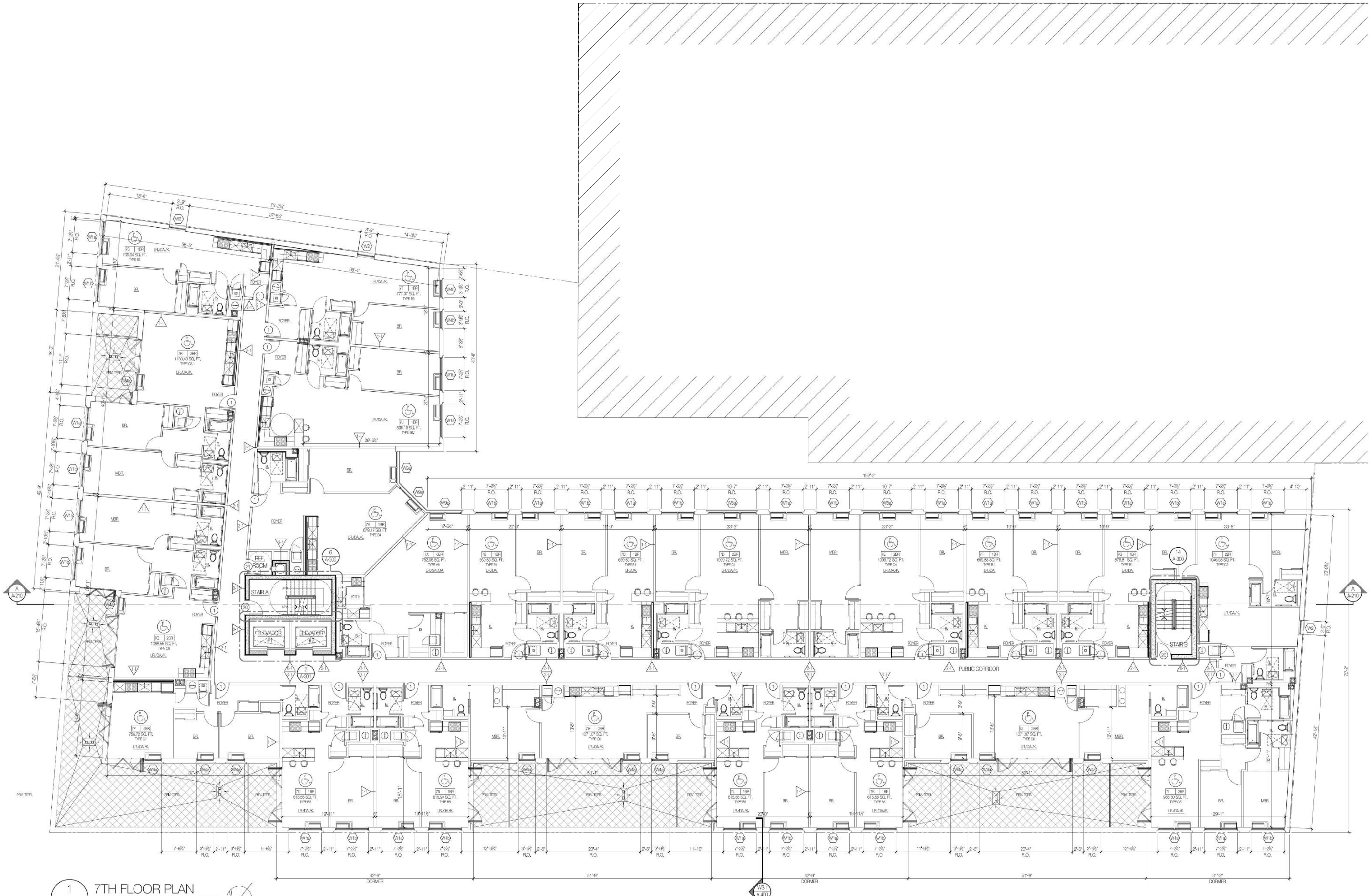

1
A-104
7TH FLOOR PLAN
SCALE : ⅛" = 1'-0"

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
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2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

WALL TYPE LEGEND:

NON RATED

0-1 FURRING AT INTERIOR CONCRETE WALL - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD OVER 1½" METAL FURRING @ 16" O.C.

0-2 TYPICAL PARTITION - (1) LAYER ⅝" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 2½" METAL STUDS @ 16" O.C.

0-3 BATHROOM CHASE WALL PARTITION - (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ONE SIDE OF 3⅝" METAL STUDS @ 16" O.C. *SEE INTERIOR DESIGN DRAWINGS FOR WALL THICKNESSES.

0-4 PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, ON EACH SIDE OF 3⅝" METAL STUDS @ 16" O.C. (@ APARTMENT ELECTRICAL PANEL/ NETWORK INTERFACE DEVICE PANEL)

1 HOUR RATED

1-1 TENANT SEPARATION PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD ON 1) SIDE, (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD ON OTHER SIDE OF 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYPSUM BOARD UP TO UNDERSIDE OF SLAB & SEAL TIGHT TO UNDERSIDE OF SLAB AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT& FIRESAFING INSULATION (GA FILE #WP-1052) (STC 50-54)

1-2 EXTERIOR NON BEARING PARTITION - (1) LAYER OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER 4" METAL STUDS @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN

1-3 TENANT SEPARATION CHASE WALL - (2) ROWS OF (1) LAYER ⅝" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½" METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2½" MTL. STUD BRACING @ 48" O.C. MAX. (UL#V442) PROVIDE INSULATION AS REQUIRED TO ACHIVE A MIN. STC RAITNG OF 50)

2 HOUR RATED

2-1 INTERIOR PARTITION - (2) LAYERS 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF CONC. FLOOR DECK OR ROOF DECK. SEAL TIGHT TO DECK W/ CONT. FIRESTOP SEALANT & FIRESAFING INSULATION. (GA FILE #WP-1522 STC 55-59).

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2-3 SHAFT WALL - (2) LAYERS OF ½" TYPE "X" GYPSUM BOARD ON ONE SIDE OF 2½" METAL C-H STUDS @ 24" O.C. WITH (1) LAYER OF 1" TYPE "X" GYPSUM LINER PANEL ON SHAFT SIDE, W/ 1" MINERAL FIBER INSULATION IN CAVITY SEAL TOP OF WALL TIGHT TO UNDERSIDE OF CONCRETE DECK W/ CONT. FIRESTOP SEALANT, GA FILE #7095 (STC-45-49)

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2-5 EXTERIOR NON BEARING PARTITION - (2) LAYERS OF ⅝" TYPE "X" GYPSUM BOARD, (INSIDE) ⅝" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER METAL STUDS (SEE MTL STUD NOTE FOR SIZING) @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN

3 HOUR RATED

3-1 (1) LAYER ½" TYPE "X" GYPSUM BOARD OVER ⅞" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CONCRETE BLOCK WALL WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF CONC. SLAB ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF CONCRETE DECK (UL #U914) (PROVIDE STC RATING OF 50-54 AT COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS)

GENERAL NOTES:

1. ALL ENLARGED PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.).
2. ALL FINISHES AS PER INTERIOR DESIGN DWGS & FINISH SCHEDULE.

LEGEND:

- CONCRETE FOUNDATION WALL
- CONCRETE BLOCK WALL - 2HR FIRE RATED (U.O.N.)
- GYPSUM BOARD PARTITION - SEE PLAN FOR SIZE.
- MASONRY VENEER
- REMOVABLE KITCHEN BASE CABINET - 2'-6" WIDE x 2'-0" DEEP
- PARTITION - SEE WALL TYPE LEGEND

- HANDICAP ADAPTABLE APARTMENT UNIT
  - A = ACCESSIBLE
  - H.V.I. = HANDICAP VISION IMPAIRMENT
  - I.U. = INCLUSIONARY UNIT
- 5'-0" DIAMETER CLEAR HANDICAP FLOOR TURNING SPACE.
- "T" FLOOR A.D.A. TURNING SPACE
- 30" x 48" CLEAR A.D.A. FLOOR SPACE
- FIRE RATED SHAFT WALL
- W WINDOW - SEE WINDOW SCHEDULE ON DWG. A-601
- X DOOR & FRAME - SEE DOOR SCHEDULE DRAWING A-600
- SCM HARDWIRED CARBON MONOXIDE DETECTOR (BC 907) (NO MORE THAN 15FT AWAY FROM BEDROOM DOORS @ CORRIDOR SIDE)

- EXIT LIGHT AND SIGN - WALL MOUNTED
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- ELECTRICAL PANEL UNIT - EP
- NETWORK INTERFACE DEVICE PANEL - NP
- SUSPENDED GYPSUM BOARD
- # APARTMENT DESIGNATION

PROGRESS PRINT
12-18-17

MTL STUD NOTE:
G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS

FIRE PROTECTION:
ALL EXPOSED STEEL COLUMNS AND BEAMS SHOULD BE PROTECTED WITH 2 HR. FIRE PROOF INTUMESCENT PAINT WHERE SPRAY-ON FIRE PROOFING IS NOT FEASIBLE

SUSPENDED CEILING:
SEE REFLECTED CEILING PLAN ON INTERIOR DESIGN DWGS. CEILING FINISH & HEIGHT PENDING FINAL COORDINATION W/ I.D. DWGS.
- EXPOSED CONCRETE SHALL RECEIVE KADEX FINISH & PAINT
- DROPPED GYP BD. PTD. IN ALL NON HABITABLE ROOMS (TYP.)

DATE	SUBMISSIONS / REVISIONS

SHEET TITLE:
7TH FLOOR PLAN

SEAL & SIGNATURE

ISSUE DATE:		PROJECT NO:	#1723
DRAWN BY:	DC	CHECKED BY:	AFM
SCALE:	1/8" = 1'-0"	SHEET NO:	
DRAWING NO:	A-105.00		

NYC DOB NUMBER:

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:

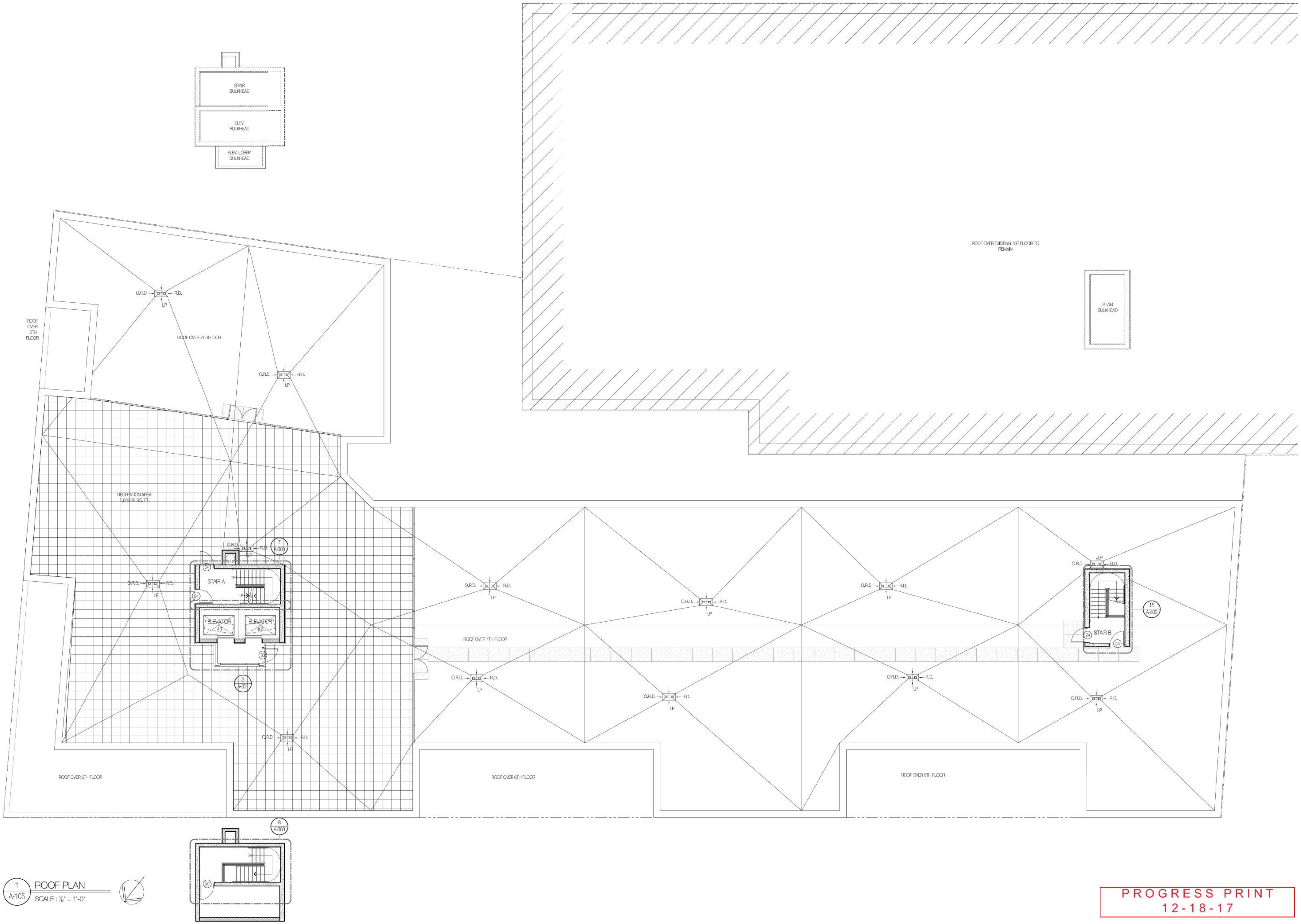
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext



1 / A-105 ROOF PLAN
SCALE : 1/8" = 1'-0"

WALL TYPE LEGEND:

NON RATED

0-1 FURRING AT INTERIOR CONCRETE WALL - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD OVER 1½" METAL FURRING @ 16" O.C.

0-2 TYPICAL PARTITION - (1) LAYER 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE OF 2½" METAL STUDS @ 16" O.C.

0-3 BATHROOM CHASE WALL PARTITION - (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYPSUM BOARD ONE SIDE OF 3⅝" METAL STUDS @ 16" O.C. *SEE INTERIOR DESIGN DRAWINGS FOR WALL THICKNESSES.

0-4 PARTITION - (1) LAYER OF 5/8" TYPE "X" GYPSUM BOARD, ON EACH SIDE OF 3⅝" METAL STUDS @ 16" O.C. (@ APARTMENT ELECTRICAL PANEL/ NETWORK INTERFACE DEVICE PANEL)

1 HOUR RATED

1-1 TENANT SEPARATION PARTITION - (1) LAYER OF 5/8" TYPE "X" GYPSUM BOARD ON (1) SIDE, (2) LAYERS OF 5/8" TYPE "X" GYPSUM BOARD ON OTHER SIDE OF 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND STUDS & GYPSUM BOARD UP TO UNDERSIDE OF SLAB & SEAL TIGHT TO UNDERSIDE OF SLAB AND/OR ROOF DECK W/ CONT. FIRESTOP SEALANT& FIRESAFING INSULATION (GA FILE #WP-1052) (STC 50-54)

1-2 EXTERIOR NON BEARING PARTITION - (1) LAYER OF 5/8" TYPE "X" GYPSUM BOARD, (INSIDE) 5/8" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER 4" METAL STUDS @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN

1-3 TENANT SEPARATION CHASE WALL - (2) ROWS OF (1) LAYER 5/8" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½" METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF SLAB OR ROOF SLAB. SEAL TIGHT TO SLAB WITH CONT. FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONT. FIRESTOP SEALANT AS REQ. PROVIDE HORIZONTAL 2½" MTL. STUD BRACING @ 48" O.C. MAX. (UL#V442) PROVIDE INSULATION AS REQUIRED TO ACHIVE A MIN. STC RAITNG OF 50)

2 HOUR RATED

2-1 INTERIOR PARTITION - (2) LAYERS 5/8" TYPE "X" GYPSUM BOARD ON EACH SIDE 3⅝" METAL STUDS @ 16" O.C. WITH 3½" SOUND ATTENUATION INSULATION. EXTEND GYPSUM BOARD & STUDS UP TO UNDERSIDE OF CONC. FLOOR DECK OR ROOF DECK. SEAL TIGHT TO DECK W/ CONT. FIRESTOP SEALANT & FIRESAFING INSULATION. (GA FILE #WP-1522 STC 55-59).

2-2 CMU WALL - CMU WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE BLOCK COURSES. SEAL TOP OF CONCRETE/METAL BLOCK WALL TIGHT TO UNDERSIDE OF CONCRETE DECK OR DECK ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE GAP EXIST. BETWEEN TOP OF WALL AND BOTTOM OF DECK (UL #U906)

2-3 SHAFT WALL - (2) LAYERS OF ½" TYPE "X" GYPSUM BOARD ON ONE SIDE OF 2½" METAL C-H STUDS @ 24" O.C. WITH (1) LAYER OF 1" TYPE "X" GYPSUM LINER PANEL ON SHAFT SIDE, W/ 1" MINERAL FIBER INSULATION IN CAVITY. SEAL TOP OF WALL TIGHT TO UNDERSIDE OF CONCRETE DECK W/ CONT. FIRESTOP SEALANT, GA FILE #7095 (STC-45-49)

2-4 PLUMBING CHASE WALL - (2) ROWS OF (1) LAYERS 5/8" TYPE "X" WATER RESISTANT GYPSUM BOARD ON ONE SIDE OF 2½"METAL STUDS @ 16" O.C. EXTEND GYPSUM BOARD & STUD UP TO UNDERSIDE OF CONCRETE SLAB. SEAL TIGHT TO SLAB WITH CONTINUOUS FIRESTOP SEALANT. SEAL ALL PENETRATIONS THRU CHASE WALL WITH FIRESAFING INSULATION AND CONTINUOUS FIRESTOP SEALANT AS REQUIRED PROVIDE HORIZONTAL 2½" MTL. STUD BRACING @ 48" O.C. MAX (UL #V442) (PROVIDED INSULATION AS REQUIRED TO ACHIEVE A MIN. STC RATING OF 50)

2-5 EXTERIOR NON BEARING PARTITION - (2) LAYERS OF 5/8" TYPE "X" GYPSUM BOARD, (INSIDE) 5/8" EXP EXTERIOR GYPSUM BOARD SHEATHING (OUTSIDE) OVER METAL STUDS (SEE MTL STUD NOTE FOR SIZING) @ 16" O.C. WITH 3½" BATT INSULATION W/ VAPOR BARRIER (R-15) (UL #U419) STUD SIZES & SEPARATIONS ARE MINIMUM REQUIRED BY THE UL DESIGN

3 HOUR RATED

3-1 (1) LAYER ½" TYPE "X" GYPSUM BOARD OVER 7/8" METAL HAT CHANNELS @ 24" O.C. OVER 2 HR RATED CONCRETE BLOCK WALL WITH CONT. GALVANIZED HORIZONTAL TRUSS TYPE REINFORCING AT ALTERNATE COURSES. SEAL TOP OF CONCRETE BLOCK WALL TIGHT TO UNDERSIDE OF CONC. SLAB ABOVE WITH CONT. FIRESTOP SEALANT AND FIRESAFING INSULATION WHERE A GAP EXISTS BETWEEN TOP OF WALL AND BOTTOM OF CONCRETE DECK (UL #U914) (PROVIDE STC RATING OF 50-54 AT COMPACTOR CHUTE ENCLOSURE ADJACENT TO DWELLING UNITS)

GENERAL NOTES:

1. ALL ENLARGED PLAN DIMENSIONS ARE TAKEN FINISH TO FINISH (U.O.N.).
2. ALL FINISHES AS PER INTERIOR DESIGN DWGS & FINISH SCHEDULE.

LEGEND:

- CONCRETE FOUNDATION WALL
- CONCRETE BLOCK WALL - 2HR FIRE RATED (U.O.N.)
- GYPSUM BOARD PARTITION - SEE PLAN FOR SIZE.
- MASONRY VENEER
- REMOVABLE KITCHEN BASE CABINET - 2'-6" WIDE x 2'-0" DEEP
- PARTITION - SEE WALL TYPE LEGEND
- HANDICAP ADAPTABLE APARTMENT UNIT
  - A = ACCESSIBLE
  - H.V.I. = HANDICAP VISION IMPAIRMENT
  - I.U. = INCLUSIONARY UNIT
- 5'-0" DIAMETER CLEAR HANDICAP FLOOR TURNING SPACE.
- "T" FLOOR A.D.A. TURNING SPACE
- 30" x 48" CLEAR A.D.A. FLOOR SPACE
- FIRE RATED SHAFT WALL
- W WINDOW - SEE WINDOW SCHEDULE ON DWG. A-601
- X DOOR & FRAME - SEE DOOR SCHEDULE DRAWING A-600
- SCM HARDWIRED CARBON MONOXIDE DETECTOR (BC 907) (NO MORE THAN 15FT AWAY FROM BEDROOM DOORS @ CORRIDOR SIDE)
- EXIT LIGHT AND SIGN - WALL MOUNTED
- EXIT LIGHT AND SIGN - CEILING MOUNTED
- ELECTRICAL PANEL UNIT - EP
- NETWORK INTERFACE DEVICE PANEL - NP
- SUSPENDED GYPSUM BOARD
- # APARTMENT DESIGNATION

PROGRESS PRINT
12-18-17

MTL STUD NOTE:
G.C. SHALL SUBMIT SHOP DRAWINGS TO ARCHITECT FOR REVIEW INDICATING SIZE, GAUGE AND SPACING OF ALL METAL STUDS AND REQUIRED METAL BOXED HEADERS

FIRE PROTECTION:
ALL EXPOSED STEEL COLUMNS AND BEAMS SHOULD BE PROTECTED WITH 2 HR. FIRE PROOF INTUMESCENT PAINT WHERE SPRAY-ON FIRE PROOFING IS NOT FEASIBLE

SUSPENDED CEILING:
SEE REFLECTED CEILING PLAN ON INTERIOR DESIGN DWGS. CEILING FINISH & HEIGHT PENDING FINAL COORDINATION W/ I.D. DWGS.
- EXPOSED CONCRETE SHALL RECEIVE KADEX FINISH & PAINT
- DROPPED GYP BD. PTD. IN ALL NON HABITABLE ROOMS (TYP.)

DATE	SUBMISSIONS / REVISIONS

SHEET TITLE:

ROOF PLAN

SEAL & SIGNATURE

ISSUE DATE:		PROJECT NO:	#1723
DRAWN BY:	DC	CHECKED BY:	AFM
SCALE:	1/8" = 1'-0"	SHEET NO:	
DRAWING NO:	A-106.00		

NYC DOB NUMBER:

PROPOSED NEW MIXED USE
BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

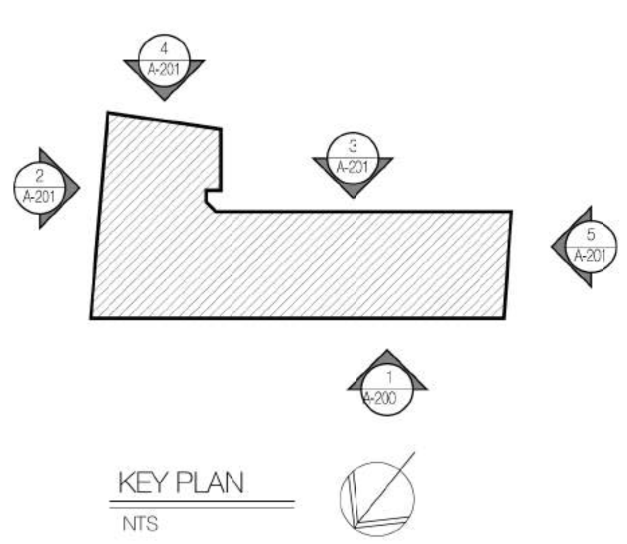
OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

1 A-200 30TH STREET ELEVATION
SCALE: 1/8" = 1'-0"

PROGRESS PRINT
12-18-17



KEY PLAN
NTS

LEGEND:
- MODULAR BRICK
- EIFs LIMESTONE FINISH
- PERFORATED BRICK PATTERN
- WINDOW, EQUITONE PANEL
- SPANDREL GLASS WINDOW

NOTE:
PROVIDE WINDOW STOP TO PREVENT PIVOTING WINDOWS FROM OPENING MORE THAN 4½" (WINDOW GUARD REGULATIONS OF THE CITY OF NY 6-30-91 CHAPTER 12)

DATE	SUBMISSIONS / REVISIONS

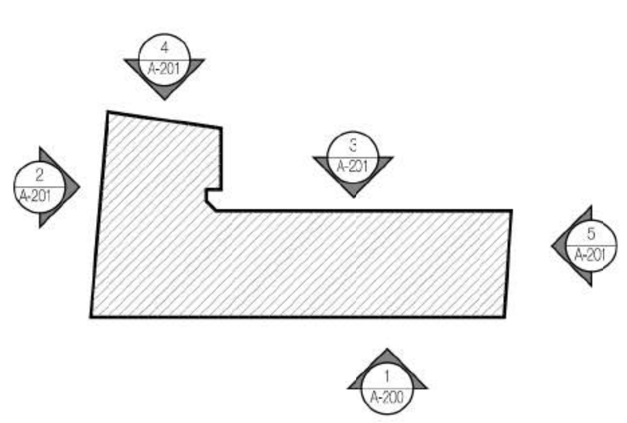
SHEET TITLE:
30TH STREET
ELEVATION

SEAL & SIGNATURE

ISSUE DATE:	PROJECT NO: #1723
DRAWN BY: DC	CHECKED BY: AFM
SCALE: 1/8" = 1'-0"	SHEET NO:
DRAWING NO: A-200.00	
NYC DOB NUMBER:	

PROGRESS PRINT
12-18-17

2
A-201
37TH AVENUE ELEVATION
SCALE : 1/8" = 1'-0"



KEY PLAN
NTS

PROPOSED NEW MIXED USE
BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

DATE	SUBMISSIONS / REVISIONS

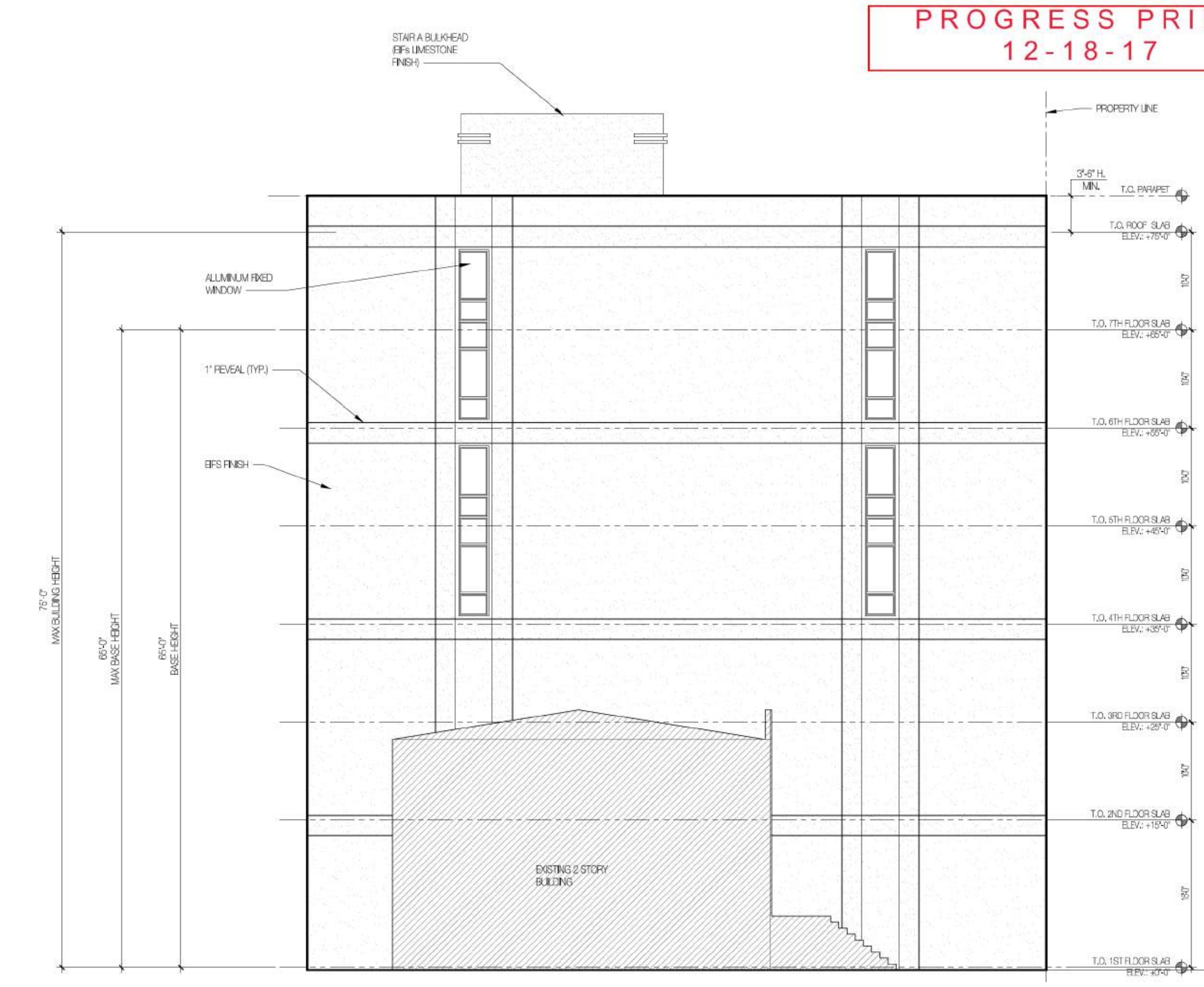
SHEET TITLE:
37TH AVENUE
ELEVATION

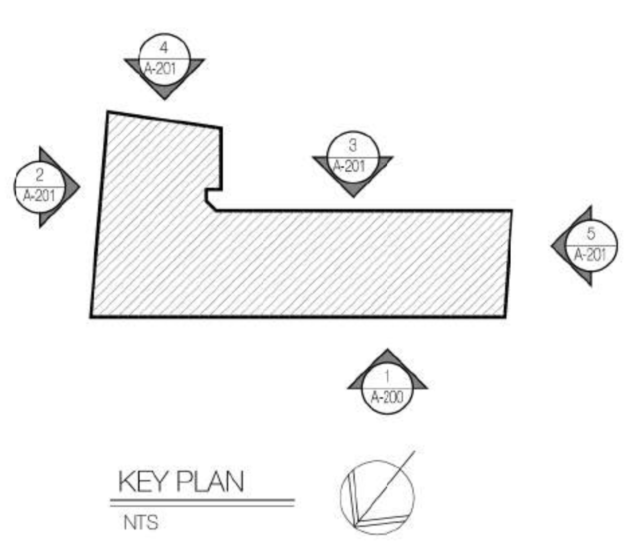
SEAL & SIGNATURE

ISSUE DATE:	PROJECT NO: #1723
DRAWN BY: DC	CHECKED BY: AFM
SCALE: 1/8" = 1'-0"	SHEET NO:
DRAWING NO: A-201.00	
NYC DOB NUMBER:	

PROGRESS PRINT
12-18-17

3 A-202 SOUTHEAST ELEVATION
SCALE : 1/8" = 1'-0"





KEY PLAN
NTS

4 A-202 SOUTHEAST ELEVATION
SCALE : 1/8" = 1'-0"

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
37-11 30th Street Holdings LLC

STRUCTURAL ENGINEER:
McNAMARA SALVIA
Structural Engineers
62 West 45th Street, 11th Floor, New York, NY 10036
Tel.: 212 246-9800

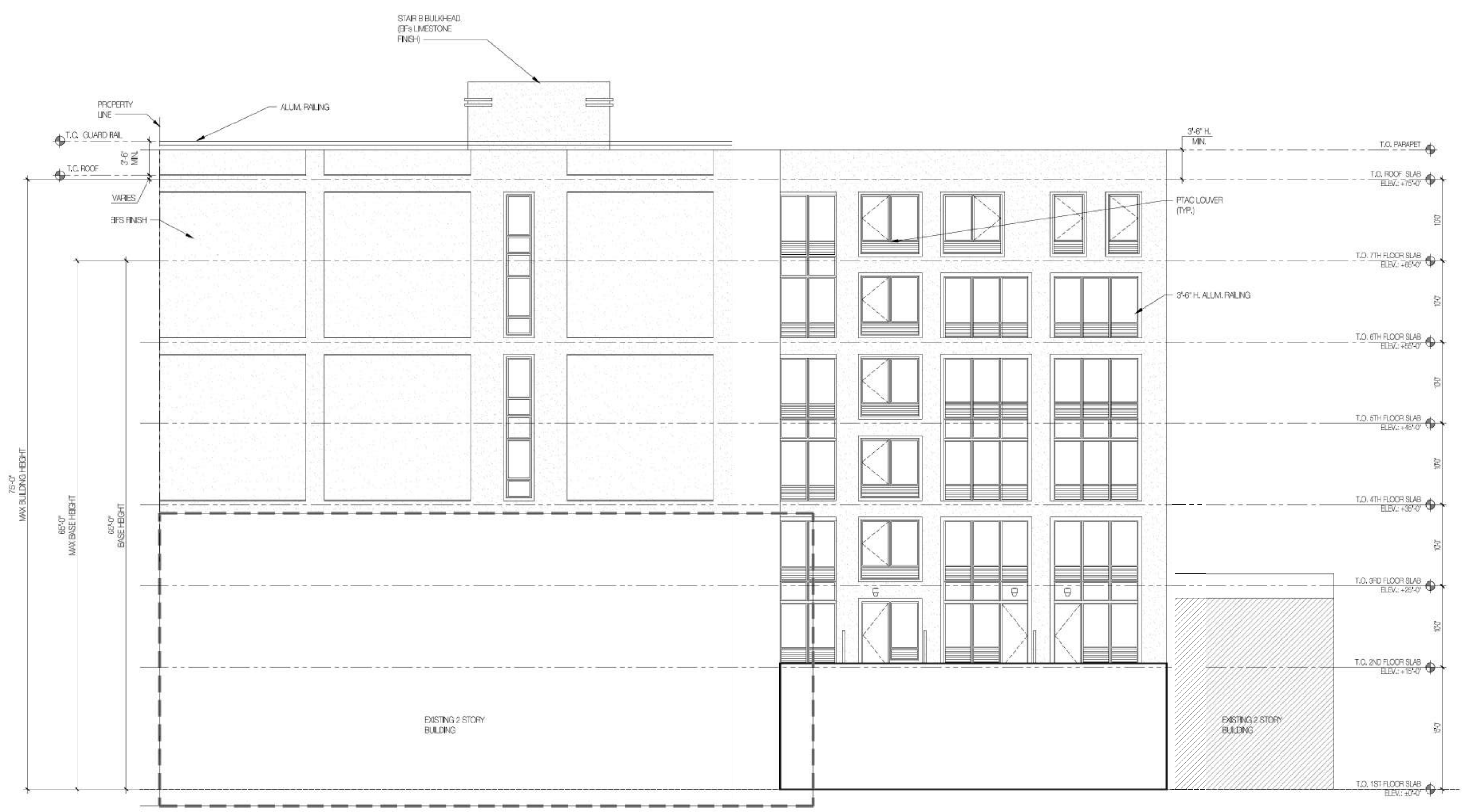
MEP ENGINEER:
A&D Engineering, PLLC
2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

DATE | SUBMISSIONS / REVISIONS

SHEET TITLE:
SOUTHEAST ELEVATION

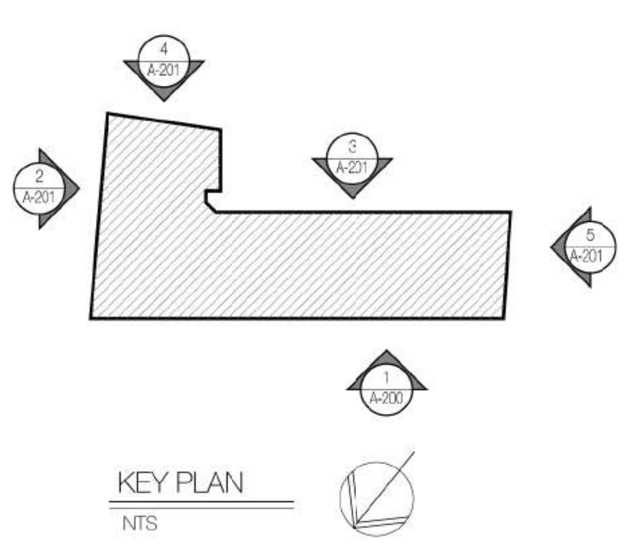
SEAL & SIGNATURE

ISSUE DATE: | PROJECT NO: #1723
DRAWN BY: DC | CHECKED BY: AFM
SCALE: 1/8" = 1'-0" | SHEET NO:
DRAWING NO: A-202.00
NYC DOB NUMBER:



4 A-203 SOUTHWEST ELEVATION
SCALE : 1/8" = 1'-0"

PROGRESS PRINT
12-18-17



KEY PLAN
NTS

PROPOSED NEW MIXED USE BUILDING FOR:

30th STREET

37-11 30TH STREET, QUEENS, NY

BLOCK: 372 LOT: 8

ARCHITECT:
AUFGANG ARCHITECTS LLC
74 LAFAYETTE AVENUE - SUITE 301
SUFFERN, NY 10901
INFO@AUFGANG.COM 845.368.0004

AUFGANG ARCHITECTS

OWNER:
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2613 E 65th Street, Brooklyn, NY 11234
T. 718.872.6122 / 718.872.6144 Ext

DATE SUBMISSIONS / REVISIONS

SHEET TITLE:
SOUTHWEST ELEVATION

SEAL & SIGNATURE

ISSUE DATE:
PROJECT NO: #1723
DRAWN BY: DC
CHECKED BY: AFM
SCALE: 1/8" = 1'-0"
SHEET NO:
DRAWING NO: A-203.00
NYC DOB NUMBER:

APPENDIX C

PREVIOUS ENVIRONMENTAL REPORTS

SEPARATE ATTACHMENT

APPENDIX D
CONSTRUCTION HEALTH AND SAFETY PLAN

CONSTRUCTION HEALTH AND SAFETY PLAN

FOR

37-11 30th STREET
LONG ISLAND CITY, NEW YORK
Queens Borough Tax Map Block 372, a portion of Lot 8 and Lot 21

Prepared For:

37-11 30th Street Holdings LLC
c/o Slate Property Group
38 East 29th Street
New York, New York

Prepared By:

Langan Engineering, Environmental, Surveying Landscape Architecture, and Geology, D.P.C.
21 Penn Plaza
360 West 31st Street, 8th Floor
New York, New York 10001

December 2018
Langan Project No. 170512301

LANGAN

TABLE OF CONTENTS

Page No.

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

***** Items to be posted prominently on site, or made readily available to personnel.

1.0 INTRODUCTION

1.1 General

This CONSTRUCTION HEALTH AND SAFETY PLAN (CHASP) was developed to address disturbance of known and reasonably anticipated subsurface contaminants and comply with Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910.120(b)(4), *Hazardous Waste Operations and Emergency Response* during anticipated site work 37-11 30th Street and 30-14 37th Avenue in the Long Island City neighborhood of Queens, New York and is identified as Tax Block 372, a portion of Lot 8 and Lot 21, on the Queens Borough Tax Map ("the Site"). This CHASP provides the minimum requirements for implementing site operations during future possible remedial measure activities. All contractors performing work on this site shall implement their own CHASP that, at a minimum, adheres to this CHASP. The contractor is responsible for their own health and safety and that of their subcontractors. Langan personnel will implement this CHASP while onsite.

The management of the day-to-day site activities and implementation of this CHASP in the field is the responsibility of the site Langan Field Team Leader (FTL). Assistance in the implementation of this CHASP can also be obtained from the site Langan Health and Safety Officer (HSO) and the Langan Health and Safety Manager (HSM). Contractors operating on the site shall designate their own FTL, HSO and HSM. The content of this CHASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the work plan.

1.2 Site Location and Background

The site is located at located at 37-11 30th Street and 30-14 37th Avenue in the Long Island City neighborhood of Queens, New York and is identified as Tax Block 372, a portion of Lot 8 and Lot 21, on the Queens Borough Tax Map. A site location map is provided as Figure 1. The site encompasses an area of about 26,978 -square-feet (0.61 acres) and is occupied by a one-story and partial three-story warehouse buildings with multiple partial cellar levels and a stockyard/ storage area in the northern portion of Lot 8 (37-11 30th Street), and a two-story residential building in Lot 21 (30-14 37th Avenue). A lighting, audio, and production rental and warehousing company most recently occupied the buildings in Lot 8, and the development in Lot 21 is designated for residential use. The site is bound by 37th Avenue to the north, 31st Street to the east, 38th Avenue to the south, and 30th Street to the west. The elevated N and Q subway tracks run north-south above 31st Street, which are about 100 feet east of the site

1.3 Summary of Work Tasks

The general categories of work tasks that may be performed at the site include, but are not limited to:

1.3.1 Demolition of the Unoccupied Building

The demolition contractor shall furnish all labor and materials, equipment and incidentals required for the proper demolition of the building located north of the UST area. This activity is independent of the Langan work scope.

1.3.2 Chromium Delineation

Langan may retain a drilling contractor to advance soil borings to a depth below grade surface (bgs) specified in the work plan. Borings locations will be based on the results of site inspection and document review. The drilling contractor will contact the appropriate utility mark-out authority and make available to their drilling staff the verification number and effective dates. The borings may be filled with clean soil cuttings after samples are collected.

Langan will screen soil for visual, olfactory, and instrumental indicators suggestive of a potential petroleum release. Instrument screening for the presence of volatile organic compounds (VOCs) may be performed with a calibrated photoionization detector (PID). Langan will collect soil samples as specified in the chromium delineation portion of the work plan. Soil samples will be submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory and analyzed in accordance with work plan specifications.

1.3.3 Chromium Hot Spot Soil Excavation and Disposal

Langan personnel will observe activities associated with the excavation and disposal of hazardous chromium hot spot impacted soil. Langan personnel will coordinate with the excavator contractor so that the boundaries of the hazardous hot spot excavation correspond to with the approved disposal facilities instructions. Langan personnel are not to sign the hazardous waste manifests unless instructed by the Project Manager.

1.3.4 Excavation and Soil Screening

Langan personnel will screen excavated material for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of volatile organic compounds (VOCs) may be performed with a calibrated photoionization detector (PID). Contractors will excavate for utilities, foundation components and potential grading using heavy equipment and hand tools. Contractors will notify Langan personnel if they identify indications suggestive of a potential chemical or petroleum release. Contaminated material shall be handled and property disposed in accordance with federal, state and city regulations, criteria and guidelines.

1.3.5 Soil Screening

As part of future excavation activities, the Langan personnel will report when they have observed visual and olfactory indications of possible soil impact. Langan personnel will also report concentrations of volatile organic vapors (VOCs) above background when using a properly calibrated hand held photoionization detector (PID, or equivalent).

1.3.6 Soil Sampling

Soil samples for excavation endpoint or delineation sampling (along with QA/QC samples) may be collected into laboratory-supplied batch-certified clean glassware and submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP).

1.3.7 Stockpiling

Potentially impacted soil may be stockpiled pending laboratory analysis and determining proper off-site disposal. Langan personnel will coordinate with the contractor in stockpiling soils (in accordance with the SMP, where applicable).

1.3.8 Characterization of Excavated Material

When required by the SMP, Langan personnel will characterize excavated soil or clean backfill in accordance with Langan standards.

1.3.9 Excavation Backfill

Areas of the site that were over-excavated may be backfilled to development grade (i.e., the grade required to complete construction of the foundation and sidewalk extension). Imported material will consist of clean fill that meets the 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6.8(a) Unrestricted Use Soil Cleanup Objectives (UU SCOs) or other acceptable fill material such as virgin stone from a permitted mine or quarry or recycled concrete aggregate (RCA), from a New York State Department of Environmental Conservation (NYSDEC)-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of RCA acquisition. Imported RCA must be derived from recognizable and uncontaminated concrete. RCA is not acceptable for, and will not be used as, site cover or drainage material.

1.3.10 Removal of Underground Storage Tank

If encountered, the contractor shall furnish all labor and materials, equipment and incidentals required for the proper decontamination, removal and closure of any UST in accordance with federal, state and local regulations. Langan personnel will monitor VOCs with a calibrated PID downwind from the UST excavation and record the PID readings.

1.3.11 Construction Dewatering

If construction dewatering is required, the dewatering contractor shall be responsible for handling contaminated dewatering fluids in accordance with federal, state and local regulations. Dewatering fluids are likely to be discharged to the local sanitary sewer system after treatment and under approved regulatory permit. Alternatively, the contractor may provide containerized storage to allow for testing of groundwater prior to, and after, treatment and before disposal. If required, Langan field personnel may sample dewatering treatment system liquids from either a discharge standpipe or a storage tank. Dewatering samples will be submitted to an ELAP-certified laboratory for analysis.

1.3.12 Construction Activity Inspections and Observations

Langan will observe construction activities including the composite cover performed by the contractor in accordance with the construction documents, RAWP, and special inspection requirements administered by the New York City Department of Buildings. Materials used for construction will be inspected by Langan for conformance to the design documents.

1.3.13 Drum Sampling

Excess or impacted soil and water that is drummed during the remedial action activities must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP-#9). Langan personnel will collect drum samples, as required, prior to off-site drum disposal. Samples will be placed into laboratory-supplied batch-certified clean glassware and submitted to a NYSDOH ELAP-certified laboratory.

2.0 IDENTIFICATION OF KEY PERSONNEL/HEALTH AND SAFETY PERSONNEL

The following briefly describes the health and safety (H&S) designations and general responsibilities that may be employed for this site. The titles have been established to accommodate the project needs and requirements and ensure the safe conduct of site activities. The H&S personnel requirements for a given work location are based upon the proposed site activities.

2.1 Langan Project Manager

The Langan Environmental Project Manager (PM) is Emily Sneed, her responsibilities include:

- Ensuring that this CHASP is developed, current, and approved prior to on-site activities.
- Ensuring that all the tasks in the project are performed in a manner consistent with Langan's comprehensive *Health and Safety Program for Hazardous Waste Operations*

and this CHASP.

2.2 Langan Corporate Health and Safety Manager

The Langan Corporate Health and Safety Manager (HSM) is Tony Moffa. His responsibilities include:

- Updating the *Construction Health and Safety Program for Hazardous Waste Operations*.
- Assisting the site Health and Safety Officer (HSO) with development of the CHASP, updating CHASP as dictated by changing conditions, jobsite inspection results, etc. and approving changes to this CHASP.
- Assisting the HSO in the implementation of this CHASP and conducting Jobsite Safety Inspections and assisting with communication of results and correction of shortcomings found.
- Maintaining records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).

2.3 Langan Site Health & Safety Officer

The Langan site HSO is William Bohrer. His responsibilities include:

- Participating in the development and implementation of this CHASP.
- When on-site, assisting the Langan Field Team Leader in conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- Ensuring that proper PPE is available, worn by employees, and properly stored and maintained.
- Controlling entry into and exit from the site contaminated areas or zones.
- Monitoring employees for signs of stress, such as heat stress, fatigue, and cold exposure.
- Monitoring site hazards and conditions.
- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Resolving conflicts that may arise concerning safety requirements and working conditions.
- Reporting all incidents, injuries and near misses to the Langan Incident/Injury Hotline immediately and the client representative.

2.4 Langan Field Team Leader Responsibilities

The Langan Field Team Leader (FTL) is to be determined prior to the start of the start of field activities. The Field Team Leader's responsibilities include:

- The management of the day-to-day site activities and implementation of this CHASP in the field.
- Participating in and/or conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- When a Community Air Monitoring Operating Program (CAMP) is part of the scope, the FTL will set up and maintaining community air monitoring activities and instructing the responsible contractor to implement organic vapor or dust mitigation when necessary.
- Overseeing the implementation of activities specified in the work plan.

2.5 Contractor Responsibilities

The contractor shall develop and implement their own CHASP for their employees, lower-tier subcontractors, and consultants. The contractor is responsible for their own health and safety and that of their subcontractors. Contractors operating on the site shall designate their own FTL, HSO and HSM. The contractor's CHASP will be at least as stringent as this Langan CHASP. The contractor must be familiar with and abide by the requirements outlined in their own CHASP. A contractor may elect to adopt Langan's CHASP as its own provided that it has given written notification to Langan, but where Langan's CHASP excludes provisions pertinent to the contractor’s work (i.e., confined space entry); the contractor must provide written addendums to this CHASP. Additionally, the contractor must:

- Ensure their employees are trained in the use of all appropriate PPE for the tasks involved;
- Notify Langan of any hazardous material brought onto the job site or site related area, the hazards associated with the material, and must provide a material safety data sheet (MSDS) or safety data sheet (SDS) for the material;
- Have knowledge of, understand, and abide by all current federal, state, and local health and safety regulations pertinent to the work;
- Ensure their employees handling hazardous materials, if identified at the Site, have received current training in the appropriate levels of 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) if hazardous waste is identified at the Site;
- Ensure their employees handling hazardous materials, if identified at the Site, have been fit-tested within the year on the type respirator they will wear; and
- Ensure all air monitoring is in place pertaining to the health and safety of their employees as required by OSHA 1910.120; and
- All contractors must adherer to all federal, state, and local regulatory requirements.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSES

A Task-Hazard Analysis (Table 1) was completed for general construction hazards that may be encountered at the Site. The potential contaminants that might be encountered during the field activities and the exposure limits are listed in Table 2 complete inventory of MSDS/SDS for chemical products used on site is included as Attachment E.

3.1 Specific Task Safety Analysis

3.1.1 Soil Screening and Sampling

When conducting soil screening and collecting soil samples, Langan personnel will don chemical resistant gloves in addition to the standard personal protection equipment (PPE).

3.1.2 Stockpile Sampling

The Langan personnel are not to scale or otherwise climb stockpiles. If the soil sampling plan requires sampling from the stockpile above ground level, samples are to be obtained using suitable excavation equipment operated by the contractor (i.e. front end loader).

3.1.3 Construction Dewatering

If required, Langan may sample dewatering treatment system liquids from either the direct discharge standpipe or from a sample port or valve built into the storage tank, Langan will don the necessary PPE including nitrile gloves and if necessary, facial splash guard. Sample ports and valves may only be sampled if they are accessible at ground level. Sampling from heights over 6 feet is prohibited unless Langan field personnel are fully accredited in fall protection and is wearing approved fall protection safety apparatus. The discharge samples will be submitted to an ELAP-certified laboratory for analysis in accordance with the work plan.

3.1.4 Removal of Underground Storage Tank

If UST excavation and removal activity is initiated, Langan personnel will conduct air monitoring for lower explosion limit (LEL) conditions within the UST excavation itself. This task is to be performed using calibrated air monitoring equipment designed to sound an audio alarm when atmospheric concentrations of VOC are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type sensor (i.e. MultiRAE). However in oxygen depleted atmospheres (confined space), only an LEL designed to work in low oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation. Langan personnel are not to enter the UST excavation nor enter an excavated UST.

In addition to monitoring LEL, Langan personnel will monitor atmospheric VOC concentrations directly downwind of the UST excavation in accordance with standard CAMP procedures using calibrated air monitoring equipment.

3.1.5 Construction Activity Inspection

The contractor will operate equipment used to install the composite cover. Langan personnel will inspect in accordance with specification in the work plan and record the data the work plan requires. The installation of the composite cover is to be done exclusively by the contractor following their own health and safety specifications outlined in their HASPs. Other activities assigned to Langan as part of construction activities are limited to inspection and observations as specified in the work pan. Langan personnel are not to operate or assist in the operation of equipment used in construction activities unless defined as part of an inspection or observation in the work plan.

3.1.6 Chromium Delineation

Chromium delineation sampling requires additional precautions to mitigate chromium exposure. Langan will monitor indoor dust using air-dust monitoring equipment (DustTrak™ 2 or equivalent). The dust monitoring equipment should be equipped with an alarm. The primary alarm should be set for 5 milligrams per cubic meter (mg/m^3) above the 15 minute average background. The secondary alarm may be set for 24 mg/m^3.

If the primary alarm activates during work, the PM notified, and dust control measures should be implemented and all workers should don half face respirator with HEPA dust filters to continue to work. Dust control measures include applying a fine water spray wet all surfaces in the work area to dampen dust and activating ventilation. Workers can remove half respirators when air borne dust concentrations return to background. If dust mitigation does not lower dust concentrations and dust levels continue to climb, all work should cease when dust concentrations exceed 24 mg/m^3 and the PM should be notified.

3.1.7 Indoor Work Using Combustion Engine

In the event that one or more boreholes and soil vapor points are to be install indoors, these boreholes and vapor points should be advanced using electrical or hydraulic powered machinery (provide the hydraulic generator is either electric or operating outside the building). If the advancement of the boreholes or soil vapor points must be done using drilling equipment powered by an internal combustion engine, the drilling contractor and Langan must do the following:

- The drilling contractor must bring heat protected tubing having sufficient length, diameter and fixtures to vent all combustion exhaust from the drill rig directly outdoors;
- The drilling contractor must bring fans to provide adequate circulation of fresh air into the work area;
- All work area windows and doors to the outside must be opened to provide continuous

fresh air;

- Langan personnel must monitor indoor air for carbon monoxide using a MultiRAE or equivalent detector:
  - The 8 hour PEL for Carbon Monoxide is 50 ppm, if the detector indicates carbon monoxide concentrations above 50 ppm, work is to stop and steps are to be taken to mitigate the carbon dioxide concentrations.
  - If the detector indicates carbon monoxide concentrations above 100 ppm, all work is to stop and the work area is to be evacuated. Langan personnel will contact the PM to determine the best course of action.

3.1.8 Drum Sampling

Drilling fluid, rinse water, grossly-contaminated soils samples and cuttings may be containerized in 55-gallon drums for transport and disposal off site. Each drum must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP-#9). Langan may collect drum samples, as required, prior to off-site drum disposal. Samples will be placed into laboratory-supplied batch-certified clean glassware and submitted to a NYSDOH ELAP-certified laboratory.

Langan employees and contractors are not to move or open any orphaned (unlabeled) drum found on the site without approval of the project manager.

3.2 Radiation Hazards

No radiation hazards are known or expected at the site.

3.3 Physical Hazards

Physical hazards, which may be encountered during site operations for this project, are detailed in Table 1.

3.3.1 Explosion

No explosion hazards are expected for the scope of work at this site.

3.3.2 Heat Stress

The use of Level C protective equipment, or greater, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 72^{o}F or above. Table 6 presents the suggested frequency for such monitoring. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Refer to the Table 7 to assist in assessing when the risk for heat related illness is likely. To use this table, the ambient temperature and relative humidity must be obtained (a regional weather report should suffice). Heat stress monitoring should be performed by the HSO or the FTL, who shall be able to recognize symptoms related to heat stress.

To monitor the workers, be familiar with the following heat-related disorders and their symptoms:

- **Heat Cramps:** Painful spasm of arm, leg or abdominal muscles, during or after work
- **Heat Exhaustion:** Headache, nausea, dizziness; cool, clammy, moist skin; heavy sweating; weak, fast pulse; shallow respiration, normal temperature
- **Heat Stroke**: Headache, nausea, weakness, hot dry skin, fever, rapid strong pulse, rapid deep respirations, loss of consciousness, convulsions, coma. *This is a life threatening condition***.**

Do not permit a worker to wear a semi-permeable or impermeable garment when they are showing signs or symptoms of heat-related illness.

To monitor the worker, measure:

- **Heart rate:** Count the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third. A worker cannot return to work after a rest period until their heart rate is below 100 beats per minute.
- **Oral temperature:** Use a clinical thermometer (3 minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6^{O}F (37.6^{O}C), shorten the next work cycle by one-third without changing the rest period. A worker cannot return to work after a rest period until their oral temperature is below 99.6^{O}F. If oral temperature still exceeds 99.6^{O}F (37.6^{O}C) at the beginning of the next rest period, shorten the following cycle by one-third. Do not permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6^{O}F (38.1^{O}C).

Prevention of Heat Stress - Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress the following steps should be taken:

- Adjust work schedules.
- Mandate work slowdowns as needed.

- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, id., eight fluid ounces (0.23 liters) of water must be ingested for approximately every eight ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
    - Maintain water temperature 50^{o} to 60^{o}F (10^{o} to 16.6^{o}C).
    - Provide small disposal cups that hold about four ounces (0.1 liter).
    - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
    - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
    - Train workers to recognize the symptoms of heat related illness.

3.3.3 Cold-Related Illness

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is generally called frostbite.

- **Hypothermia -** Hypothermia is defined as a decrease in the patient core temperature below 96^{o}F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include: shivering, apathy, listlessness, sleepiness, and unconsciousness.
- **Frostbite -** Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20^{o}F. Symptoms of frostbite are: a sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of Cold-Related Illness - To prevent cold-related illness:

- Educate workers to recognize the symptoms of frostbite and hypothermia

- Identify and limit known risk factors:
- Assure the availability of enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.
- Assure the availability of warm drinks.
- Start (oral) temperature recording at the job site:
- At the FSO or Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind-chill less than 20^{o}F, or wind-chill less than 30^{o}F with precipitation).
- As a screening measure whenever anyone worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92^{o}F) cannot return to work for 48 hours.

3.3.4 Noise

Work activities during the proposed activities may be conducted at locations with high noise levels from the operation of equipment. Hearing protection will be used as necessary.

3.3.5 Hand and Power Tools

The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. All hand and power tools should be inspected for health and safety hazards prior to use. If deemed unserviceable/un-operable, notify supervisor and tag equipment out of service. Ground Fault Circuit Interrupters (GFCIs) are required for all power tools requiring direct electrical service.

3.3.6 Slips, Trips and Fall Hazards

Care should be exercised when walking at the site, especially when carrying equipment. The presence of surface debris, uneven surfaces, pits, facility equipment, and soil piles contribute to tripping hazards and fall hazards. To the extent possible, all hazards should be identified and marked on the site, with hazards communicated to all workers in the area.

3.3.7 Utilities (Electrocution and Fire Hazards)

The possibility of encountering underground utilities poses fire, explosion, and electrocution hazards. All excavation work will be preceded by review of available utility drawings and by notification of the subsurface work to the N.Y. One –Call–Center. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

3.4 Biological Hazards

3.4.1 Animals

No animals are expected to be encountered during site operations.

3.4.2 Insects

Insects are not expected to be encountered during site operations.

3.5 Additional Safety Analysis

3.5.1 Presence of Non-Aqueous Phase Liquids (NAPL)

There is potential for exposure to NAPL at this site. Special care and PPE should be considered when NAPL is observed as NAPL is a typically flammable fluid and releases VOCs known to be toxic and/or carcinogenic. If NAPL is present in a monitoring well, vapors from the well casing may contaminate the work area breathing zone with concentrations of VOCs potentially exceeding health and safety action levels. In addition, all equipment used to monitor or sample NAPL (or ground water from wells containing NAPL) must be intrinsically safe. Equipment that directly contacts NAPL must also be resistant to organic solvents.

At a minimum, a PID should be used to monitor for VOCs when NAPL is observed. If NAPL is expected to be observed in an excavation or enclosed area, air monitoring must be started using calibrated air monitoring equipment designed to sound an audio alarm when atmospheric concentrations of VOC are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type sensor (i.e. MultiRAE). However in oxygen depleted atmospheres (confined space), only an LEL designed to work in low oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation.

When NAPL is present, Langan personnel are required to use disposable nitrile gloves at all times to prevent skin contact with contaminated materials. They should also consider having available a respirator and protective clothing (Tyvek® overalls), especially if NAPL is in abundance and there are high concentrations of VOCs.

All contaminated disposables including PPE and sampling equipment must be properly disposed of in labeled 55-gallong drums

3.6 Job Safety Analysis

A Job Safety Analysis (JSA) is a process to identify existing and potential hazards associated with each job or task so these hazards can be eliminated, controlled or minimized. A JSA will be performed at the beginning of each work day, and additionally whenever an employee begins a new task or moves to a new location. All JSAs must be developed and reviewed by all parties involved. A blank JSA form and documentation of completed JSAs are in Attachment G.

4.0 PERSONNEL TRAINING

4.1 Basic Training

Completion of an initial 40-hour HAZWOPER training program as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees working on a site engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances, health hazards, or safety hazards as defined by 29 CFR 1910.120(a). Annual 8-hour refresher training is also required to maintain competencies to ensure a safe work environment. In addition to these training requirements, all employees must complete the OSHA 10 hour Construction Safety and Health training and supervisory personnel must also receive eight additional hours of specialized management training. Training records are maintained by the HSM.

4.2 Initial Site-Specific Training

Training will be provided to specifically address the activities, procedures, monitoring, and equipment for site operations at the beginning of each field mobilization and the beginning of each discrete phase of work. The training will include the site and facility layout, hazards, and emergency services at the site, and will detail all the provisions contained within this CHASP. For a HAZWOPER operation, training on the site must be for a minimum of 3 days. Specific issues that will be addressed include the hazards described in Section 3.0.

4.3 Tailgate Safety Briefings

Before starting work each day or as needed, the Langan HSO will conduct a brief tailgate safety meeting to assist site personnel in conducting their activities safely. Tailgate meetings will be documented in Attachment H. Briefings will include the following:

- Work plan for the day;
- Review of safety information relevant to planned tasks and environmental conditions;
- New activities/task being conducted;
- Results of Jobsite Safety Inspection Checklist;
- Changes in work practices;
- Safe work practices; and
- Discussion and remedies for noted or observed deficiencies.

5.0 MEDICAL SURVEILLANCE

All personnel who will be performing field work involving potential exposure to toxic and hazardous substances (defined by 29 CFR 1910.120(a)) will be required to have passed an initial baseline medical examination, with follow-up medical exams thereafter, consistent with 29 CFR 1910.120(f). Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine.

Additionally, personnel who may be required to perform work while wearing a respirator must receive medical clearance as required under CFR 1910.134(e), *Respiratory Protection*. Medical evaluations will be performed by, or under the direction of, a physician board-certified in occupational medicine. Results of medical evaluations are maintained by the HSM.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 Levels of Protection

Langan will provide PPE to Langan employees to protect them from the specific hazards they are likely to encounter on-site. Direct hired contractors will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and, (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards.

Based on anticipated site conditions and the proposed work activities to be performed at the site, Level D protection will be used. The upgrading/downgrading of the level of protection will be based on continuous air monitoring results as described in Section 6.0 (when applicable). The decision to modify standard PPE will be made by the site HSO or FTL after conferring with the PM. The levels of protection are described below.

Level D Protection (as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes
- Coveralls (Tyvek® or equivalent)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection
- Reflective safety vest

Level D Protection (Modified, as needed)

- Safety glasses with sideshields or chemical splash goggles
- Safety boots/shoes (toe-protected)
- Disposable chemical-resistant boot covers
- Coveralls (polycoated Tyvek or equivalent to be worn when contact with wet

contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)

- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection (as needed)
- Personal floatation device (for work within 5 ft of the water)
- Reflective traffic vest

Level C Protection (as needed)

- Full or Half face, air-purifying respirator, with NIOSH approved HEPA filter
- Inner (latex) and outer (nitrile) chemical-resistant gloves
- Safety glasses with side shields or chemical splash goggles
- Chemical-resistant safety boots/shoes
- Hard hat
- Long sleeve work shirt and work pants
- Coveralls (Tyvek® or equivalent)
- Hearing protection (as needed)
- Reflective safety vest

The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C are summarized in Table 4. The written Respiratory Protection Program is maintained by the HSM and is available if needed. The monitoring procedures and equipment are outlined in Section 6.0 (when applicable).

6.2 Respirator Fit-Test

All Langan employees who may be exposed to hazardous substances at the work site are in possession of a full or half face-piece, air-purifying respirator and have been successfully fit-tested within the past year. Fit-test records are maintained by the HSM.

6.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (table 2) are reached. A respirator cartridge change-out schedule has been developed in order to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges shall be removed and disposed of at the end of each shift, when cartridges become wet or wearer experiences breakthrough, whichever occurs first.
- If the humidity exceeds 85%, then cartridges shall be removed and disposed of after 4 hours of use.

Respirators shall not be stored at the end of the shift with contaminated cartridges left on. Cartridges shall not be worn on the second day, no matter how short the time period was the previous day they were used.

7.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

7.1 Monitoring During Site Operations

Atmospheric air monitoring results may be collected and used to provide data to determine when exclusion zones need to be established and when certain levels of personal protective equipment are required. For all instruments there are Site-specific action level criteria which are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentration, are also used in making field health and safety decisions. Therefore, the HSO may establish an exclusion zone or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established CHASP action levels.

During site work involving disturbance of petroleum-impacted or fill material, real time air monitoring may be conducted for volatile organic compounds (VOCs). A photoionization detector (PID) and/or flame ionization detector (FID) will be used to monitor concentrations of VOCs at personnel breathing-zone height. Air monitoring will be the responsibility of the HSO or designee. Air monitoring may be conducted during intrusive activities associated with the completion of excavation, debris removal, and soil grading. All manufacturers' instructions for instrumentation and calibration will be available onsite.

Subcontractors' air monitoring plans must be equal or more stringent as the Langan plan.

An air monitoring calibration log is provided in Attachment D of this CHASP.

7.1.1 Volatile Organic Compounds

Monitoring with a PID, such as a MiniRAE 2000 (10.6v) or equivalent may occur during intrusive work in the AOCs. Colormetric Indicator Tubes for benzene may be used as backup for the PID, if measurements remain above background monitor every 2 hours. The HSO will monitor the employee breathing zone <u>at least</u> every 30 minutes, or whenever there is any indication that concentrations may have changed (odors, visible gases, etc.) since the last measurement. If VOC levels are observed above 5 ppm for longer than 5 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for monitored gases are provided in Table 4.

7.1.2 Metals

Based upon the site historical fill, there is a potential for the soils to contain PAHs and metals. During invasive procedures which have the potential for creating airborne dust, such as excavation of dry soils, a real time airborne dust monitor such as a Mini-Ram may be used to monitor for air particulates. The HSO will monitor the employee breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (appearance of visible dust) since the last measurement. If dust levels are observed to be greater than 0.100 mg/m^3 or visible dust is observed for longer than 15 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for dust monitoring are provided in Table 4.

7.2 Monitoring Equipment Calibration and Maintenance

Instrument calibration shall be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments shall be calibrated before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

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

7.3 Determination of Background Levels

Background (BKD) levels for VOCs and dust will be established prior to intrusive activities within the AOC at an upwind location. A notation of BKD levels will be referenced in the daily monitoring log. BKD levels are a function of prevailing conditions. BKD levels will be taken in an appropriate upwind location as determined by the HSO.

Table 4 lists the instrument action levels.

8.0 COMMUNITY AIR MONITORING PROGRAM

Community air monitoring may be conducted in compliance with the NYSDOH Generic CAMP outlined below:

Monitoring for dust and odors will be conducted during all ground intrusive activities by the FTL. Continuous monitoring on the perimeter of the work zones for odor, VOCs, and dust may be required for all ground intrusive activities such as soil excavation and handling activities. The work zone is defined as the general area in which machinery is operating in support of remediation activities. A portable PID will be used to monitor the work zone and for periodic monitoring for VOCs during activities such as soil and groundwater sampling and .soil excavation. The site perimeter will be monitored for fugitive dust emissions by visual observations as well as instrumentation measurements (if required). When required, particulate or dust will be monitored continuously with real-time field instrumentation that will meet, at a minimum, the performance standards from DER-10 Appendix 1B.

If VOC monitoring is required, the following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the hot zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the hot zone, activities will be shutdown.

If dust monitoring with field instrumentation is required, the following actions will be taken based on instrumentation measurements:

- If the downwind particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed 150 $\mu g/m^3$ above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 $\mu g/m^3$ above the background 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 PM10 concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

8.1 Vapor Emission Response Plan

This section applies if VOC monitoring is required. If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the hot zone, boring and well installation, and excavation activities will be halted or odor controls will be employed, and monitoring continued. When work shut-down occurs, downwind air monitoring as directed by the HSO or FTL will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

If the organic vapor level decreases below 5 ppm above background, sampling and boring and well installation can resume, provided:

- The organic vapor level 200 feet downwind of the hot zone or half the distance to the nearest residential or commercial structure, whichever is less, is below 1 ppm over background, and
- More frequent intervals of monitoring, as directed by the HSO or FTL, are conducted.

8.2 Major Vapor Emission

This section applies if VOC monitoring is required. If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work site, or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted or odor controls must be implemented.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the hot zone, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If either of the following criteria is exceeded in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be implemented.

- Sustained organic vapor levels approaching 5 ppm above background for a period of more than 30 minutes, or
- Organic vapor levels greater than 5 ppm above background for any time period.

8.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

- The local police authorities will immediately be contacted by the HSO or FTL and advised of the situation;
- Frequent air monitoring will be conducted at 30-minute intervals within the 20 Foot

Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO or FTL; and

- All Emergency contacts will go into effect as appropriate.

8.4 Dust Suppression Techniques

Preventative measures for dust generation may include wetting site fill and soil, construction of an engineered construction entrance with gravel pad, a truck wash area, covering soils with tarps, and limiting vehicle speeds to five miles per hour.

Work practices to minimize odors and vapors include limiting the time that the excavations remain open, minimizing stockpiling of contaminated-source soil, and minimizing the handling of contaminated material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or VOC source areas. Foam suppressants may include biodegradable foams applied over the source material for short-term control of the odor and VOCs.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: direct load-out of soils to trucks for off-site disposal; use of chemical odorants in spray or misting systems; and, use of staff to monitor odors in surrounding neighborhoods.

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

9.0 WORK ZONES AND DECONTAMINATION

9.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to assure that only authorized individuals are permitted into potentially hazardous areas.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the HSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be clearly delineated by cones, tapes or other means. The HSO may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the HSO allowing adequate space for the activity to be completed, field members and emergency equipment.

9.2 Contamination Zone

9.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

9.2.2 Minimization of Contact with Contaminants

During completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and other physical contact with contamination as PPE is intended to minimize accidental contact. This may ultimately minimize the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control over spray and runoff and to ensure that unprotected personnel working nearby are not affected.

9.2.3 Personnel Decontamination Sequence

Decontamination may be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes should be available for wiping hands and face. Drums/trash cans-will be labeled by the field crews in accordance with all local, state, and federal requirements. Management plans for contaminated PPE, and tools are provided below.

9.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment. If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury), provisions shall be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent data.

9.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment, hand tools, etc. will be cleaned with non-phosphorous soap to remove any potentially contaminated soil, and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

9.2.6 Heavy Equipment Decontamination

All heavy equipment and vehicles arriving at the work site will be free from contamination from offsite sources. Any vehicles arriving to work that are suspected of being impacted will not be permitted on the work site. Potentially contaminated heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the HSO or his designee.

9.3 Support Zone

The support zone or cold zone will include the remaining areas of the job site. Break areas and support facilities (include equipment storage and maintenance areas) will be located in this zone. No equipment or personnel will be permitted to enter the cold zone from the hot zone without passing through the decontamination station in the warm zone (if necessitated). Eating, smoking, and drinking will be allowed only in this area.

9.4 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the HSO for communication with the HSM and emergency support services/facilities.

- Hand Signals - Hand signals shall be used by field teams, along with the buddy system. The entire field team shall know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

Hand Signal	Meaning
Hand gripping throat	Out of air; cannot breathe
Grip partners wrists or place both hands around waist	Leave immediately without debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm alright; I understand
Thumbs down	No; negative
Simulated "stick" break with fists	Take a break; stop work

9.5 The Buddy System

When working in teams of two or more, workers will use the "buddy system" for all work activities to ensure that rapid assistance can be provided in the event of an emergency. This requires work groups to be organized such that workers can remain close together and maintain visual contact with one another. Workers using the "buddy system" have the following responsibilities:

- Provide his/her partner with assistance.
- Observe his/her partner for signs of chemical or heat exposure.
- Periodically check the integrity of his/her partner's PPE.
- Notify the HSO or other site personnel if emergency service is needed.

10.0 NEAREST MEDICAL ASSISTANCE

The address and telephone number of the nearest hospital:

Bellevue Hospital Center
462 First Avenue
New York, New York
212-562-4141

Map with directions to the hospital are shown in Figure 2. This information will either be posted prominently at the site or will be available to all personnel all of the time. Further, all field personnel, including the HSO & FTL, will know the directions to the hospital.

11.0 STANDING ORDERS/SAFE WORK PRACTICES

The standing orders, which consist of a description of safe work practices that must always be followed while on-site by Langan employees and contractors, are shown in Attachment A. The site HSO and FTL each have the responsibility for enforcing these practices. The standing orders will be posted prominently at the site, or are made available to all personnel at all times. Those who do not abide by these safe work practices will be removed from the site.

12.0 SITE SECURITY

No unauthorized personnel shall be permitted access to the work areas.

13.0 UNDERGROUND UTILITIES

As provided in Langan's Underground Utility Clearance Guidelines, the following safe work practices should be followed by Langan personnel and the contractor before and during subsurface work in accordance with federal, state and local regulations:

- Obtain available utility drawings from the property owner/client or operator.
- Provide utility drawings to the project team.
- In the field, mark the proposed area of subsurface disturbance (when possible).
- Ensure that the utility clearance system has been notified.
- Ensure that utilities are marked before beginning subsurface work.
- Discuss subsurface work locations with the owner/client and contractors.
- Obtain approval from the owner/client and operators for proposed subsurface work locations.
- Use safe digging procedures when applicable.
- Stay at least 10 feet from all equipment performing subsurface work.

14.0 SITE SAFETY INSPECTION

The Langan HSO or alternate will check the work area daily, at the beginning and end of each work shift or more frequently to ensure safe work conditions. The HSO or alternate must complete the Jobsite Safety Inspection Checklist, found in Attachment F. Any deficiencies shall be shared with the FTL, HSM and PM and will be discussed at the daily tailgate meeting.

15.0 HAND AND POWER TOOLS

All hand- and electric-power tools and similar equipment shall be maintained in a safe operating condition. All electric-power tools must be inspected before initial use. Damaged tools shall be removed immediately from service or repaired. Tools shall be used only for the purpose for which they were designed. All users must be properly trained in their safe operation.

16.0 EMERGENCY RESPONSE

16.1 General

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures that are addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures. In case of emergency, in addition to 911 the Langan Incident/Injury Hotline ***(800) 9-LANGAN*** (800-952-6426) extension 4699 should be called as soon as possible.

16.2 Responsibilities

16.2.1 Health and Safety Officer (HSO)

The HSO is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The HSO is responsible for ensuring the HSM are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The HSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can notify OSHA within the required time frame.

16.2.2 Emergency Coordinator

The HSO or their designated alternate will serve as the Emergency Coordinator. The Emergency Coordinator is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. They are also responsible for ensuring the HSM are notified of all incidents, all injuries, near misses, fires, spills, releases or equipment damage. The Emergency Coordinator is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized.

The Emergency Coordinator shall locate emergency phone numbers and identify hospital routes prior to beginning work on the sites. The Emergency Coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator is responsible for implementing the Emergency Response Plan.

16.2.3 Site Personnel

Project site personnel are responsible for knowing the Emergency Response Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a site emergency. Project site personnel, including all subcontractors will be trained in the Emergency Response Plan.

16.3 Communications

Once an emergency situation has been stabilized, or as soon as practically possible, the HSO will contact the Langan Incident/Injury Hotline (1-800-952-6426) or (973-560-4699) and Project Manager of identify any emergency situation.

16.4 Local Emergency Support Units

In order to be able to deal with any emergency that might occur during investigative activities at the site, the Emergency Notification Numbers (Table 5) will be posted and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulance should be relied on for response to medical emergencies and transport to emergency rooms. Always contact first responders when there are serious or life threatening emergencies on the site. Project personnel are instructed not to drive injured personnel to the Hospital. In the event of an injury, provide first aid and keep the injured party calm and protected from the elements and treat for shock when necessary.

16.5 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital in order to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and in each site vehicle.

16.6 Emergency Medical Treatment

The procedures and rules in this CHASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the HSO immediately. First-aid equipment will be available on site at the following locations:

- First Aid Kit: Contractor Mobile Office or Vehicles
- Emergency Eye Wash: Contractor Mobile office or Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

16.7 Personnel with current first aid and CPR certification will be identified.

Only in non-emergency situations may an injured person be transported to an urgent care facility. Due to hazards that may be present at the site and the conditions under which operations are conducted, it is possible that an emergency situation may develop. Emergency situations can be characterized as injury or acute chemical exposure to personnel, fire or explosion, environmental release, or hazardous weather conditions.

16.8 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs as a result of the site investigation activities, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

16.9 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the investigation activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

16.9.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.

- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the HSO.

16.10 Significant Vapor Release

Based on the proposed tasks, the potential for a significant vapor release is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel shall evacuate.
- Upgrade to Level C Respiratory Protection.
- Downwind perimeter locations shall be monitored for volatile organics..
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator shall notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

16.11 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet (MSDS) will be followed, when necessary.

SKIN AND EYE: Use copious amounts of soap and water from eye-wash kits and portable hand wash stations.

CONTACT: Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Skin shall also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs. Affected items of clothing shall also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or subcontractor on-site.

16.12 Decontamination During Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The HSO or designee will accompany contaminated victims to the medical facility to advice 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 on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless 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 or injuries, the normal decontamination procedures will be followed.

16.13 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work will continue without potentially risking the 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 working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).
- Potential for electrical storms.
- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The HSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

16.14 Spill Control and Response

All small spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles shall have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment shall be inspected prior to be admitted on site. Any vehicle or piece of equipment that develops a leak will be taken out of service and removed from the job site.

The following seven steps shall be taken by the Emergency Coordinator:

1. Determine the nature, identity and amounts of major spills.
2. Make sure all unnecessary persons are removed from the spill area.
3. Notify the HSO immediately.
4. Use proper PPE in consultation with the HSO.
5. If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with appropriate material.
7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this CHASP, Langan personnel will coordinate with the designated project manager relative to spill response and control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.
- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan shall not make any notification of spills to outside agencies. The client will notify regulatory agencies as per their reporting procedures.

16.15 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).

16.16 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

16.17 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan Incident/Injury Hotline at 1-(800)-9-LANGAN (ext. #4699) and the client representative to report the incident or near miss. For emergencies involving personnel injury and/or exposure, the HSO and affected employee will complete and submit an Employee Exposure/Injury Incident Report (Attachment C) to the Langan Corporate Health and Safety Manager as soon as possible following the incident.

17.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports and recordkeeping.

17.1 Field Change Authorization Request

Any changes to the work to be performed that is not included in the CHASP will require an addendum that is approved by the Langan project manager and Langan HSM to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

17.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day OJT, and respirator fit-test records) and medical clearance for site work and respirator use will be maintained in the office and available upon request. Records for all subcontractor employees must also be available upon request. All employee medical records will be maintained by the HSM.

17.3 Onsite Log

A log of personnel on site each day will be kept by the HSO or designee.

17.4 Daily Safety Meetings (“Tailgate Talks”)

Completed safety briefing forms will be maintained by the HSO.

17.5 Exposure Records

All personal monitoring results, laboratory reports, calculations and air sampling data sheets are part of an employee exposure record. These records will be maintained by the HSO during site work. At the end of the project they will be maintained according to 29 CFR 1910.1020.

17.6 Hazard Communication Program/MSDS-SDS

Material safety data sheets (MSDS) of Safety Data Sheets (SDS) have been obtained for applicable substances and are included in this CHASP (Attachment E). Langan's written hazard communication program, in compliance with 29 CFR 1910.1200, is maintained by the HSM.

17.7 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan incident/injury hotline at 1-800-952-6426, extension 4699 and the Project Manager to report the incident or near miss. The Project Manager will contact the client or client representative. A written report must be completed and submitted HSM within 24 hours of the incident. For emergencies involving personnel injury and/or exposure, employee will complete and submit the Langan incident/injury report to the Langan corporate health and safety manager as soon as possible following the incident. Accidents will be investigated in-depth to identify all causes and to recommend hazard control measures.

18.0 CONFINED SPACE ENTRY

Confined spaces are not anticipated at the site during planned construction activities. If confined spaces are identified, the contractor must implement their own confined space program that all applicable federal, state and local regulations. Confined spaces **will not** be entered by Langan personnel.

19.0 CHASP ACKNOWLEDGEMENT FORM

All Langan personnel and contractors will sign this CHASP Compliance Agreement indicating that they have become familiar with this CHASP and that they understand it and agree to abide by it.

Printed Name	Signature	Company	Date

TABLES

TABLE 1
TASK HAZARD ANALYSES

Task	Hazard	Description	Control Measures	First Aid
1.3.1 – 1.3.13	Contaminated Soil or Groundwater-Dermal Contact	Contaminated water spills on skin, splashes in eyes; contact with contaminated soil/fill during construction activities or sampling.	Wear proper PPE; follow safe practices, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.13	Lacerations, abrasions, punctures	Cutting bailer twine, pump tubing, acetate liners, etc. with knife; cuts from sharp site objects or previously cut piles, tanks, etc.; Using tools in tight spaces	Wear proper PPE; follow safe practices	Clean wound, apply pressure and/or bandages; seek medical attention as required.
1.3.1 – 1.3.13	Contaminated Media Inhalation	Opening drums, tanks, wells; vapors for non-aqueous phase liquids or other contaminated site media; dust inhalation during excavation; vapor accumulation in excavation	Follow air monitoring plan; have quick access to respirator, do not move or open unlabeled drums found at the site, maintain safe distance from construction activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.13	Lifting	Improper lifting/carrying of equipment and materials causing strains	Follow safe lifting techniques; Langan employees are not to carry contractor equipment or materials	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.13	Slips, trips, and falls	Slips, trips and falls due to uneven surfaces, cords, steep slopes, debris and equipment in work areas	Good housekeeping at site; constant awareness and focus on the task; avoid climbing on stockpiles; maintain safe distance from construction activities and excavations; avoid elevated areas over six feet unless fully accredited in fall protection and wearing an approved fall protection safety apparatus	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.13	Noise	Excavation equipment, hand tools, drilling equipment.	Wear hearing protection; maintain safe distance from construction activities	Seek medical attention as required
1.3.1 – 1.3.13	Falling objects	Soil material, tools, etc. dropping from drill rigs, front-end loaders, etc.	Hard hats to be worn at all times while in work zones; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.13	Underground/ overhead utilities	Excavation equipment, drill rig auger makes contact with underground object; boom touches overhead utility	"One Call" before dig; follow safe practices; confirm utility locations with contractor; wear proper PPE; maintain safe distance from construction activities and excavations	Seek medical attention as required
1.3.1 – 1.3.13	Insects (bees, wasps, hornet, mosquitoes, and spider)	Sings, bites	Insect Repellent; wear proper protective clothing (work boots, socks and light colored pants);field personnel who may have insect allergies (e.g., bee sting) should provide this information to the HSO or FSO prior to commencing work, and will have allergy medication on site.	Seek medical attention as required
1.3.1 – 1.3.13	Vehicle traffic / Heavy Equipment Operation	Vehicles unable to see workers on site, operation of heavy equipment in tight spaces, equipment failure, malfunctioning alarms	Wear proper PPE, especially visibility vest; use a buddy system to look for traffic; rope off area of work with cones and caution tape or devices at points of hazard, maintain safe distance from construction activities and equipment	Seek medical attention as required

TABLE 2
CONTAMINANT HAZARDS OF CONCERN

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	1,1,1,2-Tetrachloroethane R-130a	630-20-6	NA	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes (redness, pain), skin (redness, burning sensation, pain); Inhalation: jaundice, enlarged liver, headaches, tremors, dizziness, numbness, and drowsiness. Ingestion: burning sensation, headache, nausea	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	1,1'-Biphenyl Biphenyl Phenyl benzene Diphenyl	92-52-4	None	1 mg/m^3 100 mg/m^3	Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, throat; headache, nausea, lassitude (weakness, exhaustion), numb limbs; liver damage	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	1,2,4,5-Tetramethylbenzene	95-93-2	NA	None None	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	1,2,4-Trimethylbenzene	95-63-6	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	1,4-Dioxane 1,4-Dioxacyclohexane [1,4]Dioxane p-Dioxane [6]-crown-2 Diethylene dioxide Diethylene ether Dioxan	123-91-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	Inhalation, ingestion, skin and/or eye contact	Irritant to eyes, skin, mucous membranes and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	2,2,4-Trimethylpentane	540-84-1	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	2-Butanone Ethyl methyl ketone MEK Methyl acetone Methyl ethyl ketone	78-93-3	PID	200 ppm 3000 ppm	Soil Groundwater Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eye: Irrigate immediately Skin: Water wash immediately Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.13	2-Hexanone Butyl methyl ketone MBK Methyl butyl ketone Methyl n-butyl ketone	591-78-6	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	2-Methylnaphthalene β-methylnaphthalene	91-57-6	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion or skin absorption, eye contact	irritation to the skin, eyes, mucous membranes and upper respiratory tract. It may also cause headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	4,4'-DDD Dichlorodiphenyldichloroethane 1,1'-(2,2-Dichloroethylidene)bis (4-chlorobenzene)	72-54-8	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	4-Methyl-2-pentanone Hexone Isobutyl methyl ketone Methyl isobutyl ketone MIBK	108-10-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Acenaphthene 1,2-Dihydroacenaphthylene 1,8-Ethylenenaphthalene peri-Ethylenenaphthalene Naphthyleneethylene Tricyclododecapentaene	83-32-9	PID	NA NA	Soil	inhalation, ingestion, skin and/or eye contact,	irritation to the skin, eyes, mucous membranes and upper respiratory tract; If ingested, it can cause vomiting	Eye: Irrigate immediately Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Acenaphthylene Cycopental(de)naphthalene, Acenaphthalene	208-96-8	PID	NA NA	Soil	inhalation, ingestion, skin and/or eye contact	irritation to the skin, eyes, mucous membranes and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.13	Acetone Dimethyl ketone Ketone propane 2-Propanone	67-64-1	PID	1000 ppm 2500 ppm	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Acetophenone 1-phenylethanone Methyl phenyl ketone Phenylethanone	98-86-2	None	NA NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the skin, eyes, mucous membranes and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.13	Aluminum	7429-90-5	None	0.5 mg/m3 50 mg/m3	Soil	inhalation, skin and/or eye contact	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.13	Anthracene	120-12-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to the skin, eyes, mucous membranes and upper respiratory tract, abdominal pain if ingested.	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, Breathing: Move to fresh air, refer to medical attention; Swallow: refer to medical attention

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Antimony	7440-36-0	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation skin, possible dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Aroclor 1254	11097-69-1	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Aroclor 1260	11096-82-5	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Aroclor 1262	37324-23-5	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Arsenic	NA	None	0.5 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation skin, possible dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Barium	10022-31-8	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Benzene Benzol Phenyl hydride	71-43-2	PID	3.19 mg/m^3 1,595 mg/mg^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; lassitude (weakness, exhaustion) [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Benzo(a)anthracene Benzanthracene Benzanthrene 1,2-Benzanthracene Benzo[b]phenanthrene Tetraphene	56-55-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Benzo(a)pyrene	50-32-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately, seek medical attention Skin: Soap wash immediately; Breathing: move to fresh air; Swallow: Induce vomiting if conscious, seek medical attention immediately
1.3.1 – 1.3.13	Benzo(b)fluoranthene	205-99-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.13	Benzo(g,h,i)perylene Benzo(ghi)perylene	191-24-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	NA	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Benzo(k)fluoranthene	207-08-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.13	Beryllium	7440-41-7	None	0.002 mg/m^3 4 mg/m^3	Soil	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 to the eyes; dermatitis; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.13	Bis(2-ethylhexyl)phthalate Di-sec octyl phthalate DEHP Di(2-ethylhexyl)phthalate Octyl phthalate	117-81-7	None	5 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Bromodichloromethane dichlorobromomethane	75-27-4	None	NA NA	Groundwater Soil Vapor	inhalation, skin or eye contact, ingestion	irritation of the skin, eyes, mucous membranes and respiratory tract, narcosis, nausea, dizziness and headache	Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid) Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Cadmium	7440-43-9	None	0.005 mg/m^3 9 mg/m^3	Soil	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]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Calcium	7440-70-2	None	NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, upper resp tract; ulcer, perforation nasal septum; pneumonitis; dermatitis	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Carbazole 9-azafluorene Dibenzopyrrole Diphenylenimine diphenyleneimide	86-74-8	None	NA NA	Soil	inhalation, skin absorption (liquid), skin and/or eye contact	irritation to eyes and skin, respiratory irritation	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.13	Carbon disulfide	75-15-0	PID	20 ppm 500 ppm	Soil Groundwater Vapor	inhalation, skin or eye contact, ingestion	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid) Breathing: Respiratory support
1.3.1 – 1.3.13	Carbon tetrachloride Carbon chloride Carbon tet Freon® 10 Halon® 104 Tetrachloromethane	56-23-5	PID	10 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Chloroform Methane trichloride Trichloromethane	67-66-3	None	50 ppm 500 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Chromium Total Chromium	7440-47-3	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Chrysene Benzo[a]phenanthrene 1,2-Benzphenanthrene	218-01-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eye, skin, and respiratory, gastrointestinal irritation nausea, vomit, diarrhea [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Cis-Chlordane a-Chlordane alpha Chlordane cis-Chlordan CIS-CHLORDANE Chlordane cis-;Chlordane cis;ALPHA-CHLORDAN Chlordan, cis-ALPHA-CHLORDANE alpha(cis)-chlordane α-chlordane solution	5102-71-9	None	0.5 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Cobalt	7440-48-4	None	0.1mg/m^3 20 mg/m^3	Soil	inhalation, ingestion, skin and/or eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Copper	7440-50-8	None	1.0 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, metallic taste; dermatitis; anemia	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Cyanide	57-12-5	None	5 mg/m^3 25 mg/m^3	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	Exposure to cyanide can cause weakness, headaches, confusion, dizziness, fatigue, anxiety, sleepiness, nausea and vomiting. Breathing can speed up then become slow and gasping. Coma and convulsions also occur. If large amounts of cyanide have been absorbed by the body, the person usually collapses and death can occur very quickly. Long-term exposure to lower levels of cyanide can cause skin and nose irritation, itching, rashes and thyroid changes.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	DDE 4,4-DDE 1,1-bis-(4-chlorophenyl)-2,2-dichloroethene Dichlorodiphenyldichloroethylene	72-55-9	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	Oral ingestion of food is the primary source of exposure for the general population. Acute and chronic ingestion may cause nausea, vomiting, diarrhea, stomach pain, headache, dizziness, disorientation, tingling sensation, kidney damage, liver damage, convulsions, coma, and death. 4,4' DDE may cross the placenta and can be excreted in breast milk	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	DDT 4,4-DDT p,p'-DDT Dichlorodiphenyltrichloroethane 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane	50-29-3	None	1 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Dibenz(a,h)anthracene	53-70-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support PID Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Dibenzofuran	132-64-9	None	NA NA	Soil	inhalation, absorption	irritation to eyes, and skin	Eyes: Irrigate immediately Skin: Soap wash promptly.
1.3.1 – 1.3.13	Dibutyl phthalate Di-n-butyl phthalate Butyl phthalate n-Butyl phthalate 1,2-Benzenedicarboxylic acid dibutyl ester o-Benzenedicarboxylic acid dibutyl ester DBP Palatinol C, Elaol Dibutyl-1,2-benzene-dicarboxylate Di-n-butyl Phthalate Di-n-butylphthalate	84-74-2	None	5 mg/m^3 4000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, upper respiratory system, stomach	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Dichlorodifluoromethane Difluorodichloromethane, Fluorocarbon 12 Freon 12 Freon® 12 Genetron® 12 Halon® 122 Propellant 12 Refrigerant 12 Dichlorodifluromethane	75-71-8	None	1000 pp, 15,000 ppm	Groundwater Soil Vapor	inhalation, skin and/or eye contact (liquid)	dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.13	Dieldrin HEOD 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo exo-5,8-dimethanonaphthalene	60-57-1	PID	0.25 mg/m^3 50 mg/m^3	Groundwater Soil Water	inhalation, skin absorption, ingestion, skin and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Diesel Fuel automotive diesel fuel oil No. 2 distillate diesoline diesel oil diesel oil light diesel oil No. 1-D summer diesel	68334-30-5	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Endosulfan sulfate 1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-dimethanol, cyclic sulfate 6,7,8,9,10,10-hexachloro01,5,5a,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin-3,3-dioxide	1031-07-8	None	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	Hypersensitive to stimulation, sensation of prickling, tingling or creeping on skin. Headache, dizziness, nausea, vomiting, incoordination, tremor, mental confusion, hyperexcitable state. In severe cases: convulsions, seizures, coma and respiratory depression.	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Endrin aldehyde	7421-93-4	None	0.1 mg/m3 2 mg/m3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	epileptiform convulsions; stupor, headache, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressiveness, confusion; drowsiness, lassitude (weakness, exhaustion); anorexia; in animals: liver damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Ethanol Absolute alcohol Alcohol cologne spirit drinking alcohol ethane monoxide ethylic alcohol EtOH ethyl alcohol ethyl hydrate ethyl hydroxide ethylol grain alcohol hydroxyethane methylcarbinol	64-17-5	PID	1000 ppm 3300 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose; headache, drowsiness, lassitude (weakness, exhaustion), narcosis; cough; liver damage; anemia; reproductive, teratogenic effects	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.13	Ethyl benzene Ethylbenzene Ethylbenzol Phenylethane	100-40-4	PID	435 mg/m^3 3,472 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Fluoranthene Benzo(j, k)fluorene	206-44-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Fluorene	86-73-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attenti
1.3.1 – 1.3.13	Fuel Oil No. 2	68476-30-2	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Gasoline	8006-61-9	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Helium	7440-59-7	Helium Detector	NA NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Heptane n-Heptane	142-82-5	PID	500 ppm 750 ppm	Goundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Hexavalent Chromium Chromium VI	18540-29-9	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Indeno(1,2,3-cd)pyrene	193-39-5	None	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately, wash mouth with water
1.3.1 – 1.3.13	Iron	7439-89-6	None	10 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Isopropyl alcohol Iso-Propyl Alcohol Carbinol IPA Isopropanol 2-Propanol sec-Propyl alcohol Rubbing alcohol Isopropylalcohol	67-63-0	PID	400 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Lead	7439-92-1	None	0.050 mg/m^3 100 mg/m^3	Groundwater Soil	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 to the eyes; hypertension	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Magnesium	7439-95-4	None	15 mg/m^3 NA	Soil	inhalation, skin and/or eye contact	irritation to the eyes, skin, respiratory system; cough	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.13	Manganese	7439-96-5	None	5 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, ingestion	aerosol is irritating to the respiratory tract	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	m-Cresol 4 meta-Cresol 3-Cresol m-Cresylic acid 1-Hydroxy-3-methylbenzene 3-Hydroxytoluene 3-Methylphenol	108-39-4	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irreg rapid resp, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Mercury	7439-97-6	None	0.1 mg/m^3 10 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Methyl Chloride Chloromethane Monochloromethane	74-87-3	NA	100 ppm 2000 ppm	Groundwater Soil	inhalation, skin and/or eye contact	dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; liquid: frostbite; reproductive, teratogenic effects; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Methyl chloroform Chlorothene 1,1,1-Trichloroethane 1,1,1-Trichloroethane-(stabilized) 1,1,1-TCA	71-55-6	PID	350 ppm 700 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention
1.3.1 – 1.3.13	Methyl *tert*-butyl ether MTBE Methyl tertiary-butyl ether Methyl t-butyl ether tert-Butyl methyl ether tBME tert-BuOMe	1634-04-4	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Methylene Chloride Dichloromethane Methylene dichloride	75-09-2	PID	25 ppm 2300 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	m-Xylenes 1,3-Dimethylbenzene m-Xylol Metaxylene	108-38-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Naphthalene Naphthalin Tar camphor White tar	91-20-3	PID	50 mg/m^3 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; hematuria (blood in the urine); dermatitis, optical neuritis	Eye: Irrigate immediately Skin: Molten flush immediately/solid-liquid soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	n-Hexane Hexane, Hexyl hydride, normal-Hexane	110-54-3	PID	500 ppm 1100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Nickel	7440-02-0	None	NA 10 mg/m^3	Groundwater Soil	ion, ingestion, skin and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Methane Hydrogen Sulfide Carbon Monoxide Nitrogen	7782-44-7 74-82-8 7783-08-4 830-08-0 7727-37-9	Multi-Gas PID	NA/NA NA/NA 10/100 ppm 50/1200 ppm NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.13	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Isobutylene Nitrogen	7782-44-7 115-11-7 7727-37-9	PID	NA/NA NA/NA NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.13	o-Cresol ortho-Cresol 2-Cresol o-Cresylic acid 1-Hydroxy-2-methylbenzene 2-Hydroxytoluene 2-Methyl phenol 2-Methylphenol 2-Metyhlphenol	95-48-7	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irreg rapid resp, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediatelyethylp hhhhhhhhhh

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	o-Xylenes 1,2-Dimethylbenzene ortho-Xylene o-Xylol	95-47-6	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	p-Cresol para-Cresol 4-Cresol p-Cresylic acid 1-Hydroxy-4-methylbenzene 4-Hydroxytoluene 4-Methylphenol	106-44-5	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irreg rapid resp, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Pentachlorophenol PCP; Penta; 2,3,4,5,6-Pentachlorophenol	87-86-5	PID	0.5 mg/m^3 2.5 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; sneezing, cough; lassitude (weakness, exhaustion), anorexia, weight loss; sweating; headache, dizziness; nausea, vomiting; dyspnea (breathing difficulty), chest pain; high fever; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Perfluorobutanesulfonic acid FC-98 Nonaflate Nonafluorobutanesulphonic acid Perfluorobutanesulfonic Acid Perfluorobutane sulfonate PFBS	375-73-5	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Perfluorobutanoic Acid Heptafluorobutyric acid Heptafluorobutanoic acid Perfluorobutyric acid PFBA	375-22-4	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Perfluorohexanesulfonic Acid	355-46-4	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Perfluoroheptanoic Acid PFHpA	375-85-9	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Perfluorohexanoic Acid PFHxA	375-95-1	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Perfluorooctanoic Acid	355-67-1	NA	None None	Groundwater	Groundwater	inhalation, skin or eye contact, ingestion; strong acid	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Perfluoronoanoic Acid Perfluorononanoic Acid PFNA	375-95-1	NA	None None	Groundwater	Groundwater	inhalation, skin or eye contact, ingestion; strong acid	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Perfluorooctanesulfonic Acid PFOS	1763-23-1	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Perfluoropentanoic Acid PFPeA	2706-90-3	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Phenanthrene	85-01-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.13	Phenol Carbolic acid Hydroxybenzene, Monohydroxybenzene Phenyl alcohol Phenyl hydroxide	108-95-2	PID	5 ppm 250 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine, skin burns; dermatitis; tremor, convulsions, twitching	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Potassium	7440-09-7	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin and/or eye contact inhalation, ingestion, skin and/or eye contact	eye: Causes eye burns. Skin: Causes skin burns. Reacts with moisture in the skin to form potassium hydroxide and hydrogen with much heat. ingestion: Causes gastrointestinal tract burns. inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.	Eyes: Get medical aid immediately Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Ingestion: If victim is conscious and alert, give 2-4 full cups of milk or water. Get medical aid immediately. inhalation: Get medical aid immediately.
1.3.1 – 1.3.13	p-Xylenes 1,4-Dimethylbenzene para-Xylene p-Xylol	106-42-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Pyrene benzo[def]phenanthrene	129-00-0	PID	0.2 mg/m³ 80 mg/m³ (Coal Pitch Tar)	Groundwater Soil	inhalation, skin or eye contact, ingestion	irritation to eyes and skin, respiratory irritation(dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.13	Selenium	7782-49-2	None	1 mg/m³ 0.2 mg/m³	Soil	inhalation, ingestion, skin and/or eye contact	irritation to the 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	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Silver	7440-22-4	None	0.01 mg/m³ 10 mg/m³	Soil	inhalation, ingestion, skin and/or eye contact	blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Sodium	7440-23-5	None	NA NA	Groundwater Soil	ion, ingestion, skin and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Sodium 1H,1H,2H,2H-perfluorooctanesulfonate 2-(Perfluorohexyl)ethane-1-sulfonic Acid Sodium Salt ,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluoro-1-octanesulfonic Acid Sodium Salt; 1H,1H,2H,2H-Perfluorooctanesulfonic Acid Sodium Salt; 3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooctane-1-sulfonic Acid Sodium Salt; 3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooctanesulfonic Acid Sodium Salt; 6:2 FTS Impurity: Sodium 1H, 1H, 2H, 2H-Perfluorooctane Sulfonic (6:2)	27619-94-9	NA	None None	Groundwater	inhalation, skin or eye contact, ingestion	irritation to eyes with possible eye damage, skin causing rash, redness or burning, irritation to nose, throat and lungs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Tert-Butyl Alcohol Tertiary Butyl Alcohol Tert-Butanol Butyl alcohol 2-Methyl-2-propanol Trimethyl carbinol TBA	75-65-0	PID	100 ppm 1600 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; drowsiness, narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Tetrachloroethylene Perchlorethylene Perchloroethylene PCE Perk Tetrachlorethylene Tetrachloroethene	127-18-4	PID	100 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Thallium	7440-28-0	None	0.1 mg/m^3 15 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Toluene Methyl benzene Methyl benzol Phenyl methane Toluol	108-88-3	PID	200 ppm 500 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, paresthesia; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Total PCBs Chlorodiphenyl (42% chlorine) Aroclor® 1242 PCB Polychlorinated biphenyl	53469-21-9	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Total Xylenes Dimethylbenzene Xylol	1330-20-7	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Trichloroethylene Ethylene trichloride TCE Trichloroethene Trilene	79-01-6	PID	100 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Trichlorofluoromethane Fluorotrichloromethane Freon® 11 Monofluorotrichloromethane Refrigerant 11 Trichloromonofluoromethane	75-69-4	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.13	Trivalent Chromium Chromium III	NA	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Vanadium	7440-62-2	None	0.1 mg/m3 15 mg/m3	Groundwater Soil	inhalation, skin absorption, ingestion, skin and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.13	Zinc	7440-62-2	None	15 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation	chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function	Breathing: Respiratory support`

EXPLANATION OF ABBREVIATIONS

PID = Photoionization Detector
PEL = Permissible Exposure Limit (8-hour Time Weighted Average
IDLH = Immediately Dangerous to Life and Health

ppm = part per million
mg/m^3 = milligrams per cubic meter

TABLE 3
Summary of Monitoring Equipment

Instrument	Operation Parameters
Photoionization Detector (PID)	**Hazard Monitored:** Many organic and some inorganic gases and vapors. **Application:** Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds is possible if more than one probe is measured. **Detection Method:** Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions. **General Care/Maintenance:** Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories. **Typical Operating Time:** 10 hours. 5 hours with strip chart recorder.
Oxygen Meter	**Hazard Monitored:** Oxygen (O_2). **Application:** Measures the percentage of O_2 in the air. **Detection Method:** Uses an electrochemical sensor to measure the partial pressure of O_2 in the air, and converts the reading to O_2 concentration. **General Care/Maintenance:** Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to explanation of the specified interval. If the ambient air is less than 0.5% C O_2, replace the detector cell frequently. **Typical Operating Time:** 8 – 12 hours.
Additional equipment (if needed, based on site conditions)	
Combustible Gas Indicator (CGI)	**Hazard Monitored:** Combustible gases and vapors. **Application:** Measures the concentration of combustible gas or vapor. **Detection Method:** A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured. Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present. **General Care/Maintenance:** Recharge or replace battery. Calibrate immediately before use. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.
Flame Ionization Detector (FID) with Gas Chromatography Option *(i.e., Foxboro Organic Vapor Analyzer (OVA))*	**Hazard Monitored:** Many organic gases and vapors (approved areas only). **Application:** In survey mode, detects the concentration of many organic gases and vapors. In gas chromatography (GC) mode, identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated. **General Care/Maintenance:** Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks. **Typical Operating Time:** 8 hours; 3 hours with strip chart recorder.
Potable Infrared (IR) Spectrophotometer	**Hazard Monitored:** Many gases and vapors. **Application:** Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures. **Detection Method:** Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound. **General Care/Maintenance:** As specified by the manufacturer.

Instrument	Operation Parameters
Direct Reading Colorimetric Indicator Tube	**Hazard Monitored:** Specific gas and vapors. **Application:** Measures concentration of specific gases and vapors. **Detection Method:** The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration. **General Care/Maintenance:** Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about 2 years. Check expiration dates of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.
Aerosol Monitor	**Hazard Monitored:** Airborne particulate (dust, mist, fume) concentrations **Application:** Measures total concentration of semi-volatile organic compounds, PCBs, and metals. **Detection Method:** Based on light-scattering properties of particulate matter. Using an internal pump, air sample is drawn into the sensing volume where near infrared light scattering is used to detect particles. **General Care/Maintenance:** As specified by the mfr. Also, the instrument must be calibrated with particulates of a size and refractive index similar to those to be measured in the ambient air.
Monitox	**Hazard Monitored:** Gases and vapors. **Application:** Measures specific gases and vapors. **Detection Method:** Electrochemical sensor relatively specific for the chemical species in question. **General Care/Maintenance:** Moisten sponge before use; check the function switch; change the battery when needed.
Gamma Radiation Survey Instrument	**Hazard Monitored:** Gamma Radiation. **Application:** Environmental radiation monitor. **Detection Method:** Scintillation detector. **General Care/Maintenance:** Must be calibrated annually at a specialized facility. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

TABLE 4
INSTRUMENTATION ACTION LEVELS

Photoionization Detector Action Levels	Action Required
Background to 5 ppm	No respirator; no further action required
> 1 ppm but < 5 ppm for > 5 minutes	1. Temporarily discontinue all activities and evaluate potential causes of the excessive readings. If these levels persist and cannot be mitigated (i.e., by slowing drilling or excavation activities), contact HSO to review conditions and determine source and appropriate response action. 2. If PID readings remain above 1 ppm, temporarily discontinue work and upgrade to Level C protection. 3. If sustained PID readings fall below 1 ppm, downgrading to Level D protection may be permitted.
> 5 ppm but < 150 ppm for > 5 minutes	1. Discontinue all work; all workers shall move to an area upwind of the jobsite. 2. Evaluate potential causes of the excessive readings and allow work area to vent until VOC concentrations fall below 5 ppm. 3. Level C protection will continue to be used until PID readings fall below 1 ppm.
> 150 ppm	Evacuate the work area

Notes:
1. 1 ppm level based on OSHA Permissible Exposure Limit (PEL) for benzene.
2. 5 ppm level based on OSHA Short Term Exposure Limit (STEL) maximum exposure for benzene for any 15 minute period.
3. 150 ppm level based on NIOSH Immediately Dangerous to Life and Health (IDLH) for tetrachloroethylene.

TABLE 5
EMERGENCY NOTIFICATION LIST

ORGANIZATION	CONTACT	TELEPHONE
Local Police Department	NYPD	911
Local Fire Department	NYFD	911
Ambulance/Rescue Squad	NYFD	911
Hospital	Mount Sinai Hospital of Queens	911 or 718-932-1000
Langan Incident / Injury Hotline		800-952-6426 ex 4699
Langan Project Managers	Emily Sneed	508-918-8558 (cell)
Langan Health and Safety Manager (HSM)	Tony Moffa	215-756-2523 (cell)
Langan Health & Safety Officer (HSO)	William Bohrer	410-984-3068 (cell)
Langan Field Team Leader (FTL)	To Be Determined	
Client's Representative	David Schwartz	646-762-1429
National Response Center (NRC)		800-424-8802
Chemical Transportation Emergency Center (Chemtrec)		800-424-9300
Center for Disease Control (CDC)		404-639-3534
EPA (RCRA Superfund Hotline)		800-424-9346
TSCA Hotline		202-554-1404
Poison Control Center		800-222-1222

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan Incident/Injury Hotline at 1-(800)-9-LANGAN (ext. #4699).

TABLE 6
SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORING FOR FIT AND ACCLIMATED WORKERS[A]

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation: ta adj ^{O}F = ta ^{O}F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

TABLE 7

HEAT INDEX

ENVIRONMENTAL TEMPERATURE (Fahrenheit)

RELATIVE HUMIDITY	70	75	80	85	90	95	100	105	110	115	120
	APPARENT TEMPERATURE*										
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	**130**
30%	67	73	78	84	90	96	104	113	123	**135**	**148**
40%	68	74	79	86	93	101	110	123	**137**	**151**	
50%	69	75	81	88	96	107	120	**135**	**150**		
60%	70	76	82	90	100	114	**132**	**149**			
70%	70	77	85	93	106	124	**144**				
80%	71	78	86	97	113	**136**					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body
Source: National Oceanic and Atmospheric Administration

How to use Heat Index:
1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

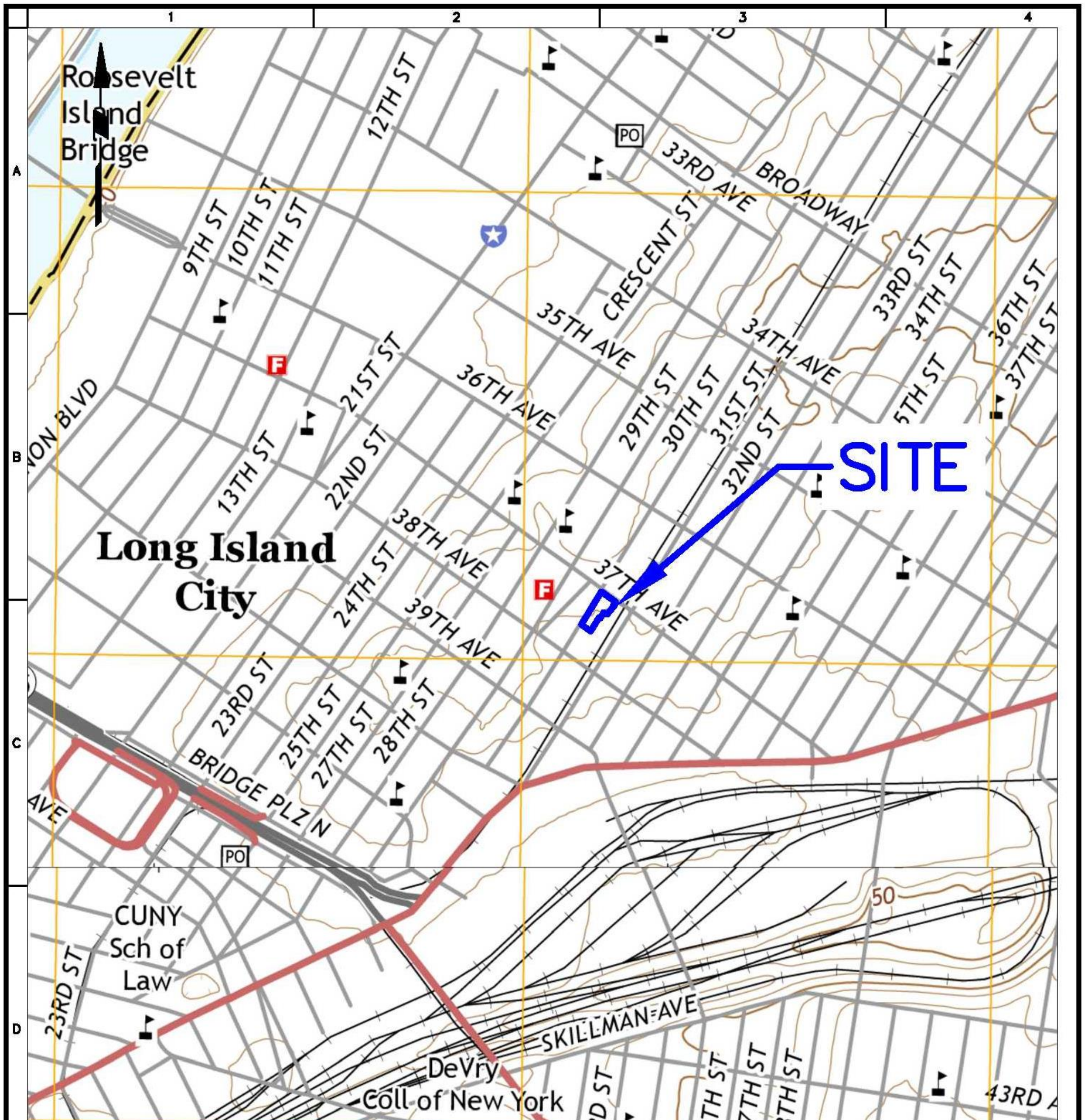
Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	Heat Stress Risk with Physical Activity and/or Prolonged Exposure
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

FIGURES

FIGURE 1

Site Location Map



NOTES:

1. BASE MAPS ADAPTED FROM UNITED STATES GEOLOGICAL SURVEY (USGS) 7.5-MINUTE WEEHAWKEN (NEW JERSEY), CENTRAL PARK (NEW YORK), JERSEY CITY (NEW JERSEY), AND BROOKLYN (NEW YORK) TOPOGRAPHIC QUADRANGLES, DATED 2016.

1000 0 500 1000
SCALE IN FEET

LANGAN	Project	Figure Title		Figure No.
21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. S.A. Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. Langan Engineering and Environmental Services, Inc. Langan CT, Inc. Langan International LLC Collectively known as Langan	**37-11 30TH STREET** BLOCK No. 372, P/O LOT NO. 8 AND LOT No. 21 QUEENS NEW YORK	**SITE LOCATION MAP**	Project No. 170512301 Date 01/16/2018 Scale 1"=1000' Drawn By ERA / Checked By ES Submission Date 02/15/2018	**1** Sheet 1 of 3

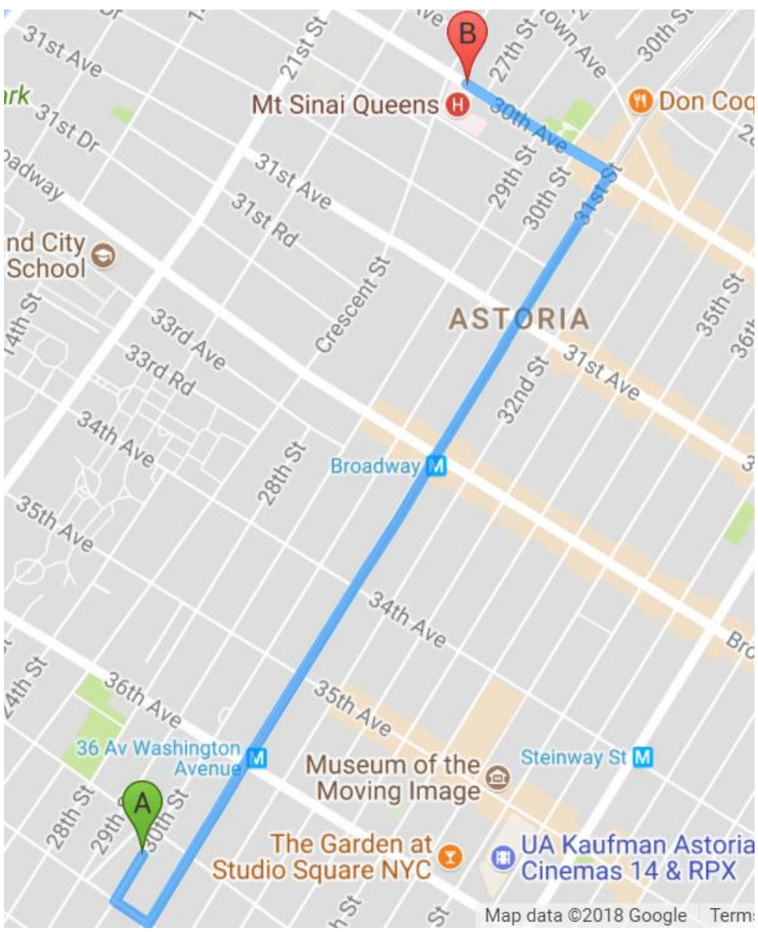
FIGURE 2
HOSPITAL ROUTE PLAN

Hospital Location: **Mount Sinai Hospital of Queens**
25-10 30th Avenue
Long Island City, New York
718-932-1000

START: 37-11 30th Street, Long Island City, NY

1. Head southwest on 30th Street toward 38th Avenue
2. Turn left at 1st cross street onto 38th Avenue
3. Turn left at 1st cross street onto 31st Street
4. Turn left onto 30th Avenue, destination will be on the left.

END: Mount Sinai Hospital of Queens, 25-10 30th Avenue, Long Island City, NY



ATTACHMENT A

STANDING ORDERS

STANDING ORDERS

GENERAL

- No smoking, eating, or drinking in this work zone.
- Upon leaving the work zone, personnel will thoroughly wash their hands and face.
- Minimize contact with contaminated materials through proper planning of work areas and decontamination areas, and by following proper procedures. Do not place equipment on the ground. Do not sit on contaminated materials.
- No open flames in the work zone.
- Only properly trained and equipped personnel are permitted to work in potentially contaminated areas.
- Always use the appropriate level of personal protective equipment (PPE).
- Maintain close contact with your buddy in the work zone
- Contaminated material will be contained in the Exclusion Zone (EZ).
- Report any unusual conditions.
- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible.
- The number of personnel and equipment in the work zone will be kept to an essential minimum.
- Be alert to the symptoms of fatigue and heat/cold stress, and their effects on the normal caution and judgment of personnel.
- Conflicting situations which may arise concerning safety requirements and working conditions must be addressed and resolved quickly by the site HSO.

TOOLS AND HEAVY EQUIPMENT

- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other device not specifically designed to carrying passengers.
- Loose-fitting clothing or loose long hair is prohibited around moving machinery.
- Ensure that heavy equipment operators and all other personnel in the work zone are using the same hand signals to communicate.
- Drilling/excavating within 10 feet in any direction of overhead power lines is prohibited.
- The locations of all underground utilities must be identified and marked out prior to initiating any subsurface activities.
- Check to insure that the equipment operator has lowered all blades and buckets to the ground before shutting off the vehicle.
- If the equipment has an emergency stop device, have the operator show all personnel its location and how to activate it.
- Help the operator ensure adequate clearances when the equipment must negotiate in tight quarters; serve as a signalman to direct backing as necessary.
- Ensure that all heavy equipment that is used in the Exclusion Zone is kept in that zone until the job is done, and that such equipment is completely decontaminated before moving it into the clean area of the work zone.
- Samplers must not reach into or get near rotating equipment such as the drill rig. If personnel must work near any tools that could rotate, the equipment operator must completely shut down the rig prior to initiating such work. It may be necessary to use a remote sampling device.

ATTACHMENT B

DECONTAMINATION PROCEDURES

PERSONNEL DECONTAMINATION

LEVEL C DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Face piece Removal	6. Face piece is removed (avoid touching face with fingers). Face piece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

LEVEL D DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

EQUIPMENT DECONTAMINATION

GENERAL:

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Depending on site conditions, backhoe and pumps may be decontaminated over a portable decontamination pad to contain wash water; or, wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such.

Miscellaneous tools and equipment will be dropped into a plastic pail, tub, or other container. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

MONITORING EQUIPMENT:

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as much of the instruments as possible with plastic without hindering the operation of the unit. The PID, HNu or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

RESPIRATORS:

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, followed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.

ATTACHMENT C

EMPLOYEE EXPOSURE/
INJURY INCIDENT REPORT

EMPLOYEE INCIDENT/INJURY REPORT
LANGAN ENGINEERING & ENVIRONMENTAL SERVICES

(Complete and return to Tony Moffa in the Doylestown Office)

Affected Employee Name: ______________________________ Date: ______________________________

Incident type: ☐ Injury ☐ Report Only/No Injury

☐ Near Miss ☐ Other: ______________________________

____

EMPLOYEE INFORMATION (Person completing Form)

Employee Name: ______________________________ Employee No: ______________________

Title: ______________________________ Office Location: ______________________

Length of time employed or date of hire: ______________________________

Mailing address: ______________________________

____

Sex: M ☐ F ☐ Birth date: ________________

Business phone & extension: ____________________ Residence/cell phone: ____________________

ACCIDENT INFORMATION

Project: ______________________________ Project #: ______________________

Date & time of incident: ____________________ Time work started & ended: ____________________

Site location: ______________________________

Incident Type: Possible Exposure ☐ Exposure ☐ Physical Injury ☐

Names of person(s) who witnessed the incident: ______________________________

____

Exact location incident occurred: ______________________________

____

Describe work being done: ______________________________

Describe what affected employee was doing prior to the incident occurring:

Describe in detail how the incident occurred:

Nature of the incident (List the parts of the body affected):

Person(s) to whom incident was reported (Time and Date):

List the names of other persons affected during this incident:

Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc.):

Weather conditions during incident:

MEDICAL CARE INFORMATION

Did affected employee receive medical care? Yes ☐ No ☐

If Yes, when and where was medical care received:

Provide name of facility (hospital, clinic, etc.):

Length of stay at the facility?

Did the employee miss any work time? Yes ☐ No ☐ Undetermined ☐

Date employee last worked: ______________________ Date employee returned to work: ________________

Has the employee returned to work? Yes ☐ No ☐

Does the employee have any work limitations or restrictions from the injury? : Yes ☐ No ☐

If Yes, please describe: ____

____

Did the exposure/injury result in permanent disability? Yes ☐ No ☐ Unknown ☐

If Yes, please describe: ____

HEALTH & SAFETY INFORMATION

Was the operation being conducted under an established site specific CONSTRUCTION CONSTRUCTION HEALTH AND SAFETY PLAN?
Yes ☐ No ☐ Not Applicable: ☐

Describe protective equipment and clothing used by the employee:

____

____

____

Did any limitations in safety equipment or protective clothing contribute to or affect exposure / injury? If so, explain:

____

____

____

______________________________ ______________________
Employee Signature Date

______________________________ ______________________
Langan Representative Date

ATTACHMENT D

CALIBRATION LOG

DATE:________________ **PROJECT:____________________**

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrat. Reading	Performed By:

ATTACHMENT E

MATERIAL SAFETY DATA SHEETS

SAFETY DATA SHEETS

All Langan Field Personnel Completing This Work Plan Are To Have Real Time Accessibility To Material Safety Data Sheet (MSDs) or Safety Data Sheet (SDSs) Through Their Smart Phone.

The link is http://www.msds.com/
The login name is "drapehead"
The password is "2angan987"

If You Are Unable To Use the Smart Phone App, You Are To Bring Printed Copies of the MSDs/SDSs to the Site

ATTACHMENT F

JOBSITE SAFETY INSPECTION CHECKLIST

Jobsite Safety Inspection Checklist

Date: ______________________ **Inspected By:** ______________________

Location: ______________________ **Project #:** ______________________

Check one of the following: **A:** Acceptable **NA**: Not Applicable **D**: Deficiency

	A	NA	D	Remark
1. CHASP available onsite for inspection?				
2. Health & Safety Compliance agreement (in CHASP) appropriately signed by Langan employees and contractors?				
3. Hospital route map with directions posted on site?				
4. Emergency Notification List posted on site?				
5. First Aid kit available and properly stocked?				
6. Personnel trained in CPR/First Aid on site?				
7. MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
8 Appropriate PPE being worn by Langan employees and contractors?				
9. Project site safe practices ("Standing Orders") posted?				
10. Project staff have 40-hr./8-hr./Supervisor HAZWOPER training?				
11. Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
12. Respiratory protection readily available?				
13. Health & Safety Incident Report forms available?				
14. Air monitoring instruments calibrated daily and results recorded on the Daily Instrument Calibration check sheet?				
15. Air monitoring readings recorded on the air monitoring data sheet/field log book?				
16. Subcontract workers have received 40-hr./8-hr./Spvsr. HAZWOPER training, as appropriate?				
17. Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
18. Subcontract workers have respirators readily available?				
19. Mark outs of underground utilities done prior to initiating any subsurface activities?				
20. Decontamination procedures being followed as outlined in CHASP?				
21. Are tools in good condition and properly used?				
22. Drilling performed in areas free from underground objects including utilities?				

23. Adequate size/type fire extinguisher supplied?				
24. Equipment at least 20 feet from overhead powerlines?				
25. Evidence that drilling operator is responsible for the safety of his rig.				
26. Trench sides shored, layer back, or boxed?				
27. Underground utilities located and authorities contacted before digging?				
28. Ladders in trench (25-foot spacing)?				
29. Excavated material placed more than 2 feet away from excavation edge?				
30. Public protected from exposure to open excavation?				
31. People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
32. Confined space entry permit is completed and posted?				
33. All persons knowledgeable about the conditions and characteristics of the confined space?				
34. All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
35. Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
36. Attendant and/or supervisor certified in basic first aid and CPR?				
37. Confined space atmosphere checked before entry and continuously while the work is going on?				
38. Results of confined space atmosphere testing recorded?				
39. Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
40. Are extension cords rated for this work being used and are they properly maintained?				
41. Are GFCIs provided and being used?				

Unsafe Acts: ____

____

____

____

Notes: ____

____

____

____

ATTACHMENT G

JOB SAFETY ANALYSIS FORM

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA TITLE: **JSA NUMBER:**	**DATE CREATED:** **CREATED BY**: **REVISION DATE:** **REVISED BY:**

Langan employees must review and revise the Job Safety Analysis (JSA) as needed to address the any site specific hazards not identified. Employees must provide their signatures on the last page of the JSA indicating they have review the JSA and are aware the potential hazards associated with this work and will follow the provided preventive or corrective measures.

PERSONAL PROTECTIVE EQUIPMENT REQUIRED: (PPE): ■ Required	☒ As Needed	
☐ Steel-toed boots	☐ Nitrile gloves	☐ Dermal Protection (Specify)
☐ Long-sleeved shirt	☐ Leather/ Cut-resistant gloves	☐ High visibility vest/clothing
☐ Safety glasses	☐ Face Shield	☐ Hard hat
ADDITIONAL PERSONAL PROTECTIVE EQUIPMENT NEEDED (Provide specific type(s) or descriptions)		
☐ Air Monitoring:	☐ Respirators:	☐ Other:
☐ Dermal Protection:	☐ Cartridges:	☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE OR CORRECTIVE ACTION
1.	1. 2.	1a. 1b. 2a. 2b.
2.	1.	1
Additional items identified in the field.		
Additional Items.		

If additional items are identified during daily work activities, please notify all relevant personnel about the change and document on this JSA.

LANGAN	Job Safety Analysis (JSA) Health and Safety

JSA Title: **General Construction Activities**

JSA Number: **JSA010-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Transport equipment to work area	1. Back Strain 2. Slips/ Trips/ Falls 3. Traffic 4. Cuts/abrasions from equipment 5. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
2. Installation of piping from vapor wells to skid connections and from discharge piping to effluent stack	1. Pinch fingers when connecting pipes 2. Slips/ Trips/ Falls 3. Machinery Hazards	1. Wear proper PPE (leather gloves) 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 3. Wear proper PPE (safety vest) / Maintain safe distance from operating machinery
3. Remediation equipment installation	1. Back strain when lifting heavy equipment 2. Slips/ Trips/ Falls 3. Traffic	1. Use proper lifting techniques / Use wheeled transport / Minimize distance to vehicle 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray pain 3. Wear proper PPE (safety vest)
4. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety

JSA Title: **Subsurface Investigation**

JSA Number: **JSA030-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Dielectric Overshoes, Sun Block				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	1. Back/strain 2. Slip/Trip/Falls 3. Traffic 4. Cuts/abrasions/contusions from equipment 5. Accidents due to vehicle operations	1. Use proper lifting techniques/Use wheeled transport 2. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes) 5. Observe posted speed limits/ Wear seat belts at all times
6. Traffic	1. Hit by moving vehicle	1. Use traffic cones and signage/ Use High visibility traffic vests and clothing/ Caution tape when working near active roadways.
7. Field Work (drilling, resistivity testing, and inspection)	1. Biological Hazards: insects, rats, snakes, poisonous plants, and other animals 2. Heat stress/injuries 3. Cold Stress/injuries 4. High Energy Transmission Lines 5. Underground Utilities 6. Electrical (soil resistivity testing)	11. Inspect work area to identify biological hazards. Wear light colored long sleeve shirt and long pants/ Use insect repellant as necessary/ Beware of tall grass, bushes, woods and other areas where ticks may live/ Avoid leaving garbage on site to prevent attracting animals/ Identify and avoid contact with poisonous plants/Beware of rats, snakes, or stray animals. 12. Wear proper clothing (light colored)/ drink plenty of water/ take regular breaks/use sun block 13. Wear proper clothing/ dress in layers/ take regular breaks. 14. Avoid direct contact with high energy transmission lines/ position equipment at least 15 feet or as required by PSE&G from the transmission lines/ wear proper PPE (dielectric overshoes 15 kV minimum rating). 15. Call one-call service before performing intrusive field work/ Review utility mark-outs and available utility drawings (with respect to proposed work locations)/ Follow Underground Utility Guidelines

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		16. See AGI Sting R1 operating manual for specific concerns during operating instrument
8. All activities	11. Slips/ Trips/ Falls 12. Hand injuries, cuts or lacerations during manual handling of materials 13. Foot injuries 14. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	17. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 18. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 19. Wear Langan approved safety shoes 20. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 21. Wear high visibility clothing & vest / Use cones or signs to designate work area 22. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 23. Wear proper hearing protection 24. Wear hard hat / Avoid areas were overhead hazards exist. 25. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 26. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety

JSA Title: Field Sampling

JSA Number: JSA022-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☐ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. Unpack/Transport equipment to work area.	6. Back Strains 7. Slip/Trips/Falls 8. Cuts/Abrasions from equipment 9. Contusions from dropped equipment	6. Use proper lifting techniques/Use wheeled transport 7. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 8. Wear proper PPE (leather gloves, long sleeves). 9. Wear proper PPE (Langan approved safety shoes).
10.Initial Site Arrival-Site Assessment	1. Traffic	1. Situational awareness (be alert of your surroundings). Secure area from through traffic.
11.Surface Water Sampling	4. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	1. Wear appropriate PPE (Safety glasses, appropriate gloves). Review (M)SDS for all chemicals being.
12.Sampling from bridges	1. Struck by vehicles	1. Wear appropriate PPE (Safety Vest). Use buddy system and orange safety cones.
13. Icing of Samples/ Transporting coolers/equipment from work area.	21. Back Strains 22. Slips/Trips/Falls 23. Cuts/Abrasions from equipment 24. Pinch/Crushing Hazards.	27. Drain coolers of water. Use proper lifting techniques. Use wheeled transport. 28. Have unobstructed path from work area. Aware of surroundings. 29. Wear proper PPE (Leather gloves, long sleeves) 30. Wear proper PPE (Leather gloves, long sleeves)
14. Site Departure	1. Contaminated PPE/Vehicle	1. Contaminated PPE should be disposed of on-site. Remove boots and soiled clothing for secure storage in trunk. Wash hands promptly.
15. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	3. Foot injuries 4. Back injuries 25. Traffic 26. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 27. High Noise levels 28. Overhead hazards 29. Heat Stress/ Cold Stress 30. Eye Injuries	fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 31. Wear high visibility clothing & vest / Use cones or signs to designate work area 32. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 33. Wear hearing protection 34. Wear hard hat / Avoid areas were overhead hazards exist. 35. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 36. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety

JSA Title: **Equipment Transportation and Set-Up**

JSA Number: **JSA012-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
16. Transport equipment to work area	10. Back Strain 11. Slips/ Trips/ Falls 12. Traffic 13. Cuts/abrasions from equipment 14. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
17. Moving equipment to its planned location	2. Pinch Hazard 3. Slips/ Trips/ Falls	4. Wear proper PPE (leather gloves) 5. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint
18. Equipment Set-up	5. Pinch Hazard 6. Cuts/abrasions to knuckles/hands 7. Back Strain	4. Wear proper PPE (leather gloves) 5. Wear proper PPE (leather gloves) 6. Use proper lifting techniques / Use wheeled transport
19. All activities	31. Slips/ Trips/ Falls 32. Hand injuries, cuts or lacerations during manual handling of materials 33. Foot injuries 34. Back injuries 35. Traffic 36. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 37. High Noise levels 38. Overhead hazards 39. Heat Stress/ Cold Stress 40. Eye Injuries	37. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 38. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 39. Wear Langan approved safety shoes 40. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 41. Wear high visibility clothing & vest / Use cones or signs to designate work area 42. Be aware of surroundings at all times, including the presence of wildlife/

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
7. All activities (cont'd)		Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 43. Wear hearing protection 44. Wear hard hat / Avoid areas were overhead hazards exist. 45. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 46. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety

JSA Title: Excavation Oversight

JSA Number: JSA041-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
20. Transport equipment to work area	15. Back Strain 16. Slips/Trips/Falls 17. Traffic 18. Cuts/abrasions/contusions from equipment	10. Use proper lifting techniques / Use wheeled transport 11. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 12. Wear proper PPE (high visibility vest or clothing) 13. Wear proper PPE (leather gloves, long sleeves, safety shoes)
21.Earth Moving Equipment	4. Equipment running over employee	2. Ensure you have direct line of sight with operator of equipment; don't walk behind equipment; maintain a safe distance away from equipment. 3. Wear proper PPE (high vis vest/clothing)
22.Excavation	8. Excavation collapse 9. Confined space 10. Soil	2. Use proper shoring/benching/sloping techniques; Ladder is properly situated in excavation; no water in excavation; competent person has inspected excavation prior to allow employees to enter. 3. Langan employees are not authorized to enter a confined space; 4. Soil and equipment is kept at least 2 feet from edge of excavation
23.Excavated soil	1. Hazardous substances	1. Use proper equipment to monitor excavated soil for contaminates; ensure levels do not exceed PEL's for contaminates; Wear proper PPE
24. All activities	41. Slips/ Trips/ Falls 42. Hand injuries, cuts or lacerations during manual handling of materials 43. Foot injuries 44. Back injuries 45. Traffic 46. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 47. High Noise levels 48. Overhead hazards 49. Heat Stress/ Cold Stress	47. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 48. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 49. Wear proper PPE (Langan approved safety shoes) 50. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 51. Wear high visibility clothing & vest / Use cones or signs to designate work area

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	50. Eye Injuries	52. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 53. Wear hearing protection 54. Wear hard hat / Avoid areas were overhead hazards exist. 55. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 56. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	**Job Safety Analysis (JSA)** **Health and Safety**

JSA Title: **55-gallon Drum Sampling**

JSA Number: **JSA043-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):

☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	

☒ Other: All Drums are required to be labeled. Langan employees do not open or move undocumented drums or unlabeled drums without proper project manager authorization.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
25.Unpack/Transport equipment to work area.	19.Back Strains 20.Slip/Trips/Falls 21.Cuts/Abrasions from equipment 4. Contusions from dropped equipment	14. Use proper lifting techniques/Use wheeled transport 15. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 16. Wear proper PPE (leather gloves, long sleeves). 4. Wear proper PPE (Langan approved safety shoes).
26.Open Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 2. Pressure from drums.	1. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 2. Open drum slowly to relieve pressure. Wear proper PPE: face shield and goggles; correct gloves; and over garments.
27.Collecting Soil/Fluid Sample	5. Irritation to eye from vapor, soil dust, or splashing 6. Irritation to exposed skin	4. Wear proper eye protection including safety glasses/ face shield/googles and when necessary, splash guard. If dust or vapor phase is present, wear appropriate safety breathing gear (1/2 mask or full face mask with correct filter) 5. Wear proper skin protection including nitrile gloves.
28.Closing Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid.	5. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches.
29.Moving Drums	2. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 3. Back Strains	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 3. Use proper lifting techniques/Use wheeled transport

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
30. All activities	51. Slips/ Trips/ Falls 52. Hand injuries, cuts or lacerations during manual handling of materials 53. Foot injuries 54. Back injuries 55. Traffic 56. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 57. High Noise levels 58. Overhead hazards 59. Heat Stress/ Cold Stress 60. Eye Injuries	57. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 58. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 59. Wear Langan approved safety shoes 60. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 61. Wear high visibility clothing & vest / Use cones or signs to designate work area 62. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 63. Wear hearing protection 64. Wear hard hat / Avoid areas were overhead hazards exist. 65. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 66. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Site Inspection

JSA Number: JSA024-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☒ Rubber Boots
☒ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
31.Jobsite Pre-briefing	22.None	17. Review JSA, SOP's, and discuss hazards that may be present and control measures for present hazards while on-site.
2. Working near railroads	1. Passing Trains. 2. Slip/Trips/Falls.	1. Wear reflective vest/ Stay away from tracks/ Do not cross tracks within 10 ft. of train car or when there is a train within view/listen for train horn. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
3. Walking around site	4. Uneven terrain 5. Wildlife: Stray animals, mice/rats, vectors (i.e. mosquitoes, bees, etc.) 6. Weather: Heat/cold stress 7. Slip/Trips/Falls 8. Foot injuries 9. Eye injuries	4. Pay attention to surrounding area (puddles, wet, frozen, uneven areas); Mark with cones or spray paint. 5. Use bug spray/ Avoid stray animals/Use repellant when needed. 6. Dress for the correct weather situation/ Use sunscreen or protective clothing in sunlight, layers in cold weather/ Drink plenty of fluids/ Take breaks when needed. 4. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones. 5. Wear proper PPE (Langan approved safety shoes)/ Change wet socks during cold weather. 6. Wear proper PPE (safety glasses/goggles).
4. Working near road	1. Passing vehicles 2. Slip/Trips/Falls	1. Wear reflective vest/ Stay away from roadway/ Use buddy system/ Place signage or cones when needed. 2. Be aware of tripping hazards/ Follow good housekeeping procedures/ Mark significant hazards with spray paint or cones.
5. All activities	61. Slips/ Trips/ Falls 62. Hand injuries, cuts or lacerations during manual handling of materials 63. Foot injuries 64. Back injuries	67. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 68. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	65. Traffic 66. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 67. High Noise levels 68. Overhead hazards 69. Heat Stress/ Cold Stress 70. Eye Injuries	69. Wear Langan approved safety shoes 70. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 71. Wear high visibility clothing & vest / Use cones or signs to designate work area 72. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 73. Wear hearing protection 74. Wear hard hat / Avoid areas were overhead hazards exist. 75. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 76. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety

JSA Title: **Direct-Push Soil Borings**
JSA Number: **JSA004-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions.

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
32.Move equipment to work site	23.Back strain when lifting equipment 24.Slips/ Trips/ Falls while moving equipment 25.Traffic (if applicable) 26.Pinched fingers or running over toes during geoprobe set-up 27.Overturn drilling rig while transporting to loading dock on flat-bed tow truck	18. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 19. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 20. Wear high visibility safety vests or clothing / Exercise caution 21. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 22. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
33.Calibration of monitoring equipment	7. Skin or eye contact with calibration chemicals 8. Pinch fingers in monitoring equipment	6. Wear proper PPE (safety glasses/ goggles) 7. Wear proper PPE (leather gloves)
34.Set-up geoprobe rig	11. Geoprobe rig movement	6. All field personnel should stay clear of the geoprobe rig while moving / Use a spotter when backing up the geoprobe
35.Advance geoprobe rods below ground surface to desired depth	10. Underground utilities 11. High noise levels	7. Clean all subsurface soil borings to a minimum of 5 feet below grade 8. Wear proper PPE (hearing protection)
36. Remove and open acetate liner	71. Pinched fingers while removing macrocore 72. Cuts/lacerations when cutting acetate liner open 73. Exposure to hazardous vapors	1. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 2. Wear proper PPE (cut-resistant or leather gloves) 3. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Remove and open acetate liner (cont'd)	74. Skin contact with contaminated soil	contained in the Health and Safety Plan 4. Wear proper PPE (nitrile gloves)
37. Sample Collections a) Monitor parameters b) Prepare sample containers and labels	1. Contact with potentially contaminated soil 2. Lacerations from broken sample bottles 3. Back strain while transporting full coolers 4. Internal exposure to contaminants and metals through inhalation of dust 5. Slips/ Trips/ Falls	1. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 2. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage 9. Use proper lifting techniques / Do not lift heavy loads without assistance 10. Avoid creating dust / If necessary, wear a half mask respirator with applicable dust cartridge / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location 11. Be alert / Follow good housekeeping procedures
38. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Cuts/lacerations from acetate liner 2. Pinched fingers/hand while opening/closing drum 3. Skin contact with contaminated soil 4. Soil debris in eyes	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (nitrile gloves) 4. Wear proper PPE (safety glasses)
8. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Back, arm or shoulder strain from moving drums 2. Pinch fingers/hand in drum cart when moving drums 3. Pinch fingers/hand when operating lift-gate on vehicle 4. Contact with potentially contaminated groundwater when moving improperly sealed drums 5. Slips when moving drums 6. Drop drum on feet/toes	77. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance 78. Wear proper PPE (cut-resistant or leather gloves) 79. Wear proper PPE (cut-resistant or leather gloves) 80. Wear proper PPE (nitrile gloves underneath work gloves) 81. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions 82. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum
9. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. All activities (cont'd)	10. Eye Injuries	dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

ATTACHMENT H

TAILGATE SAFETY BRIEFING FORM

LANGAN TAILGATE SAFETY BRIEFING

Date:__________________________ Time: _____________________________________

Leader:______________________________ Location:___________________________________

Work Task: ____

SAFETY TOPICS (*provide some detail of discussion points*)

Chemical Exposure Hazards and Control:____

Physical Hazards and Control: ____

Air Monitoring: ____

PPE: ____

Communications:____

Safe Work Practices: ____

Emergency Response: ____

Hospital/Medical Center Location: ____

Phone Nos.: ____

Other: ____

FOR FOLLOW-UP (the issues, responsibilities, due dates, etc.**)**

ATTENDEES

PRINT NAME	COMPANY	SIGNATURE

APPENDIX E

CITIZEN PARTICIPATION PLAN

NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
37-11 West 30th Street

October 2018

BCP Site No. C241211
37-11 West 30th Street
Long Island City, New York 11101

Contents

***   *   *   *   ***

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: **37-11 30th Street Holdings LLC ("Applicant")**
Site Name: **37-11 30th Street** (**"Site")**
Site Address: **37-11 30th Street and 30-14 37th Street, Queens, NY 11101**
Site County: **Queens**
Site Number: **C241211**

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

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

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

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

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

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

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

Involving citizens affected and 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;
- 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.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

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.

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.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

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 Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

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

After a review of previous environmental reports, the following potential issues of public concern were identified: air quality, health of the community, nuisance odors, noise, and construction-related traffic. These issues are of the most concern to adjacent property businesses and residents. These issues will be addressed in the Remedial Action Work Plan (RAWP), a Community Air Monitoring Program (CAMP), and a site-specific Health and Safety Plan (HASP) for the project, to be approved by NYSDEC prior to work.

The site is located in an Environmental Justice Area. Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

Because the site is located in an Environmental Justice Area, all future fact sheets will be translated into Spanish. In addition, there may be issues with regards to truck traffic, noise or odors.

The site was an undeveloped vacant lot until at least 1915. The existing warehouse building at Lot 8 was constructed around 1920 and historically operated as a plastics manufacturer (The Marblette Corp. Mfg. of Plastic Materials) from at least 1930 to about 1980. Following 1980, the site operated as a warehouse for audio and lighting equipment. Lot 21 was developed with a two-story residential dwelling as early as 1898. From the 1930s through the 1980s, Marblette Corp. manufactured plastics, which primarily included production of synthetic resins. During this time period, plastic was typically made using a mixture of synthetic chemicals, solvents, and petroleum products. A lighting, audio, and production rental and warehousing company most recently occupied the buildings in Lot 8, and the development in Lot 21 is designated for residential use.

Contaminants of concern at the property, discussed in more detail in Section 4, include Volatile Organic Compounds (VOC), Chlorinated VOCs (CVOCs), Semi-volatile Organic Compounds (SVOC) and metals. The contaminants will be remediated to support the redevelopment of the site for unrestricted use under a NYSDEC-approved RAWP.
Site information is available through Project Contacts mentioned in Section 2 and detailed in Appendix A. The BCP Application and the Remedial Investigation Report (RIR), which

includes the previous investigations at the site and future reports prepared for NYSDEC, will be available in the document repository discussed above in Section 2 and detailed in Appendix A. The RAWP will include schedules for the planned work to make Citizen Participation Plans (CPPs) as consistent as possible with DER's CP Handbook, Region 2.

4. Site Information

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

Site Description

The site is located at 37-11 30th Street and 30-14 37th Avenue in Long Island City, NY and is identified as Tax Block 372, Lot 21 and a part of Lot 8, on the Queens Borough Tax Map. A site location map is provided as Figure 1. The site encompasses an area of about 26,978 square-feet (0.61 acres) and is occupied by a three-story warehouse building with multiple partial cellar levels in the southern part of Lot 8 (37-11 30th Street), a stockyard/storage area in the northern part of Lot 8, and a vacant lot on Lot 21 (30-14 37th Avenue). A lighting, audio, and production rental and warehousing company most recently occupied the buildings in Lot 8, and a two story residential building demolished prior to execution of the BCA and implementation of the Remedial Investigation Work Plan (RIWP) formerly occupied the eastern part of Lot 21. The site is bound by 37th Avenue to the north, 31st Street to the east, 38th Avenue to the south, and 30th Street to the west. The elevated N and Q subway tracks run north-south above 31st Street, which are about 100 feet east of the site. Appendix C contains a map identifying the location of the site.

History of Site Use, Investigation, and Cleanup

The 26,978-square-foot (0.61 acres) site is developed with a one-story and partial three-story warehouse building with multiple partial cellar levels, a stockyard/ storage area in the northern portion of Lot 8 (37-11 30th Street) and a vacant lot in Lot 21 (30-14 37th Avenue). The warehouse building on Lot 8 is vacant and was most recently occupied by a lighting, audio, and production rental and warehousing company. Lot 21 is vacant and was most recently used as a single-family residence. During the 2014 Limited Subsurface Investigation, one 550-gallon abandoned heating oil Underground Storage Tank (UST) was encountered in the sidewalk along 30th Street, adjacent and to the west of the proposed BCP site. Historical Sanborn fire insurance maps suggest that another UST is present in Lot 8 within the proposed BCP site. In addition, a 5,000-gallon AST and 2,000-gallon UST were encountered in the east-central portion of Lot 8, adjoining the proposed BCP site to the east. These tanks within Lot 8 and adjoining the proposed BCP site were reportedly closed in place on July 7, 2000. An abandoned former water supply well is located near the northeast corner of the proposed BCP property in the stockyard/ storage area of Lot 8.

The site was an undeveloped vacant lot until at least 1915. The existing warehouse building at Lot 8 was constructed around 1920 and historically operated as a plastics manufacturer (The Marblette Corp. Mfg. of Plastic Materials) from at least 1930 to about 1980. Following 1980, the site operated as a warehouse for audio and lighting equipment. Lot 21 was developed with a two-story residential dwelling as early as 1898. From the 1930s through the 1980s, Marblette Corp. manufactured plastics, which primarily included production of synthetic resins. During this time period, plastic was typically made using a mixture of synthetic chemicals, solvents, and petroleum products. A lighting, audio, and production rental and warehousing company most recently occupied the buildings in Lot 8. The two-story residential building in Lot 21 was demolished prior to execution of the BCA and implementation of the RIWP.

Prior to entry into the BCP, the site was the subject of three environmental investigations, which are documented in the following reports:

1. Phase I Environmental Site Assessment (ESA), prepared by Hillman Consulting LLC, dated April 8, 2014
2. Focused Subsurface Site Investigation, prepared by Merritt Environmental Consulting Corp., dated July 7, 2014
3. Limited Subsurface Investigation, prepared by Hydro Tech Environmental Corp., dated December 2017

Below is a summary of each report:

Phase I ESA, prepared by Hillman Consulting LLC, dated April 8, 2014

Hillman Consulting LLC (Hillman) conducted a Phase I ESA in April 2014. This Phase I ESA was conducted in general conformance with ASTM International's Standard Practice for Environmental Site Assessments E1527-13 and the United States Environmental Protection Agency (USEPA) All Appropriate Inquiry (AAI) Rule, for the purpose of identifying Recognized Environmental Conditions (RECs) in connection with the proposed brownfield site.

The following RECs were identified in the Phase I:

REC 1 – Historic On-Site Operations

The site historically operated as a plastics manufacturer (The Marblette Corp. Mfg. of Plastic Materials) from at least 1930 to about 1980. During this time period, plastic was typically made using a mixture of synthetic chemicals, chlorinated solvents, and petroleum products. Leaks or spills of petroleum products, solvents, and/or other hazardous materials associated with plastics manufacturing during the 50 years of on-site operations may have adversely affected soil, groundwater and/or soil vapor at the site.

REC 2 - Historic Petroleum Storage and Use

Documents indicate two underground storage tanks (UST), including a 2,000-gallon and 550-gallon UST, and 5,000-gallon above-ground storage tank (AST) were closed-in-place on July 7, 2000. The documents were prepared by U.S.A. Tank Maintenance, Inc. and were provided to the NYC Fire Department for documentation purposes. The tanks were not registered on the NYSDEC Petroleum Bulk Storage (PBS) database. Historical records documented the 5,000-gallon Above-Ground Storage Tank (AST) was installed in 1947, the 2,000-gallon UST was installed in 1933, and the 550-gallon UST was installed in 1941. According to historic Sanborn Fire Insurance Maps, a 10,000-gallon tank was also depicted at the site from 1947 to 1950; however the tank was not listed on any regulatory records. The property was listed in the Leaking Tanks (LTANK) database due to a tank test failure on April 21, 1998. According to records provided by NYSDEC, three soil borings were advanced in the vicinity of the tank in February 2000 as part of an investigation for a proposed building expansion. No evidence of impacts to the subsurface was noted during the investigation, and NYSDEC closed the LTANKS case on September 15, 2004; however, undocumented spills or releases of petroleum products associated with the tanks or piping may have adversely affected soil, groundwater, or soil vapor.

REC 3 - Historical Use at Surrounding Properties

Historical uses of adjoining and surrounding properties included auto repair facilities (1936, 1947-1950, 1999-2010), gasoline filling stations (1947-1950, 1970-1996, 2001-2006) dry cleaners (2004-2009), and various manufacturing facilities (1970-1996, 2001-2006). Records identified multiple lots in the surrounding area assigned with an Environmental Designation (E-Designation) for Hazardous Materials. The Hazardous

Materials E-Designation requires appropriate subsurface investigation and remediation, if necessary, of each property assigned prior to redevelopment. Undocumented spills or releases of petroleum products or hazardous substances associated with historical uses of nearby properties including petroleum bulk storage may have adversely affected groundwater or soil vapor beneath the site.

Focused Subsurface Site Investigation, prepared by Merritt Environmental Consulting Corp., dated July 7, 2014

Merritt Environmental Consulting Corp. (Merritt) completed a Focused Subsurface Site Investigation at the site in June 2014 to determine if soil and groundwater conditions at the site were impacted as a result of the historical use as a plastics manufacturing and historical petroleum bulk storage on site. The investigation included a geophysical survey, advancement of six soil borings, installation of four temporary groundwater monitoring wells, and collection of soil and groundwater samples. Field observations and laboratory analytical results are summarized below:

- Geophysical Survey: The geophysical survey identified two subsurface anomalies in locations consistent with the reported closed-in-place 2,000-gallon, and 550-gallon USTs. The 2,000-gallon UST was identified off-site in the sidewalk along 31st Street, which adjoins Lot 8 to the east. The 550-gallon UST was identified in the sidewalk along 30th Street, which adjoins Lot 8 to the west. Abandoned vent and fill lines were observed in the vicinity of the closed-in-place 5,000-gallon AST located in the east-central portion of Lot 8.
- Soil: Four soil borings were advanced up to 32 feet below ground surface (bgs) using a track-mounted GeoProbe© rig in the vicinity of an oil/water separator and closed-in-place 2,000-gallon UST, along the western portion of the site, and in the northwest exterior stockyard/ storage area. Two soil borings were advanced to six feet bgs in the vicinity of the closed-in-place 5,000-gallon heating oil AST. No evidence of petroleum impacts (e.g., staining, odors or photoionization detector [PID] readings above background) was observed during the soil boring investigation. Soil samples were analyzed for VOCs, SVOCs and Polychlorinated Biphenyls (PCBs). With the exception of methylene chloride, no VOCs were detected in soil samples. In addition, no SVOCs or PCBs were detected in soil samples.

- Groundwater: One VOC, chloroform (maximum concentration of 20 micrograms per liter [µg/L]), was detected in monitoring well B-3GW at a concentration above the New York Codes, Rules and Regulations (NYCRR) Part 703.5 Groundwater Quality Standards (GQS). CVOCs were detected in two monitoring wells along the eastern and western perimeters of the site, but at concentrations below the NYSDEC GQS.

Limited Subsurface Investigation, prepared by Hydro Tech Environmental Corp., dated December 2017

Hydro Tech Environmental Corp. (Hydro Tech) performed a Limited Subsurface Investigation at the site in December 2017 to determine, to the extent practical, the nature and extent of contamination in soil, groundwater, and soil vapor. The investigation included advancement of 9 soil borings, installation of 5 groundwater monitoring wells, installation of 6 sub-slab and 3 soil vapor sampling points, and collection and analysis of soil, groundwater, soil vapor, sub-slab vapor, indoor air, and outdoor ambient air samples. Langan was provided with copies of the site sampling location plan, and analytical result summary tables for soil, groundwater, and soil vapor samples collected during the limited investigation. Laboratory analytical results are summarized below:

- Soil: Metals including copper, mercury and lead were detected at concentrations above Title 6 NYCRR Part 375 Restricted Use Restricted-Residential (RRU) Soil Cleanup Objectives (SCOs). Metals including barium, hexavalent chromium, and zinc were detected at concentrations above Part 375 Unrestricted Use (UU) SCOs. One VOC, acetone, was detected at a concentration above the Part 375 UU SCOs. Soil samples collected throughout the site exceeded UU and/or RRU SCOs for metals including barium, hexavalent chromium, copper, lead, mercury, and zinc.
- Groundwater: Dissolved metals including magnesium, manganese, and sodium were detected at concentrations above the NYSDEC GQS. Perchloroethylene (PCE) was detected at concentrations ranging between 0.3 and 1.5 µg/L in three monitoring wells located in the west-central portion of the site (MW-3, MW-4, and MW-5). Detected concentrations of PCE in groundwater samples were below the NYSDEC GQS. Groundwater samples collected throughout the site exceeded NYSDEC GQS for metals including magnesium, manganese, and sodium.

- Indoor Air, Sub-Slab Vapor, and Soil Vapor: Indoor air analytical results were compared to the Air Guidance Values (AGV) specified in the New York State Department of Health (NYSDOH) guidance document. PCE was detected at a concentration of 68 micrograms per cubic meter (µg/m^3) in indoor air sample IA-1, and at 66 µg/m^3 in indoor air sample IA-2, which is two-times greater than the NYSDOH AGV of 30 µg/m^3. PCE concentrations detected in sub-slab vapor samples ranged from 7 µg/m^3 at SSB-6 to 12,000 µg/m^3 at SSB-1. Trichloroethene (TCE) concentrations above the NYSDOH AGV of 2 µg/m^3 were detected in three soil vapor samples collected throughout the western part of Lot 8 (within the proposed BCP site boundary). TCE concentrations detected in sub-slab vapor samples ranged from 7.70 µg/m^3 at SSB-2 to 16 µg/m^3 at SSB-1. TCE was detected at concentrations between 0.26 µg/m^3 and 0.46 µg/m^3 in indoor air samples collected. Currently the site buildings are vacant and unoccupied.

  In addition, NYSDOH provides decision matrices for eight CVOCs (carbon tetrachloride, 1,1-dichloroethene, cis-1,2-dichloroethene, TCE, methylene chloride, PCE, 1,1,1-trichloroethane, and vinyl chloride). The decision matrices recommend a range of activities based on the soil vapor and sub-slab and indoor air sample results collected. Two of the eight VOCs, PCE and TCE, that can be evaluated using the NYSDOH decision matrices were detected in sub-slab vapor samples. Based on the concentrations detected, the NYSDOH decision matrices recommend mitigation for PCE and monitoring for TCE.

Based on the investigations conducted to date, the primary contaminants of concern are VOCs, CVOCs, SVOCs, and metals.

5. Investigation and Cleanup Process

Application

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

The Applicant in its Application proposes that the site will be used for mixed-use residential, commercial, and light manufacturing development with one full cellar level.

New development will incorporate a cover system across the site and vapor mitigation measures. The proposed remedy will achieve a Track 1 unrestricted use cleanup.

To achieve this goal, the Applicant conducted an investigation and will perform 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 conducted an investigation of the site officially called a “remedial investigation” (RI). This investigation was performed with NYSDEC oversight. The Applicant developed a remedial investigation workplan, which was subject to public comment.

The site investigation has several goals:

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

The Applicant submitted a draft “Remedial Investigation Work Plan” to NYSDEC for review and approval. NYSDEC made the draft plan available to the public review during a 30-day public comment period.

When the investigation was complete, the Applicant prepared and submitted a report that summarizes the results. This report also recommends 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.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

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 draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft 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 selected remedy is formalized in the site Decision Document.

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

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the FER. NYSDEC then will issue a 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

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

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

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

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

Appendix A -
Project Contacts and Locations of Reports and Information

Project Contacts

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

New York State Department of Environmental Conservation (NYSDEC):

Hasan Ahmed
Project Manager
NYSDEC
Division of Environmental Remediation
One Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101
Phone: (718) 482-6405
Email: hasan.ahmed@dec.ny.gov

New York State Department of Health (NYSDOH):

Renata Ockerby
Project Manager
NYSDOH
Empire State Plaza
Corning Tower Room 1787
Albany, NY 12237
Phone: (518) 402-7860
Email: renata.ockerby@health.ny.gov

Remedial Engineer and Volunteer's Representative

Jason Hayes, P.E.
Langan Engineering
21 Penn Plaza
360 W 31st Street, 8th Floor
New York, New York 10001
Phone: 212-479-5427
Email: jahayes@langan.com

Locations of Reports and Information

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

Queens Library at Long Island City
37-44 21st Street
Long Island City, NY 11101
Phone: 718-752-3700
Monday 9:00am to 8:00pm
Tuesday: 1:00pm to 6:00pm
Wed. & Fri: 10:00am to 6:00pm
Thursday: 12:00pm to 8:00pm
Saturday: 10:00am to 5:00pm
Sunday: Closed

Queens Community Board 1
45-02 Ditmars Boulevard Astoria, NY 11105
Phone: 718-626-1021
Email: qn01@cb.nyc.gov
Attn: Florence Koulouris, District Manager
Marie Torniali, Chairwoman
Antonella Di Saverio, Environmental Protection Committee Chairwoman

Appendix B - Site Contact List

Chief Executive Officer
Mayor Bill de Blasio
City Hall
260 Broadway Avenue
New York, NY 10007

Borough of Queens, Borough President
Melinda Katz
120-55 Queens Boulevard
Kew Gardens, NY 11424
(718) 286-3000

NYC Department of City Planning Commissioner
Marisa Lago
Department of City Planning
120 Broadway, 31st Floor
New York, NY 10271

NYC Department of City Planning, Director of Queens Borough Office
Irving Poy
120-55 Queens Boulevard
Kew Gardens, NY 11424
(718) 286-2860

NYC Office of Environmental Remediation
Mark McIntyre, Director
100 Gold Street, 2nd Floor
New York, NY 10038

NYC DEP Bureau of Environmental Planning and Assessment
Julie Stein, Project Manager
59-17 Junction Boulevard, 11th floor
Flushing, NY 11373

NYSDEC Public Participation Specialist
Thomas V. Panzone
47-40 21st Street
Long Island City, NY 11101

NYSDEC Environmental Program Specialist
Larry Ennist
625 Broadway, 12th floor
Albany, NY 12233

NYC Comptroller
Hon. Scott M. Stringer
1 Centre Street
New York, NY 10007
(212) 669-3916

NYC Public Advocate
Hon. Letitia James
1 Centre Street, 15th Floor
New York, NY 10007
(212) 669-7200

Queens County Clerk
Hon.Audrey Pheffer
Kew Gardens, NY

NYC Councilmann, District 26
Hon. Jimmy Van Bramer
47-01 Queens Boulevard, Suite 205
Sunnyside, NY 11104
(718) 383-9566

NYS Senator, 12th District
Hon. Michael Gianaris
31-19 Newtown Ave South, Suite 402
Astoria, NY 11102
(718) 728-0960

NYS Assemblymember, District 57
Hon. Brian Barnwell
55-19 69th Street
Maspeth, NY 11378
(718) 651-3185

U.S. Senator
Hon. Charles Schumer
780 Third Avenue, Suite 2301
New York, NY 10017
(212) 486-4430

U.S. Senator
Hon. Kirsten Gillibrand
780 Third Avenue, Suite 2601
New York, NY 10017
(212) 688-6262

U.S. House of Representatives
Hon. Carolyn B. Maloney
31-19 Newtown Avenue
Astoria, NY 11102
(718) 932-1804

Queens Community Board 1
45-02 Ditmars Boulevard, LL Suite 125
Astoria, NY 11105
Phone: 718-626-1021
Email: qn01@cb.nyc.gov
Attn: Florence Koulouris

Local news media from which the community typically obtains information:

Western Queens Gazette
42-16 34th Avenue
Long Island City, NY 11101
(718) 361-6161

Times-Ledger Newspapers
41-02 Bell Boulevard, 2nd Floor
Bayside, NY 11361

Queens Chronicle
71-19 80th Street, Suite 8-201
Glendale, NY 11385

Queens Tribune
150-50 14th Road
Whitestone, NY 11357

LIC/Astoria Journal
69-60 Grand Avenue
Maspeth, NY 11378

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

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

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

The public water supplier which services the area in which the property is located:
The responsibility for supplying water in New York City is shared between the NYCDEP, the Municipal Water Finance Authority, and the New York City Water Board:

<u>NYCDEP – Public Water Supplier</u>
Vincent Sapienza, Commissioner
59-17 Junction Boulevard
Flushing, NY 11373

New York City Municipal Water Finance Authority
255 Greenwich Street, 6th Floor
New York, NY 10007

New York City Water Board
NYC Department of Environmental Protection
59-17 Junction Boulevard, 8th Floor
Flushing, NY 11373

Any person who has requested to be placed on the contact list:
No requests have been made by individuals for inclusion on the contact list.

Local Daycare Facilities and Schools:

The Oliver Wendell Holmes Intermediate School 204
(about 650 feet north of the site)
Faye Erstejn-Kotzer, Principal
36-41 28th Street
Queens, NY 11101
(718) 937-1463

Queensbridge Early Childhood Development Center
(about 775 feet west of the site)
No specific contact name available
38-11 27th Street
Queens, NY 11101
(718) 937-7640

PS 112 Dutch Kills
(about 940 feet northwest of the site)
Rafael Campos Gatjens, Principal
25-05 37th Avenue
Queens, NY 11101
(718) 784-5250

Growing up Green Charter School
(about 1,200 feet southwest of the site)
Matthew Greenberg, Principal
39-37 28th Street
Queens, NY 11101
(347) 642-4306

Baccalaureate School for Global Education
(about 1,250 feet northeast of the site)
Kelly Johnson, Principal
34-12 36th Avenue
Queens, NY 11101
(718) 361-5275

Newcomers High School
(about 1,550 feet southeast of the site)
German Sarmiento, Principal
28-01 41st Avenue
Queens, NY 11101
(718) 937-6005

PS 166 Henry Gradstein
(about 1,700 feet northeast of the site)
Jessica Geller, Principal
33-09 35th Avenue
Queens, NY 11101
(718) 786-6703
All Children's Child Care

(about 1,775 feet northeast of the site)
No specific contact name available
35-01 24th Street
Queens, NY 11106
(718) 707-0501

Academy for New Americans
(about 1,900 feet southeast of the site)
Betty Cartagena, Principal
30-14 30th Street
Queens, NY 11101
(718) 956-4140

Andrew Landi Early Childhood Development Center
(about 2,150 feet northeast of the site)
No specific contact name available
21-20 35th Avenue
Queens, NY 11101
(718) 806-1598

PS 111 Jacob Blackwell
(about 2,350 feet northeast of the site)
Dionne Jaggon, Principal
37-15 13th Street
Queens, NY 11101
(718) 786-2073

Jackson Developmental Center and Children’s Services
(about 2,500 feet northeast of the site)
No specific contact name available
36-02 14th Street
Queens, NY 11101
(718) 779-8800

Evangel Christian School
(about 2,100 feet west of the site)
Carmen Perez, Principal
39-21 Crescent Street,
Queens, NY 11101
(718) 937-9600

Community, Civic, Religious and other Environmental Organizations:

<u>Queens Community Board 1</u>
45-02 Ditmars Boulevard, LL Suite 125
Queens, NY 11101
Phone: 718-626-1021
Email: qn01@cb.nyc.gov

Carol Conslato – Director
Consolidated Edison Corporate Affairs
59-17 Junction Boulevard – 2nd Floor
Elmhurst, NY 11373

114th Precinct Council
Ann Bruno, President
34-16 Astoria Boulevard
Queens, NY 11103

FDNY Ladder 116
37-20 29th Street,
Long Island City, NY 11101

Evangel Church
39-20 27th Street,
Queens, NY 11101
(718) 361-5454

St. George Coptic Orthodox Church
Attn: Pastor
38-25 31st Street
Long Island City, NY 11101
Assembly of God – NY Portuguese

3007 39th Avenue
Long Island City, NY 11101
El Ber Masjid – Mosque
36-07 30th Street
Long Island City, NY 11101

Residents, owners, and occupants of the site:

None.

Adjacent properties include:

Residential Buildings
30-14 37th Avenue
Queens, NY 11101
Owner: Robert W. See

Evangelos Douvogiannis Auto Repair Shop
30-16 37th Avenue
Queens, NY 11101
Owner: Effie Douvogiannis
Business #: (718)-937-1575

Parking Lot
30-18 37th Avenue
Queens, NY 11101
Owner: Effie Douvogiannis
Business #: (718) 937-1575

Imperial Mach Corporation
37-24 30th Street
Queens, NY 11101
Owner: Wilbee Corp.
Business #: (718) 784-1021

Architectural Iron Realty Inc.
.
37-31 30th Street
Queens, NY 11101
Owner: Architectural Iron Realty Corp
Owner #: (718) 937-5775

Parking Lot
37-37 30th Street
Queens, NY 11101
Owner: Architectural Iron Realty Corp
Owner #: (718) 937-5775

Bright Star Industries, Inc.
37-36 31st Street
Queens, NY 11101
Owner: PFAS Realty Corp.
Owner #: (708) 729-3655

M & K 88 Cleaners
37-26/28 30th Street
Queens, NY 11101
Owner: Wilbee Corp.
Business #: (718) 433-1889

IDK Cooling Corp.
37-22 30th Street
Queens, NY 11101
Owner: Arthur Klansky
Owner #: (718) 786-7200

DurAmerica Brokerage
37-14 30th Street
Queens, NY 11101
Owner: 37-14 Alve Realty LLC
Business #: (718) 626-0700

Available Light New York
29-16 37th Avenue
Queens, NY 11101
Owner: AL7 Realty Corporation
Business #: (718) 707-9670

Industrial Space
29-09 37th Avenue
Queens, NY 11106
Owner: Golden Century Realty

Cyber Metal Tech
37-29 31st Street
Queens, NY 11101
Owner: 31/32 LIC LLC
Business #: (718) 937-6508

Z.A. & D. Service Station
31-01 38th Avenue
Queens, NY 11101
Owner: 31 Street Realty LLC
Business #: (718) 786-4488

Ashlar Mechanical Corp.
37-20 30th Street
Queens, NY 11101
Owner: Ashlar Realty Company, LLC
Owner #: (718) 786-7200

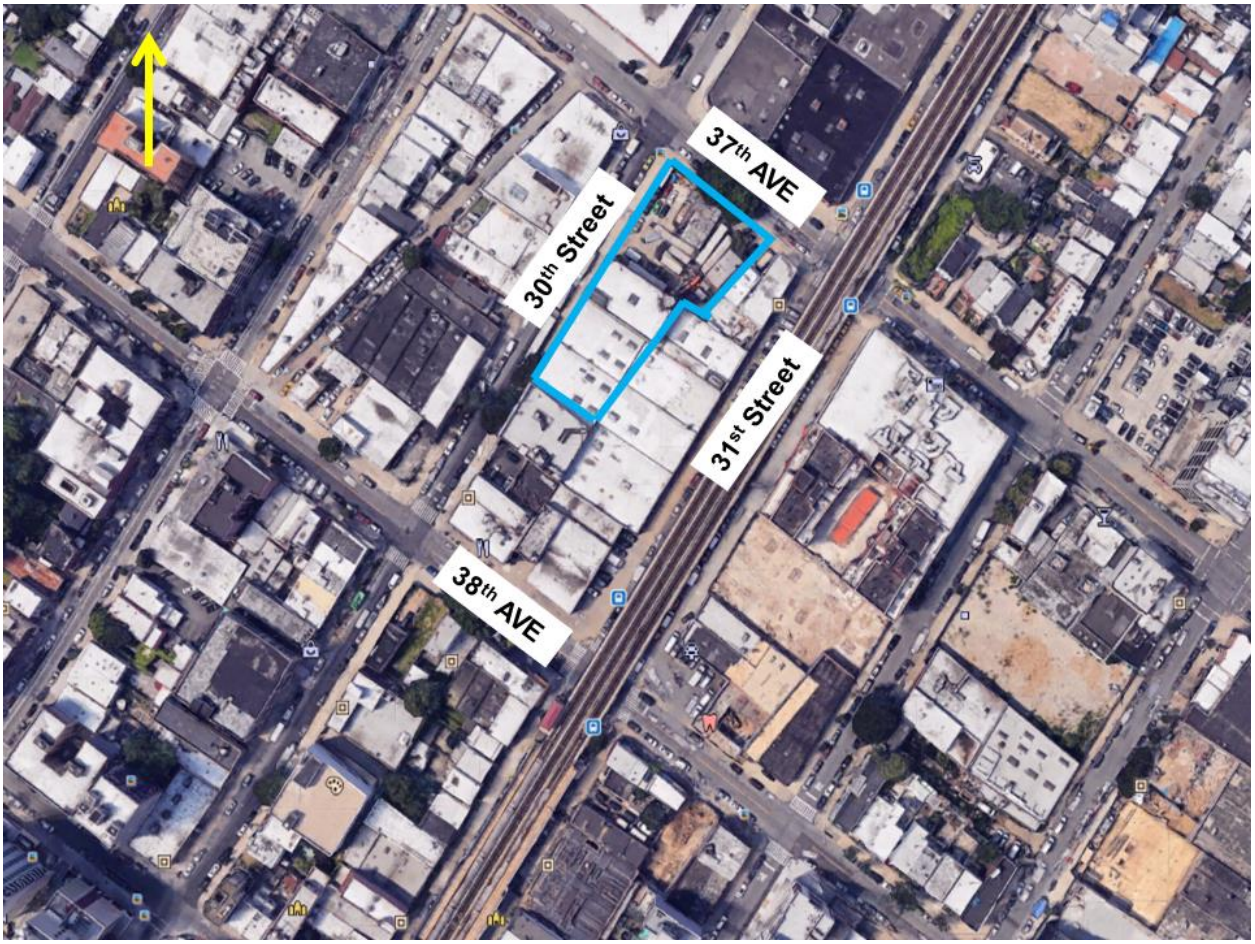
Greek National Gerald Daily
37-12 30th Street
Queens, NY 11101
Owner: Diamataris Properties Ltd.
Business #: (718) 784-5255

Supreme Glass
30-01 37th Avenue
Queens, NY 11101
Owner: WB Waerwaiss Realty LLC
Business #: (718) 729-1520

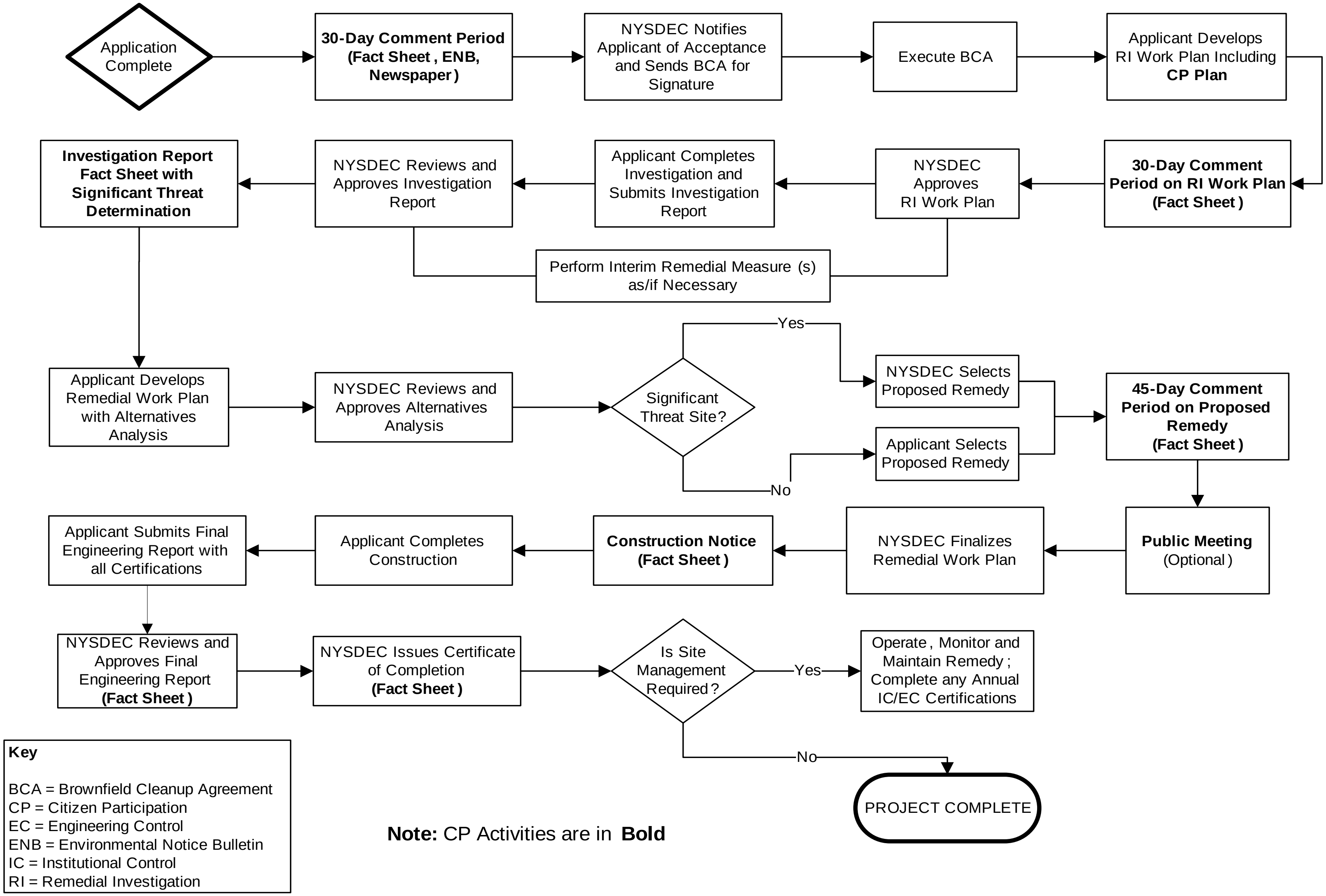
Trumbull Equities, LLC
31-10 37th Avenue
Queens, NY 11101
Owner: Trumbull Equities, LLC
(718) 392-5378

Valco Building and Maint. Supplies
37-21 31st Street
Queens, NY 11101
Alma Tower, LLC
Business #: (718) 730-1350

Appendix C - Site Location Map



Appendix D– Brownfield Cleanup Program Process



NEW YORK STATE OF OPPORTUNITY. | Department of Environmental Conservation

Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern (see instructions)

Site Name: 37-11 West 30th Street

Site Number: C241211

Site Address and County: 37-11 West 30th Street Long Island City, NY 11101

Remedial Party(ies): 37-11 Street Holdings LLC

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 information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**
After a review of previous environmental reports, potential issues of environmental and public concern were identified as: air quality, soil quality, health of workers and community, nuisance odors, noise, and construction-related traffic. These issues will be addressed in the Remedial Action Work Plan (RAWP), a Community Air Monitoring Program (CAMP) and/or a site-specific Health and Safety Plan (HASP) for the project to be approved by the New York State Department of Environmental Conservation (NYSDEC) prior to work. Air monitoring and site controls will be in place, in accordance with NYSDEC and NYSDOH regulations, to minimize the environmental impacts referenced above. In order to inform the public of ongoing environmental investigation and remediation efforts and to help alleviate associated environmental and public health concerns, all reports issued in relation to this project will be stored in the two document repositories for easy public access.

How were these issues and/or information needs identified?
The site was subject to limited-scope environmental investigations in June 2014 and December 2017, and the Remedial Investigation was performed at the site from September to October 2018 in accordance with the NYSDEC-approved September 20, 2018 RIWP. The investigations identified groundwater, soil vapor, and soil contamination, including historic fill and metals-impacted soil. Other concerns, such as worker and community health and safety, nuisance odors, noise and construction-related traffic, are predicted to be of concern during remediation of the site.

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
No additional information is needed from the community at this time.

How were these information needs identified?

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.
The community has been and will continue to be made aware of the following issues and information:

- *Contaminants of concern related to historic site use;*

- *Project contacts and ways to get information;*
- *Components of the selected remedy;*
- *Progress and major project milestones; and*
- *Remediation and construction schedule.*

Information will be communicated to the public as outlined in the Citizen Participation Plan. NYSDEC and NYSDOH contacts are provided in this CPP. Two repositories exist for the public to review documentation.

How were these issues and/or information needs identified?
They were identified through a review of media coverage, public concerns that arose during the BCP application process, available project information, and experience on similar projects.

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 at and around site:
☒ **Residential** ☐ **Agricultural** ☐ **Recreational** ☒ **Commercial** ☒ **Industrial**

b. Residential type around site:
☒ **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:
☒ **High** ☐ **Medium** ☐ **Low**

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Not required

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☒ **Yes** ☐ **No**

h. Special considerations:
☒ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
All future fact sheets will be translated into Spanish.

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. 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:** See Contact List

☒ **Media:** See Contact List

☒ **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):** See Contact List

☐ **Environmental Justice Group(s):** Click here to enter text.

☐ **Environmental Group(s):** Click here to enter text.

☒ **Civic Group(s):** See Contact List

☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

Prepared/Updated By: Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C	**Date:** January 28, 2019
Reviewed/Approved By:	**Date:**

APPENDIX F
PROJECT PERSONNEL RESUMES

WILLIAM BOHRER, PG

PROJECT GEOLOGIST

GEOLOGIST

Mr. Bohrer is an experienced geologist responsible for managing Langan's environmental standards and Health and Safety compliance for projects throughout New York City. His services include dissemination of environmental protocols, troubleshooting at project sites, in-house/field training, and maintenance of quality standards across the environmental discipline. Mr. Bohrer has a diverse and extensive background in geophysics, hydrogeology, mining and petroleum, and geotechnical engineering. He has developed conceptual site models for public, industrial and commercial facilities nationwide.

SELECTED PROJECTS

- NYU Poly – 122 Johnson Street, Brooklyn, NY
- Con Edison of New York at Governor's Island, NY, NY
- 535 4th Avenue, Brooklyn, NY
- 27 Wooster Street, New York, NY
- 42 West Street, Brooklyn, NY
- 455 West 19th Street, New York, NY
- Kings Plaza Mall, Brooklyn, NY
- Hudson Yards "Terra Firma", New York, NY
- Hudson Yards, Platform Special Inspection, New York, NY
- PSAC II, Bronx, NY
- 595-647 Smith Street, Brooklyn, NY
- New York University, 7-13 Washington Square North Investigation, New York, NY
- NYU 4 Washington Square Village, New York, NY
- 125th Street and Lenox Avenue, New York, NY
- Sullivan Street Development, New York, NY
- Hudson Crossing II, New York, NY
- New York Aquarium, Shark Tank & Animal Care Facility, Brooklyn, NY
- 209-219 Sullivan Street, New York, NY
- 261 Hudson Street, New York, NY
- 460 Washington Street, New York, NY
- 552 West 24th Street, New York, NY
- Brooklyn Bridge Park Pier 1, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- 203 East 92nd Street, New York, NY
- HighLine 28-29, New York, NY
- 539 Smith Street Bulkhead, Brooklyn, NY
- Willets Point, Corona, NY
- Plume Migration and Fracture Flow Aquifer Investigation, Brunswick, MD
- Plume Migration and Fracture Flow Aquifer Investigation, Fallston, MD
- Emergency Response Site Investigation & Remediation, Wappingers Falls, NY
- Emergency Response Site Investigation & Remediation, Allentown, PA

EDUCATION

Post Graduate Studies in Geophysics
Cornell University

B.S., Geology
Tufts University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40 Hour OSHA HazWOPER

OSHA Construction Safety & Health

OSHA Supervisory Certification Credential (TWIC)

Transportation Worker Identification

NYS DEC- Protecting New York's Natural Resources with Better Construction Site Management

AFFILIATIONS

American Association of Petroleum Geologists

National Groundwater Association

Geological Society of America

LANGAN

- Emergency Response Site Investigation & Remediation, Shamokin, PA
- Bermuda International Airport, Jet Fuel Release Investigation, Bermuda
- Little Missouri River Basin, Geotechnical Site Evaluation (Horizontal Drilling Pipeline Install), ND
- Seismic Susceptibility Evaluation (Class 2 Injection Wells), Litchfield, OH
- Bedrock Mapping, Bradford and Sullivan Counties, PA
- Soil Solidification, Carteret, NJ

PA Council of Professional Geologists

MICHAEL D. BURKE, PG, CHMM, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING AND REMEDIATION

Mr. Burke is a geologist/environmental scientist whose practice involves site investigation and remediation, transactional due diligence, environmental site assessments, in-situ remedial technology, and manufactured gas plant (MGP) site characterization and remediation. His additional services include multi-media compliance audits, sub-slab depressurization system design, non-hazardous and hazardous waste management, emergency response, community air monitoring programs, environmental and geotechnical site investigations, and health and safety monitoring. He has experience with projects in the New York State Department of Environmental Conservation (NYSDEC) and New York State Brownfield Cleanup (NYS BCP) Programs; Inactive Hazardous Waste, and Spill Programs, and New York City Office of Environmental Remediation (OER) e-designated and New York City Voluntary Cleanup Program (NYC VCP) sites.

SELECTED PROJECTS

- 227-14 North Conduit Avenue, Industrial Wastewater Compliance, Jamaica, NY
- 420 Kent Avenue, NYS Brownfield Cleanup Program, Brooklyn, NY
- 572 Eleventh Avenue, NYC VCP, New York, NY
- Monian Site A, OER E-Designated Site, New York, NY
- 537 Sackett Street, Gowanus Canal Due Diligence/MGP Site, Brooklyn, NY
- ABC Blocks 25, 26 and 27, NYS Brownfield Cleanup Program Sites, Long Island City, NY
- 432 Rodney Street, NYS Brownfield Cleanup Program, Petroleum and Chlorinated Volatile Organic Compound Investigation and Remediation, Brooklyn, NY
- 787 Eleventh Avenue, NYS Brownfield Cleanup Program Site, New York, NY
- President Street at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 22-36 Second Avenue at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 563 Sacket Street, NYS Brownfield Cleanup Program Site, MGP Investigation, and Remediation, Brooklyn, NY
- 156-162 Perry Street, NYS Brownfield Cleanup Program Site, New York, NY
- Christopher and Weehawken Streets, NYS Brownfield Cleanup Program, New York, NY
- Phelps Dodge Block 2529 (Lots 40, 50, and 45), Inactive Hazardous Waste Disposal Site, Maspeth NY
- 42-50 24th Street, NYS Brownfield Cleanup Program Site, Long Island City, NY
- Storage Deluxe (163 6th Street), OER E-Designation Site, New York, NY

EDUCATION

M.S., Environmental Geology
Rutgers University

B.S., Geological Sciences
Rutgers University

B.S., Environmental Science
Rutgers University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

Certified Hazardous Materials Manager – CHMM No. 15998

LEED Accredited Professional (LEED AP)

OSHA Certification for Hazardous Waste Site Supervisor

OSHA 29 CFR 1910.120 Certification for Hazardous Waste Operations and Emergency Response

NJDEP Certification for Community Noise Enforcement

Troxler Certification for Nuclear Densometer Training

LANGAN

- Prospect Park Redevelopment, Landfill Reclamation, Prospect Park, NJ
- 431 Carroll Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 76 4th Street Property, Gowanus Due Diligence, Brooklyn, NY
- Foxgate/MREC, Due Diligence and Solid Waste Compliance, Central Islip, NY
- 175-225 3rd Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- New York University Tandon School of Engineering, Spill Investigation/Remediation Dual Phase Recovery, and Laser Fluorescence Investigation, Brooklyn, NY
- 2420-2430 Amsterdam Avenue, NYS Brownfield Cleanup Program/Board of Standards and Appeals Variance, New York, NY
- 170 Amsterdam Avenue, NYC VCP, New York, NY
- 538-540 Hudson Street, NYS Brownfield Cleanup Program (Former Gas Station), New York, NY
- 234 Butler Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 550 Clinton Street, NYS Brownfield Cleanup Program E-Designation, Brooklyn, NY
- 111 Leroy Street, OER E-Designation Site, New York, NY
- 335 Bond Street, NYS Brownfield Cleanup Program, New York, NY
- Gowanus Canal Northside, NYS BCP Former Fuel Oil Terminal, Brooklyn, NY
- Multiple Buildings, Major Oil Storage Facility, Gowanus Canal Location, Brooklyn, NY
- 197-205 Smith Street at Gowanus Canal, MGP Due Diligence, Brooklyn, NY
- 450 Union Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- 86 Fleet Place, NYC VCP E-Designation, Brooklyn, NY
- New York University College of Nursing at 433 1st Avenue, NYS BCP, Bronx, NY
- Retail Building at 225 3rd Street, Brooklyn, NY
- 29-37 41st Avenue, NYS Brownfield Cleanup Program, Long Island City, NY
- 43-01 22nd Street, NYS Brownfield Cleanup Program, Long Island City, NY
- Compliance Audit for NYU at Washington Square Park, New York, NY
- Former Watermark Locations, NYS Brownfield Cleanup Program, Chlorinated Volatile Organic Compound Investigation and Remediation; AS/SVE, Brooklyn, NY
- Former Gas Station (1525 Bedford Avenue), Brooklyn, NY
- NYS Brownfield Cleanup Program at 514 West 24th Street, New York, NY
- Gowanus Canal Due Diligence at 76 4th Street, Brooklyn, NY
- Urban Health Plan, Medical Building, NYS Brownfield Cleanup Program CVOC Investigation and Remediation, Bronx, NY
- 420 East 54th Street, NYS Spill Closure, New York, NY
- Equity Residential at 160 Riverside Boulevard, NYS Spill Closure, New York, NY
- 357-359 West Street and 156 Leroy Street, NYC VCP, New York, NY
- Emergency Spill Response at 322 West 57th Street, Investigation and Closure, New York, NY

- Hurricane Sandy, Emergency Response at 21 West Street, New York, NY
- Hurricane Sandy, Emergency Response at 71 Pine Street, New York, NY
- Greenpoint Landing, NYC E-Designation, Brooklyn, NY
- 23-01 42nd Road, NYS Brownfield Cleanup Program, Long Island City, NY
- Greenpoint Waterfront Development, NYS Brownfield Cleanup Program, Brooklyn, NY
- 125th Street and Lenox Avenue, NYC VCP, New York, NY
- Whitehead Realty Solvent Site, Inactive Hazardous Waste site, CVOC
  Investigation and Remediation, Brooklyn, NY
- SunCap Property Group Environmental On-Call Consulting, Various Locations, Nationwide
- Consolidated Edison Company of New York, Underground Storage Tank On-Call Contract, Five Boroughs of New York City, NY
- Consolidated Edison Company of New York, Appendix B Spill Sites On-Call Contract, Five Boroughs of New York City, NY
- Meeker Avenue Plume Trackdown Site, Brooklyn, NY
- Distribution Facility, Superfund Redevelopment, Long Island City, NY
- Edison Properties, West 17th Street Development Site (Former MGP Site), New York, NY
- Con Edison on Governors Island, Dielectric Fluid Spill, Investigation and Remediation, New York, NY
- 144-150 Barrow Street, NYS Brownfield Cleanup Program, New York, NY
- West 17th Street Development, NYS Brownfield Cleanup Program, MGP Investigation and Remediation, New York, NY
- Montefiore Medical Center, Emergency Response, PCB Remediation, Bronx, NY
- New York University, 4 Washington Square Village Fuel Oil Remediation, New York, NY
- NYCSCA, Proposed New York City School Construction Sites, Five Boroughs of New York City, NY
- Con Edison, East 60th Street Generating Station, New York, NY
- Residential Building at 82 Irving Place, Environmental Remediation, New York, NY
- 1113 York Avenue, Storage Tank Closures, New York, NY
- Peter Cooper Village/Stuyvesant Town, Phase I ESA, New York, NY
- Superior Ink, Waste Characterization and Remedial Action Plans, New York, NY
- Bronx Mental Health Redevelopment Project, Phase I ESA, Bronx, NY
- 2950 Atlantic Avenue, Site Characterization Investigation, Brooklyn, NY
- Con Edison, East 74th Street Generating Station, Sediment Investigation, New York, NY
- Con Edison, First Avenue Properties, New York, NY
- Queens West Development Corp. Stage II, Long Island City, NY
- Article X Project Environmental Reviews, Various New York State Electrical Generation Sites, NY
- Poletti Generating Station, Astoria, NY
- Arthur Kill Generating Station, Staten Island, NY

- Distribution Facility, Phase I & Phase II ESA and Regulatory Compliance, Bohemia, NY
- Huntington Station Superfund Due Diligence, Huntington Station, NY
- Garvies Point Bulkhead, Glen Cove, NY
- Johnson & Hoffman Metal Stamping Facility, Environmental Compliance, Carle Place, NY
- Floral Park Storage Facility, Phase I and Phase II ESA
- Garden City Phase I ESAs at two sites, including part of a Superfund Site, Garden City, NY
- Huntington Station Storage Facility, Phase I and II ESA, Huntington Station, NY

BRIAN GOCHENAUR, QEP

SENIOR PROJECT MANAGER

ENVIRONMENTAL SCIENTIST

Mr. Gochenaur is an environmental project manager whose experience includes environmental due diligence, site investigation and remediation, fuel oil storage tank investigation and removal, soil vapor intrusion assessments, in-situ remedial technology, spill closure, vapor barrier and sub-slab depressurization system design and construction, emergency response, environmental and geotechnical site investigations, and health and safety monitoring. He has extensive experience with the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup, Voluntary Cleanup and Spill Programs and New York City Department of Environmental Protection (NYCDEP) “E” Designated and New York City Voluntary Cleanup Program (BCP) sites. His areas of expertise include Phase I Environmental Site Assessments, Phase II Site Investigations, and environmental consulting and oversight on large scale construction projects.

SELECTED PROJECTS

- 440 Washington Street, E-Designated services, New York, NY
- 3514 Surf Avenue, Tall Residential and Retail Building, Brooklyn, NY
- ARO 242 West 53, Tall Residential Building, New York, NY
- NY Aquarium Shark Exhibit, Soil Characterization and Excavation Oversight, Coney Island Neighborhood, Brooklyn, NY
- 60 West Street, Site Investigation and Redevelopment, Brooklyn, NY
- 535 4th Avenue, BCP Auto Repair Cleanup and Redevelopment, Brooklyn, NY
- 1525 Bedford Avenue, BCP Gas Station Cleanup and Redevelopment, Brooklyn, NY
- 220 Eleventh Avenue, Residential Building, New York, NY
- 432 Rodney Street, Residential Building, Brooklyn, NY
- 563 Sackett Street, Brooklyn, NY
- 362 West 125th Street, Residential Building, New York, NY
- Bedford Armory Redevelopment, Brooklyn, NY
- 268 West Street, BCP Redevelopment of Former Commercial and Industrial Site, New York, NY
- 110 125th Street, Soil Excavation and Remediation, New York, NY
- Former Roseland Ballroom Redevelopment, Soil Characterization and Excavation Oversight, New York, NY
- 42 Crosby Street, “E” Designated Site Investigation and Remediation, New York, NY
- New York School Construction Authority, Various Locations, In-House Environmental Consulting, Five Boroughs of New York City
- EZ Serve Portfolio, GE Capital, Various Phase II Site Investigations, FL, GA, LA, and MS
- Beth Elohim Child Daycare Center, Lead Based Paint Abatement, Brooklyn, NY
- Price Battery, Environmental Protection Agency (EPA) Lead Fallout Superfund Site, Hamburg, PA

EDUCATION

B.S., Environmental Science
University of Florida

PROFESSIONAL REGISTRATION

Qualified Environmental Professional (QEP) certified by the Institute of Professional Environmental Practice

40-Hour OSHA (HAZWOPER)

- Clark Portfolio, GE Capital, Various Phase II Locations, MI, IL, ID, and OH
- Tops Plaza Portfolio, Prudential Real Estate Investors, Various Phase II Locations, NY
- Cingular Wireless Portfolio, Cingular Wireless, Various Locations Phase I and II Locations, WA
- Queens Center Mall Expansion, Remedial Oversight, Elmhurst, NY
- Soka Gakkai International-USA, Cultural Center, Brooklyn, NY

JASON J. HAYES, PE, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING

Mr. Hayes has experience in New York, New Jersey, Washington D.C., California, Washington, Oregon, Alaska, and Internationally. His experience includes Environmental Protection Agency (EPA), New York State (NYS) Brownfields applications, investigation, and remediation; New York City Department of Environmental Protection (NYCDEP) and New York City Office of Environmental Remediation (OER) E-designated site applications, investigations, and remediation. His expertise also includes Phase I and II Environmental Site Investigations and Assessments; contaminated building cleanup and demolition; Underground Storage Tank (UST) permitting, removal specifications, and closure reporting; soil vapor intrusion investigation and mitigation system design (depressurization systems, etc.); development of groundwater contaminant plume migration models; environmental analysis; and oversight, design and specification generation for remediation operations with contaminants of concern to include polychlorinated biphenyls (PCBs), solvents, mercury, arsenic, petroleum products, asbestos, mold and lead.

SELECTED PROJECTS

- Confidential Location (Remediation for Mercury-Contaminated Site), New York, NY
- Confidential Location (Phase II ESI and Remedial Design for Mercury Impacted Site), Brooklyn, NY
- NYC School Construction Authority (PCB Remediation), Various Locations, New York, NY
- 28-29 High Line (Phase I ESA, Phase II ESI, and Environmental Remediation), New York, NY
- Georgetown Heating Plant (Phase II ESI and Remedial Design for Mercury Impacted Site), Washington D.C.
- 268 West Street (BCP Application, RI and RIWP), New York, NY
- Confidential Multiple Mixed-Use Tower Location (BCP Application, RI, Phase I ESA, and Phase II ESI), New York, NY
- Dock 72 at Brooklyn Navy Yard, (NYS Voluntary Cleanup Program), Brooklyn, NY
- 27-21 44th Drive (BCP Application, Remedial Investigation Phase I ESA, and Phase II ESI), Long Island City, NY
- Purves Street Development, BCP Application, RAWP, and Phase II ESI, Long Island City, NY
- 267-273 West 87th Street (BCP Application, Remedial Investigation, RIWP, RAWP), New York, NY
- New York Aquarium, Shark Tank and Animal Care Facility (Environmental Remediation), Coney Island, NY
- International Leadership Charter School (Environmental Remediation), Bronx, NY
- West & Watts (BCP Application), New York, NY
- Hudson Yards Redevelopment (Phase I ESA and Phase II ESI), New York, NY

EDUCATION

M.S., Environmental Engineering Columbia University

B.S., Chemistry, Environmental Toxicology Humboldt State University

Business Administration (minor) Humboldt State University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

LEED Accredited Professional (LEED AP)

Troxler Certification for Nuclear Densometer Training

CPR and First Aid Certification

OSHA 40-Hour HAZWOPER

OSHA HAZWOPER Site Supervisor

AFFILIATIONS

US Green Building Council, NYC Chapter (USGBC), Communications Committee

- 627 Smith Street (RI and Report), Brooklyn, NY
- Gateway Center II Retail (Phase I ESA and Phase II ESI), Brooklyn, NY
- 261 Hudson Street (Phase I ESA, Phase II ESI, BCP, and RAWP), New York, NY
- Riverside Center, Building 2 (BCP, Phase I ESA and Phase II ESI), New York, NY
- New York Police Academy, (Sub-Slab Depressurization and Vapor Barrier System), College Point, NY
- Bronx Terminal Market (BCP, RIWP, RAWP, Phase I ESA and Phase II ESI), Bronx, NY
- Jacob Javits Convention Center (Phase I ESA and Phase II ESI), New York, NY
- Yankee Stadium Development Waterfront Park (NYSDEC Spill Sites), Bronx, NY
- Bushwick Inlet Park (Phase I ESA, Approvals for NYC E-Designation), Brooklyn, NY
- Silvercup West (BCP, RIWP, RIR, RAWP, and RAA), Long Island City, NY
- 29 Flatbush, Tall Residential Building (Groundwater Studies, RIR and RAWP), Brooklyn, NY
- Gowanus Village I (BCP, RIWP and RIR), Brooklyn, NY
- Sullivan Street Hotel (Site Characterization Study and Owner Representation), New York, NY
- Riker's Island Co-Generation Plant (Soil and Soil Vapor Quality Investigations), Bronx, NY
- The Shops at Atlas Park (Sub-Slab Depressurization and Vapor Barrier Design), Glendale, NY
- Memorial Sloan-Kettering Cancer Center (Subsurface and Soil Vapor Intrusion Investigations), New York, NY
- Element West 59th Street (Oversight and Monitoring of Sub-Slab Depressurization and Vapor Barrier Systems), New York, NY
- Teterboro Airport (Delineation and Remedial Oversight of Petroleum-Contaminated Soils), Teterboro, NJ
- Proposed New York JETS Stadium (Phase I ESA), New York, NY
- Former Con Edison Manufactured Gas Plant Sites (Research Reports), New York, NY
- 7 World Trade Center (Endpoint Sampling and Final Closure Report), New York, NY
- Peter Cooper Village, Environmental Subsurface Investigations, New York, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

NYC Mayor's Office of Environmental Remediation – Big Apple Brownfield Workshop – Presented on Soil Vapor Intrusion Remedies (e.g., SSD Systems, Vapor Barriers, Modified HVAC)

New York City Brownfield Partnership – Presented on environmental considerations and complications of the Hudson Yards Development

Urban Land Institute (ULI), member

Commercial Real Estate Development Associations (NAIOP), member

NYC Brownfield Partnership, member

Waterfront Development Technical Course – Presented on Impacted Waterfront Planning Considerations

RYAN MANDERBACH, CHMM

SENIOR ASSOCIATE/VP

ENVIRONMENTAL ENGINEERING & SITE ASSESSMENTS

Mr. Manderbach has experience in New York, New Jersey, Massachusetts, Maine, Rhode Island, New Hampshire, and Connecticut. His recent experience includes New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup, Voluntary Cleanup and Spill Programs, and New York City Office of Environmental Remediation (OER) E-designated site investigation, and remediation. He has managed and performed Phase I and II Environmental Site Assessments; Underground Storage Tank (UST) removals and closures; soil vapor intrusion investigations; and site investigations and remediation. He also has extensive experience with Hazard Ranking System (HRS) evaluations, site assessments, removal actions, and emergency response activities under the EPA Regions I and II Superfund program.

SELECTED PROJECTS

- Brownfield Redevelopment, 520 West 41st Street, New York, NY
- Riverside Parcel 1, 3, 4 and 5, Mixed-Use Development, New York, NY
- Brownfield Redevelopment, 267-273 West 87th Street, New York, NY
- Brownfield Redevelopment, 225 33rd Street, Brooklyn, NY
- River Place Residential, SMP Implementation, New York, NY
- Mixed-Use Educational/Residential Development, New York, NY
- Public Safety Answering Center (PSAC) II, Bronx, NY
- American Copper Buildings (616 First Avenue), New York, NY
- Environmental Assessments at 430 East 92nd Street, New York, NY
- Environmental Assessments at 125th Street and Lenox, New York, NY
- Hotel at 70 Park Avenue, New York, NY
- Environmental Due Diligence at Mixed-Use Development, 85 Jay Street, Brooklyn, NY
- 346 Broadway Due Diligence, New York, NY
- Liberty Brass Site, 38-01 Queens Boulevard, Long Island City, NY
- Environmental Remediation, 42 West Street Residential, Brooklyn, NY
- Brownfield Redevelopment, 335 Bond Street, Brooklyn, NY
- Residences at 540 West 21st Street, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- President Street Properties, Brooklyn, NY
- Residential Development, 43-30 24th Street, Long Island City, NY
- Mixed-Use Condominium, 505-513 West 43rd Street, New York, NY
- 685 First Avenue, New York, NY
- Columbia University, Manhattanville Development, New York, NY
- The Shops at Atlas Park, Glendale, NY
- 536 West 41st Street, New York, NY
- Shore Parkway, Brooklyn, NY
- 100 West 125th Street, New York, NY

EDUCATION

B.A., Environmental Analysis and Policy
Boston University

PROFESSIONAL REGISTRATION

Certified Hazardous Materials Manager (CHMM)

40 Hour HAZWOPER

AFFILIATIONS

New York Building Congress (NYBC), Young Professionals Committee

American Council of Engineering Companies of New York (ACEC NY) – Emerging Leaders Committee

LANGAN

- 11 North Moore Street, New York, NY
- 290 West Street, New York, NY
- City University of New York (CUNY), John Jay College Expansion, New York, NY
- Queens West Development, Long Island City, NY
- United Nations Capital Master Plan, New York, NY
- Former Air Products and Chemicals, Inc. Facility, Middlesex, NJ
- Lower Manhattan Indoor Dust Test and Clean Program, New York, NY
- Former Buckbee-Mears Facility, Cortland, NY
- Old Landfill, Norton, MA
- Boulter Farm Area, Cumberland, RI
- Hollingsworth & Vose Co., Walpole, MA
- Chlor-Alkali Facility (Former), Berlin, NH
- Limerick Mill Complex, Limerick, ME
- Danielson Pike Chlorinated Solvent Sites, Scituate, RI
- Tiogue Lake Sediment Contamination Site, Coventry, RI
- Atlas Copco Sites, Holyoke, MA
- Fisherville Mill, Grafton MA
- Hurricane Katrina Federal Disaster Response, New Orleans, LA
- Hurricane Ike Federal Disaster Response, Pasadena, TX

Anthony Moffa, Jr., ASP, CHMM, COSS

Associate/Corporate Health and Safety Manager

20 years in the industry

Mr. Moffa is Langan's Corporate Health & Safety Manager and is responsible for managing health and safety compliance in all Langan office locations. He has over 20 years' experience in the health and safety field. He is responsible for ensuring compliance with all federal and state occupational health and safety laws and development and implementation of corporate health and safety policies. Responsibilities include reviewing and updating Langan's Corporate Health and Safety Program and assisting employees in the development of site specific Health & Safety Plans. He maintains and manages health and safety records for employees in all Langan office locations including medical evaluations, respirator fit testing, and Hazardous Waste Operations and Emergency Response training. He is also responsible for documentation and investigation of work-related injuries and incidents and sharing this information with employees to assist in the prevention of future incidents. He is also the chairman of the Corporate Health & Safety Committee and Health & Safety Leadership Team that meet periodically throughout the year. He is responsible for coordinating and providing health and safe training to Langan employees. He was formerly the Environmental, Health and Safety Coordinator at a chemical manufacturer. His experience included employee hazard communications, development of material safety data sheets for developed products, respirator fit testing and conducting required Occupational Health & Safety Association and Department of Transportation training.

Selected Projects

Verizon - Pennsylvania, Inc. Philadelphia Naval Yard, PA
Confidential Client, Philadelphia, PA
Penn Color, Doylestown, PA
Verizon - Pennsylvania, Inc., Phase I Environmental Assessment, Lansdowne, PA
Verizon - Pennsylvania, Inc. (formerly Bell Atlantic Corporation), Various Locations, PA
Kinder Morgan Bulk Terminals, Inc. Fairless Hills, PA
PP&L – Martins Creek, Bangor, PA
Concord Beverage Company, Concordville, PA
Penn Color, Hatfield, PA
National Starch & Chemical Company, Bloomfield, NJ
Air Products and Chemicals, Inc.., Middlesex, NJ
PSEG Services Corporation, Jersey City, NJ
Sampson Coatings, Richmond, VA
Custom Chemicals Corporation, Elmwood Park, NJ

Education

B.S., Physics
West Chester University

Professional Registration

Associate Safety Professional (ASP)

Certified Hazardous Material Manager (CHMM)

Certified Occupational Safety Specialist (COSS)

Affiliations

Pennsylvania Chamber of Business & Industry

Chemical Council of New Jersey

New Jersey Business & Industry Association

Geoprofessional Business Association

Certifications and Training

Hazardous Waste Operations and Emergency Response Training

OSHA Site Supervisor Training

10 & 30-Hour Construction Safety & Health Training

30-Hour Construction Safety & Health Training

10-Hour Industry Safety & Health Training

Confined Space Awareness & Entry

Competent Person in Excavations

Hazard Communications

Defensive Driving Training

LANGAN

EMILY L. SNEAD, PG

PROJECT SCIENTIST

ENVIRONMENTAL ENGINEERING

Ms. Snead brings field experience and technical expertise to environmental investigations and remediation projects. She has independently performed Phase I and Phase II assessments and investigations, UST removals and closures, remedial excavations, vapor extractions, and ISCO injections. She excels at project research, environmental sampling, remedial oversight, proposal and report preparation. Her projects have included hospital centers, day care facilities, residential buildings, chemical plants, and commercial/industrial sites throughout New York City and the Tri-State area. Prior to her career in Environmental Consulting, Ms. Snead conducted research with NASA and performed construction oversight management in the Cayman Islands.

SELECTED PROJECTS

- Silvercup West, Brownfield Cleanup Site, Long Island City, NY
- Highline 28-29 Development, PCE-Contaminated Soil Delineation and Implementation of Bioaugmentation Remediation, New York, NY
- 295 Locust Avenue, Soil Excavation/Trucking, Monitoring Well Decommissioning, Groundwater Sampling and SMP inspections, Bronx, NY
- Hotel Trades Union (620 Fulton Street), Hazardous Lead Soil removal, UST closure and Soil Management Report Brooklyn, NY
- 743 Fifth Avenue, Soil Management Report, New York, NY
- Suncap Facility, UST Investigations and Test Pit Explorations, Yonkers, NY
- New York University (383 Lafayette Street), Hazardous Lead Soil Removal and UST Closure New York, NY
- 601 Washington Street, Remedial Excavation, Groundwater ISCO Treatment, and Installation of an Active SMD System, New York, NY
- NYC OER E-Designated site (50 Hudson Yards/2 Hudson Boulevard), Remedial Investigation, Remedial Excavation Oversight, and Closure Reporting, New York, NY
- Riverside Center Parcel 1, VCP Site Remedial Excavation, UST Closure, Spill Investigation and Closure, and Reporting, New York, NY
- Riverside Center Parcels 3 and 4, VCP Site Remedial Excavation, UST Closure, New York, NY
- Bronx Terminal Market, Triennial SMP Reporting and Annual Inspections, Bronx, NY
- 616 First Avenue, VCP Program Includes Remedial Excavation Oversight, SMP Annual Inspections, Reporting, New York, NY
- Luxury Car Dealership (787 Eleventh Avenue), Spill Investigation and UST Closure, New York, NY
- 335 Bold Street, Phase II and BCP Application, Brooklyn, NY
- President Street Properties, Phase II Investigation and BCP Application, Brooklyn, NY
- 38-01 Queens Boulevard Due Diligence, Long Island City, NY

EDUCATION

B.S., Environmental Science & Geology
Northeastern University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40-Hour OSHA HAZWOPER

8-Hour OSHA HAZWOPER Refresher

10-Hour OSHA Construction Safety Training

DOT Hazardous Materials Shipping Training

First Aid/ CPR Training

AFFILIATIONS

NAIOP New York City Chapter, member

Urban Land Institute (ULI), Member

LANGAN

- 250 Water Street, Phase II Investigation, New York, NY
- 139 East 56th Street, Joint Geotechnical and Environmental Waste Characterization, New York, NY
- Le Soleil d'Or Boutique Hotel, Cayman Brac, Cayman Islands
- Columbia University Medical Center, Phase I and II Environmental Site Investigation Nursing School, New York, NY
- Consolidated Edison of NY, Remedial Investigation and RIR Investigation, New York, NY
- 11-09 Borden Avenue, MTA Bridges and Tunnels/Borden Avenue ISCO Remediation, Disposal of Petroleum-Impacted Soil, Long Island City, NY
- Columbia University Medical Center, Removal of a 1,000-gal UST and Closure Report, New York, NY
- Children's Aid Society (910 East 172nd Street), Oversight of the VEFR and Collection of Groundwater Samples New York, NY
- New York City Housing Authority, Community Air Monitoring Program and Environmental Oversight, Bronx, NY
- YRC Freight Newtown Creek EPA RFI, Brooklyn, NY
- 522-532 West 29th Street Redevelopment, Phase II Site Investigation and RAWP New York, NY
- Memorial Sloan-Kettering Cancer Center Ambulatory Surgery Building, Community Air Monitoring Program, New York, NY
- Keith Hilltop Terrace Apartments, Phase I and II Environmental Site Assessment, Altoona, PA
- Southern Boulevard Phase II ESA, Bronx, NY
- Former Auto Dealership, Remedial Investigation and Delineation of Polycyclic Aromatic Hydrocarbons (PAHs), Paramus, NJ
- 711 11th Avenue, Former Auto Dealership, Chrysler Group LLC, Phase I and Limited Phase II Due Diligence Investigation, New York, NY
- 37-14 36th Street, Field Investigations Silver Star-Mercedes Benz, Long Island City, NY
- Otto Pehle Park, Bergen County Health Department, Groundwater Sampling and Ecological Surveys, Paramus, NJ
- Bay Park Brownfield Redevelopment, Installation of Sub-Slab Depressurization System, Coney Island, Brooklyn, NY
- PQ Corporation, Oversight of Remedial Action Field Activities, Rahway, NJ
- Post-Graduate Center for Mental Health (304 Echo Place), Phase I and Limited Phase II Due Diligence Investigation, Bronx, NY
- Air Quality Monitoring, Sweeny & Conroy, Inc., New York, NY
- Former Auto Dealership, Chrysler Group LLC, Phase I and Limited Phase II Due Diligence Investigation, New York, NY
- New York Life Investment Management, Phase II Environmental Site Assessment, Jessup, MD
- 366 Broadway, Former Brunswick Hospital Campus, 25,000-Gallon UST Removal, Amityville, NY

EMILY G. STRAKE

PROJECT CHEMIST / RISK ASSESSOR

ENVIRONMENTAL ENGINEERING

Ms. Strake has 17 years of environmental chemistry, risk assessment, auditing, and quality assurance experience. Most recently, she has focused her efforts on human health risk assessment, and has been the primary author or key contributor of risk assessment reports and screening evaluations for projects governed under RCRA, CERCLA, NJDEP, DNREC, SWRCB, DTSC, PADEP, CTDEEP, ODEQ, NYSDEC and MDE. She has experience in site-specific strategy development, which has enabled her to perform assessments to focus areas of investigation and identify risk-based alternatives for reducing remediation costs. Ms. Strake is a member of the Interstate Technology and Regulatory Council Risk Assessment Team responsible for the development and review of organizational risk assessment guidance documents and serves as a National Trainer in risk assessment for the organization.

Ms. Strake has extensive experience in environmental data validation, focused on ensuring laboratory deliverables follow specific guidelines as described by regulatory agencies and the analytical methods employed. In addition, she has experience in EQuIS chemical database management. She also has a broad range of environmental field experience and maintains current OSHA HAZWOPER certification. Ms. Strake is experienced in auditing laboratory and field-sampling activities for compliance with Quality Assurance Project Plans (QAPPs), the National Environmental Laboratory Accreditation Conference Standards Quality Systems manual, and applicable USEPA Guidance. Ms. Strake has also audited on-site laboratories in support of groundwater treatment operations and implemented corrective actions. Her responsibilities include writing reports on the value of laboratory work, writing/editing QAPPs for clients and project-specific sites, peer reviewing colleague’s work, and mentoring staff within the office. She has also served as the Quality Assurance officer for several long-term projects, responsible for the achievement of all forms of Quality Control/Quality Assurance by onsite personnel relating to sampling, analysis, and data evaluation.

SELECTED PROJECTS

- Sunoco Refineries, Various Locations
- PECO/Exelon, Various Locations
- Avon, Rye, NY
- Honeywell, Highland Park, NJ
- Delaware City Refinery, DE
- Major League Soccer’s San Jose Earthquakes Stadium, Santa Clara, CA
- DuPont, Waynesboro, VA
- Texas Instruments, San Francisco, CA
- Regency, Philadelphia, PA
- Veteran’s Affairs, Palo Alto, CA
- DOW Chemical, Various Locations
- Golden Gate National Parks Conservancy, San Francisco, CA
- Occidental Chemical, Bakersfield, CA

EDUCATION

MBA
The University of Scranton

B.S., Chemistry
Cedar Crest College

PROFESSIONAL REGISTRATION

Board Certified Environmental Professional (CEP)

TRAINING

40 HR OSHA HAZWOPER Training/Nov 2002

8 HR HAZWOPER Supervisor/June 2004

8 HR OSHA HAZWOPER Refresher/2013

AFFILIATIONS

The Society for Risk Analysis

Interstate Technology and Regulatory Council

- Floreffe Terminal, Pittsburgh, PA
- Ryder, Hartford, CT
- Rohm and Haas, Philadelphia, PA

APPENDIX G
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

for

37-11 30th STREET
LONG ISLAND CITY, NEW YORK
BCP Site No. C241211

Prepared For:
37-11 30th Street Holdings LLC
c/o Slate Property Group
38 East 29th Street
New York, New York

Prepared By:
Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
21 Penn Plaza
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New York, New York 10001

January 28, 2019
Langan Project No. 170512301

LANGAN

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is for the 26,978 -square-foot site located at 37-11 30th Street and 30-14 37th Avenue in the Long Island City neighborhood of Queens, New York (the site). The Volunteer, 37-11 30th Street Holdings LLC, was accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) to investigate and, where necessary, remediate the site in conjunction with new development under a NYSDEC Brownfield Cleanup Agreement (BCA) for Site No. C241211, dated July 9, 2018. Additional site information, including site maps, is provided in the NYSDEC-approved September 20, 2018 Remedial Investigation Work Plan (RIWP) and Remedial Action Work Plan (RAWP).

This QAPP specifies analytical methods to be used to ensure that data from the proposed Remedial Action (RA) at the Site are precise, accurate, representative, comparable, and complete.

1.2 PROJECT OBJECTIVES

The environmental objectives of this RAWP are to achieve a Track 1 cleanup under the New York State Brownfield Cleanup Program which includes the following:

- Excavation as described herein and off-site disposal of soil/fill to about 15 feet below grade surface (bgs) site-wide and disposal of a hazardous chromium hot-spot area.
- Prevent ingestion and direct contact with contaminated soil.
- Prevent contact with or inhalation of volatiles from contaminated groundwater.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminated soil.
- Prevent impacts to biota from ingestion and direct contact with the contaminated soil.

These objectives have been established in order to protect public health and the environment for the anticipated mixed-use development at the Site.

1.3 SCOPE OF WORK

Implementation of the Remedial Action (RA) is described in detail in the RAWP. All remedial work will be overseen by Langan on behalf of the 37-11 30th Street Holdings LLC. The Proposed RA consists of the following:

- Development and implementation of a Construction Health and Safety Plan (CHASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers, community/residents, and environment during remediation and construction activities.
- Abatement of hazardous materials (including asbestos containing materials [ACM] identified in building materials, lead based paint [LBP], PCB-laden material, and other universal waste and miscellaneous hazardous waste articles) and demolition of existing buildings in order to prepare the site for remediation (see Appendix B for asbestos abatement report and demolition plans).
- Construction of the support of excavation (SOE) system to facilitate the Track 1 remediation.
- Implementation of soil erosion, pollution and sediment control measures in compliance with applicable laws and regulations.
- Excavation, stockpiling, off-site transport, and disposal of about 15,000 cubic yards of historic fill and native soil that exceeds Unrestricted Use (UU) Soil Cleanup Objectives (SCOs) as defined by 6 NYCRR Part 375-6.8.
- Excavation and disposal of hazardous chromium hotspot (centered on soil borings SB04/SB04A), which exceeds the Track 1 SCOs), to a depth of up to eight feet bgs. This area covers a roughly 18-foot by 15-foot region in the northeast part of the 3-story vacant warehouse building.
- Removal of any encountered USTs and/or associated appurtenances (e.g., fill lines, vent line, and electrical conduit) and decommissioning/ disposal off-site during site redevelopment in accordance with DER-10, 6 NYCRR Part 613.9, NYSDEC CP-51, and other applicable NYSDEC UST closure requirements.
- Screening for indications of contamination (by visual means, odor, and monitoring PIDs) of excavated material during intrusive site work.
- Appropriate off-site disposal of material removed from the site in accordance with federal, state and local rules and regulations for handling, transport, and disposal.
- Backfilling of remediated areas to development sub-grade with certified-clean material (i.e., material meeting UU SCOs), virgin stone, or recycled concrete aggregate (RCA).
- Collection and analysis of documentation soil samples in accordance with DER-10 to confirm a Track 1 remedy was achieved; over-excavation would be required as necessary to meet Track SCOs.
- Mechanical ventilation of enclosed subgrade parking garages that are proposed in future on-site buildings, to mitigate any potential residual soil vapor intrusion.

- Development and execution of plans for the protection of on-site workers, the community, and the environment during the remediation phase of development.

2.0 DATA QUALITY OBJECTIVES AND PROCESS

Data Quality Objectives (DQOs) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. The sampling program will also provide for collection of soil, soil vapor, indoor air, or groundwater samples as part of a future need for sampling. DQOs for sampling activities are determined by evaluating five factors:

- Data needs and uses: The types of data required and how the data will be used after it is obtained.
- Parameters of Interest: The types of chemical or physical parameters required for the intended use.
- Level of Concern: Levels of constituents, which may require remedial actions or further investigations.
- Required Analytical Level: The level of data quality, data precision, and QA/QC documentation required for chemical analysis.
- Required Detection Limits: The detection limits necessary based on the above information.

The quality assurance and quality control objectives for all measurement data include:

- **Precision** – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and/or matrix spike duplicates.
- **Accuracy** – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. For soil and groundwater samples, accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), internal standards, laboratory method blanks, instrument calibration, and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.

For soil vapor or air samples, analytical accuracy will be assessed by examining the percent recoveries that are added to each sample, internal standards, laboratory method blanks, and instrument calibration.

- **Representativeness** – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is accomplished by following all applicable methods, laboratory-issued standard operating procedures (SOPs), the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

- **Completeness** – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.

- **Comparability** – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis as documented in the QAPP, using standard reporting units and reporting formats, and data validation.

- **Sensitivity** – the ability of the instrument or method to detect target analytes at the levels of interest. The project manager will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection.

3.0 PROJECT ORGANIZATION

Any future remedial activities and investigations will be overseen by Langan or another environmental consultant for the Volunteer or a future owner. The environmental consultant will also arrange data analysis and reporting tasks. The analytical services will be performed by an ELAP-certified laboratory. Data validation services will be performed by approved data validation contractor(s).

For the required sampling as stated in the IRM Work Plan, sampling will be conducted by Langan, the analytical services will be performed by Alpha Analytical Laboratories, Inc. of Westborough, Massachusetts (NYSDOH ELAP certification number 11148). Data validation services will be performed by Emily Strake; résumé attached (Attachment A).

Key contacts for this project are as follows:

37-11 30th Street Holdings LLC	Mr. David Schwartz Telephone: (646) 762-1429
Langan Project Manager:	Mr. Brian Gochenaur Telephone: (212) 479-5479
Langan Quality Assurance Officer (QAO): Résumé attached (Attachment A)	Mr. Michael Burke, CHMM Telephone: (212) 479-5582
Program Quality Assurance Monitor:	Mr. Jason Hayes Telephone: (212) 479-5427
Data Validator:	Ms. Emily Strake Telephone: (215) 491-6526
Laboratory Representative:	Mr. Ben Rao Telephone: (201) 847-9100
Field Personnel: Résumé attached (Attachment A)	Ms. Emily Snead Telephone: (212) 479-5432

4.0 QUALITY ASSURANCE OBJECTIVES FOR COLLECTION OF DATA

The overall quality assurance objective is to develop and implement procedures for sampling, laboratory analysis, field measurements, and reporting that will provide data of sufficient quality to evaluate the engineering controls on the site. The sample set, chemical analysis results, and interpretations must be based on data that meet or exceed quality assurance objectives established for the site. Quality assurance objectives are usually expressed in terms of accuracy or bias, sensitivity, completeness, representativeness, comparability, and sensitivity of analysis. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

4.1 PRECISION

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates. Laboratory precision and sample heterogeneity also contribute to the uncertainty of field duplicate measurements. This uncertainty is taken into account during the data assessment process. For field duplicates, results less than 2x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2x the RL and acceptable based on professional judgment. For results greater than 2x the RL, the acceptance criteria is a relative percent difference (RPD) of ≤50% (soil and air), <30% (water). RLs and method detection limits (MDL) are provided in Attachment B.

4.2 ACCURACY

Accuracy is the measurement of the reproducibility of the sampling and analytical methodology. It should be noted that precise data may not be accurate data. For the purpose of this QAPP, bias is defined as the constant or systematic distortion of a measurement process, which manifests itself as a persistent positive or negative deviation from the known or true value. This may be due to (but not limited to) improper sample collection, sample matrix, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques.

Accuracy in the field is assessed through the use of field blanks and through compliance to all sample handling, preservation, and holding time requirements. All field blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field blank will be evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias. Trip blanks are not required for non-aqueous matrices but are planned for non-aqueous matrices where high concentrations of VOCs are anticipated.

Laboratory accuracy is assessed by evaluating the percent recoveries of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control samples (LCS), surrogate compound recoveries, and the results of method preparation blanks. MS/MSD, LCS, and surrogate percent recoveries will be compared to either method-specific control limits or laboratory-derived control limits. Sample volume permitting, samples displaying outliers should be reanalyzed. All associated method blanks should be non-detect when analyzed by the laboratory.

4.3 COMPLETENESS

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;

- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and

- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Air, soil vapor, soil, and groundwater data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for a determination of compliance will also be evaluated.

4.4 REPRESENTATIVENESS

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 within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable SOPs and this QAPP. All field technicians will be given copies of appropriate documents prior to sampling events and are required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable EPA methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

4.5 COMPARABILITY

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the sampling plan is followed and that sampling is performed according to the SOPs or other project-specific procedures. Analytical data will be comparable when similar sampling and analytical methods are used as documented in the QAPP. Comparability will be controlled by requiring the use of specific nationally-recognized analytical methods and requiring consistent method performance criteria. Comparability is also dependent on similar quality assurance objectives. Previously collected data will be evaluated to determine whether they may be combined with contemporary data sets.

4.6 SENSITIVITY

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest. The project director will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the project director will select the level of data assessment to ensure that only data meeting the project DQOs are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

Analytical methods and quality assurance parameters associated with the sampling program are presented in Attachment C. The frequency of associated field blanks and duplicate samples will be based on the recommendations listed in DER-10, and as described in Section 5.3.

Site-specific MS and MSD samples will be prepared and analyzed by the analytical laboratory by spiking an aliquot of submitted sample volume with analytes of interest. Additional sample volume is not required by the laboratory for this purpose. An MS/MSD analysis will be analyzed at a rate of 1 out of every 20 samples, or one per analytical batch. MS/MSD samples are only required for soil and groundwater samples.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10/Technical Guidance for Site Investigation and Remediation (May 2010). The following sections describe procedures to be followed for specific tasks.

5.1 FIELD DOCUMENTATION PROCEDURES

Field documentation procedures will include summarizing field data in field books and proper sample labeling. These procedures are described in the following sections.

5.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability, and secure page binding. The pages of the notebook will not be removed.

Entries will be made in waterproof, permanent blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number
- Reasons for being on-site or taking the sample
- Date and time of activity
- Sample identification numbers
- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate
- Physical location of sampling locations such as depth below ground surface
- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures

- Description of the sample including physical characteristics, odor, etc.

- Readings obtained from health and safety equipment

- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample

- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera

- Other pertinent observations such as the presence of other persons on the site, actions by others that may affect performance of site tasks, etc.

- Names of sampling personnel and signature of persons making entries

Field records will also be collected on field data sheets including boring logs, which will be used for geologic and drilling data during soil boring activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

5.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number in accordance with the sample nomenclature guidance included in Attachment D, and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

5.2 EQUIPMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

A PID will be used during the sampling activities to evaluate work zone action levels and screen soil samples. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site HSO, and will be accomplished by following the procedures outlined in the operating manual for the instrument. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration

- Type of equipment serviced and identification number (such as serial number)
- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled and unscheduled maintenance.

5.3 SAMPLE COLLECTION

Soil Samples

Soil samples will be visually classified and field screened using a PID to assess potential impacts from VOCs and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using either EnCore® or Terra Core® sampling equipment. For analysis of non-volatile parameters, samples will be homogenized and placed into glass jars. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected soil sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

Sample Field Blanks and Duplicates

Field blanks will be collected for quality assurance purposes at a rate of one per 20 soil investigations samples per analysis. Field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blank samples will be analyzed for the complete list of analytes on the day of sampling. Trip blanks will be collected at a rate of one per day if soil samples are analyzed for VOCs during that day.

Duplicate soil samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 investigative soil samples per analysis and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

Groundwater Samples

Groundwater sampling will be conducted using USEPA's Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples From Monitoring Wells, revised September 19, 2017.

During purging, field parameters should be measured, including: water level drawdown, purge rate, pH, specific conductance, temperature, dissolved oxygen, turbidity and oxidation-reduction-potential (ORP), every five minutes using a water quality meter (Horiba U-52 or similar) and a depth-to-water interface probe that should be decontaminated between wells. Samples should generally not be collected until the field parameters have stabilized. Field parameters will be considered stable once three sets of measurements are within ±0.1 standard units for pH, ±3% for conductivity and temperature, ±10 millivolts for ORP, and ±10% for turbidity and dissolved oxygen. Purge rates should be adjusted to keep the drawdown in the well to less than 0.3 feet, as practical. Additionally, an attempt should be made to achieve a stable turbidity reading of less than 10 Nephelometric Turbidity Units (NTU) prior to sampling. If the turbidity reading does not stabilize at reading of less than 10 NTU for a given well, then both filtered and unfiltered samples should be collected from that well. If necessary, field filtration should be performed using a 0.45 micron disposable in-line filter. Groundwater samples should be collected after parameters have stabilized as noted above or the readings are within the precision of the meter. Deviations from the stabilization and drawdown criteria, if any, should be noted on the sampling logs.

Samples should be collected directly into laboratory-supplied jars. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected groundwater samples will meet all quality assurance criteria set forth by this QAPP and DER-10.

Soil Vapor Samples

Prior to sample collection, a pre-sampling inspection will be conducted to document chemicals and potential subsurface pathways at the Site. The pre-sampling inspection will assess the potential for interference from chemical storage nearby or within the building. Air samples will be collected into laboratory-supplied, batch certified-clean Summa® canisters calibrated for a sampling rate of two hours. The pressure gauges on each calibrated flow controller should be monitored throughout sample collection. Sample collection should be stopped when the pressure reading reaches -4 mmHg.

Sample Field Blanks and Duplicates

To assess field sampling and decontamination performance, two types of "blanks" will be collected and submitted to the laboratory for analyses. In addition, the precision of field sampling procedures will be assessed by collecting coded field duplicates and matrix spike/matrix spike duplicates (MS/MSDs). The blanks will include:

a. Trip Blanks - A trip blank will be prepared before the sample containers are sent by the laboratory. The trip blank will consist of a 40-ml VOA vial containing distilled, deionized water, which accompanies the other water sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of water samples for Part 375 volatiles analysis. The Trip Blank will be analyzed for volatile organic compounds to assess any contamination from sampling and transport, and internal laboratory procedures.

b. Field Blanks - Field blanks will be taken at a minimum frequency of one per 20 field samples per sample matrix. Field blanks are used to determine the effectiveness of the decontamination procedures for sampling equipment. The field blank will consist of a sample of deionized, distilled water provided by the laboratory that has passed through a decontaminated bailer, tubing or other sampling apparatus. It is usually collected as a last step in the decontamination procedure, prior to taking an environmental sample. The field blank may be analyzed for all or some of the parameters of interest.

The duplicates will include:

c. Coded Field Duplicate - To determine the representativeness of the sampling methods, coded field duplicates will be collected at a minimum frequency of one per 20 field samples for each matrix (soil, groundwater, and soil vapor). The samples are termed "coded" because they will be labeled in such a manner that the laboratory will not be able to determine that they are a duplicate sample. This will eliminate any possible bias that could arise.

d. Matrix Spike/Matrix Spike Duplicate (MS/MSD) - MS/MSD samples (MS/MSD for organics; MS and laboratory duplicate for inorganics) will be taken at a frequency of one pair per 20 field samples (soil and groundwater). These samples are used to assess the effect of the sample matrix on the recovery of target compounds or target analytes.

5.4 SAMPLE CONTAINERS AND HANDLING

Certified, commercially clean sample containers will be obtained from the analytical laboratory. If soil or groundwater samples are being collected, the laboratory will also prepare and supply the required trip blanks and field blank sample containers and reagent preservatives. Sample bottle containers, including the field blank containers, will be placed into plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, Langan field personnel will fill the plastic coolers with ice in Ziploc® bags (or equivalent) to maintain a temperature of 4° ±2° C.

Soil samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on-ice in laboratory provided coolers until shipment to the laboratory. The temperature in the coolers containing samples and associated field blanks will be maintained at a temperature of 4°±2°C while on-site and during sample shipment to the analytical laboratory.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 5.9, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 5.6.

5.5 SAMPLE PRESERVATION

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field. Samples will be preserved according to the requirements of the specific analytical method selected, as shown in Attachment C.

5.6 SAMPLE SHIPMENT

5.6.1 Packaging

Soil sample containers will be placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will be placed in a Ziploc® bag (or equivalent) and placed inside the cooler. The cooler will be taped closed and custody seals will be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (e.g. FedEx) then laboratory address labels will be placed on top of the cooler.

5.6.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All environmental samples will be transported to the laboratory by a laboratory-provided courier under the chain-of-custody protocols described in Section 5.9.

- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

5.7 DECONTAMINATION PROCEDURES

Decontamination procedures will be used for non-dedicated sampling equipment. Decontamination of field personnel is discussed in the site-specific CHASP included in Appendix D of the RAWP. Field sampling equipment that is to be reused will be decontaminated in the field in accordance with the following procedures:

1. Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
2. Generous tap water rinse
3. Distilled/de-ionized water rinse

5.8 RESIDUALS MANAGEMENT

Debris (e.g., paper, plastic and disposable PPE) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal. If applicable, residual solids (e.g., leftover soil cuttings) will be placed back in the borehole from which it was sampled. If gross contamination is observed, soil will be collected and stored in Department of Transportation (DOT)-approved 55-gallon drums in a designated storage area at the Site. The residual materials stored in a designated storage area at the site for further characterization, treatment or disposal.

Residual fluids (such as purge water) will be collected and stored in DOT-approved (or equivalent) 55-gallon drums in a designated storage area at the site. The residual fluids will be transported to the on-site wastewater treatment plant or analyzed, characterized and disposed off-site in accordance with applicable federal and state regulations. Residual fluids such as decontamination water may be discharged to the ground surface, however, if gross contamination is observed, the residual fluids will be collected, stored, and transported similar purge water or other residual fluids.

5.9 CHAIN OF CUSTODY PROCEDURES

A chain-of-custody protocol has been established for collected samples that will be followed during sample handling activities in both field and laboratory operations. The primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safe keeping. Chain-of-custody procedures are provided below:

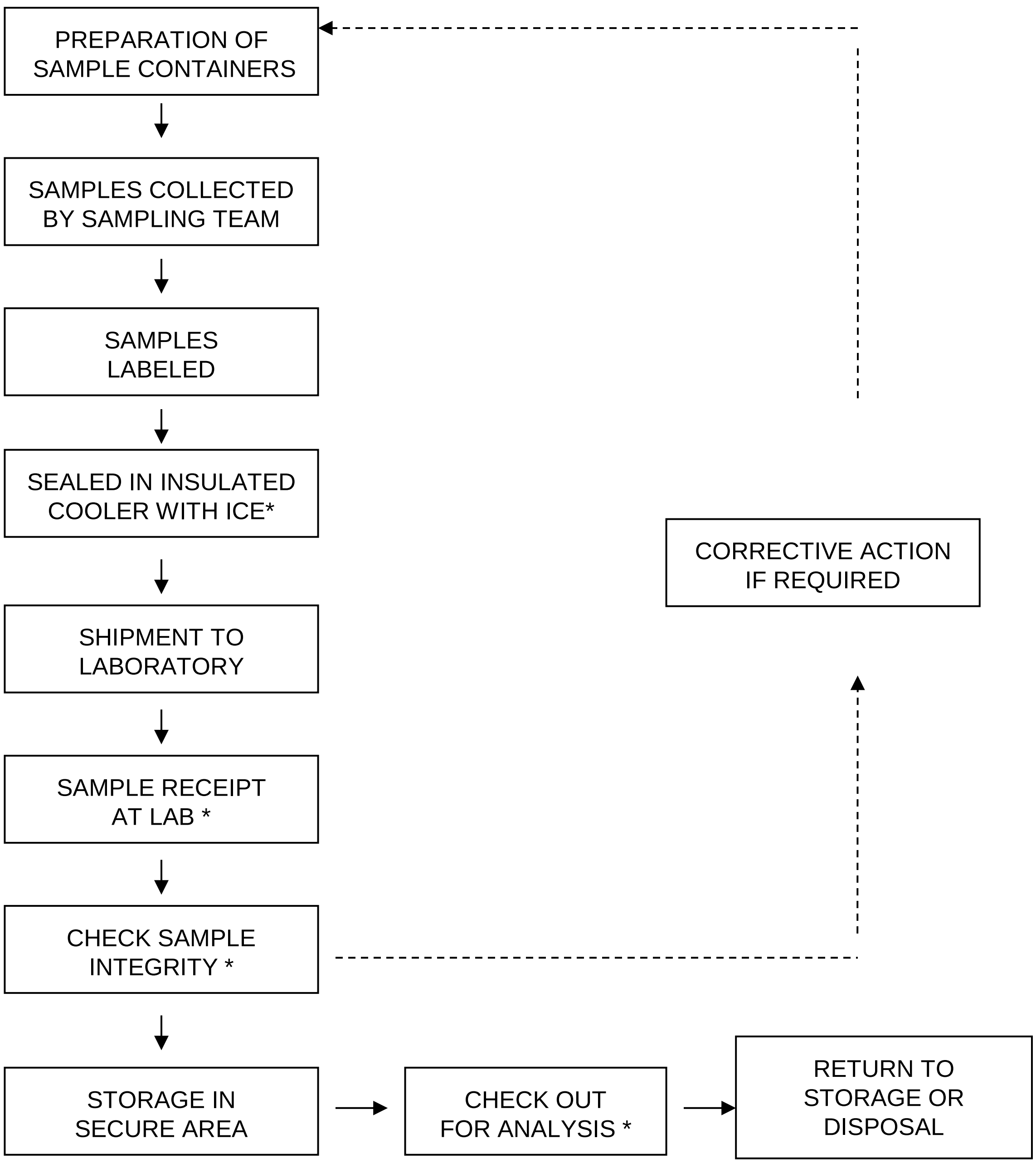
- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, permanent blue or black ink.
- Langan field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain-of-custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors and sign the chain-of-

custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

Sample coolers will be accompanied by the chain-of-custody form, sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid. If applicable, a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form.

Samples will be packaged for shipment to the laboratory with the appropriate chain-of-custody form. A copy of the form will be retained by the sampling team for the project file and the original will be sent to the laboratory with the samples. Bills of lading will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory. A flow chart showing a sample custody process is included as Figure 5.1, and chain-of-custody forms from the laboratory are included as Figures 5.2 and 5.3.

Figure 5.1 Sample Custody



* REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

Figure 5.2 Sample Chain-of-Custody Form – Air Sample

ALPHA ANALYTICAL

AIR ANALYSIS

CHAIN OF CUSTODY

PAGE ____ OF ____

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #:

Client Information

Client:
Address:
Phone:
Fax:
Email:
❑ These samples have been previously analyzed by Alpha

Project Information

Project Name:
Project Location:
Project #:
Project Manager:
ALPHA Quote #:

Turn-Around Time

❑ Standard ❑ RUSH (only confirmed if pre-approved!)

Date Due: **Time:**

Report Information - Data Deliverables

❑ FAX
❑ ADEx
Criteria Checker: ________
(Default based on Regulatory Criteria Indicated)
Other Formats: ________
❑ EMAIL (standard pdf report)
❑ Additional Deliverables:
Report to: (if different than Project Manager)

Billing Information

❑ Same as Client info | PO #:

Regulatory Requirements/Report Limits

State/Fed	Program	Res / Comm

Other Project Specific Requirements/Comments:

Project-Specific Target Compound List: ❑

All Columns Below Must Be Filled Out

ANALYSIS

ALPHA Lab ID (Lab Use Only)	Sample ID	COLLECTION End Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-15	TO-15 SIM	APH	Subtract Non-petroleum HCs ❑	Fixed Gases	Sulfides & Mercaptans by TO-15		Sample Comments (i.e. PID)

*SAMPLE MATRIX CODES
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type

Relinquished By:	Date/Time	Received By:	Date/Time:

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions.
See reverse side.

Form No: 101-02 Rev: (25-Sep-15)

Figure 5.3 Sample Chain-of-Custody Form – Soil and Groundwater

ALPHA ANALYTICAL

NEW YORK CHAIN OF CUSTODY

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page ___ of ___

Date Rec'd in Lab

ALPHA Job #

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Client Information
Client:
Address:
Phone:
Fax:
Email:

Project Information
Project Name:
Project Location:
Project #
(Use Project name as Project #) ☐
Project Manager:
ALPHAQuote #:

Turn-Around Time
Standard ☐ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables
☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement
☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Billing Information
☐ Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☐**Done**
☐**Lab to do**
Preservation
☐**Lab to do**
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS								Sample Specific Comments	Total Bottles

Preservative Code:	Container Code
A = None	P = Plastic
B = HCl	A = Amber Glass
C = HNO_3	V = Vial
D = H_2SO_4	G = Glass
E = NaOH	B = Bacteria Cup
F = MeOH	C = Cube
G = $NaHSO_4$	O = Other
H = $Na_2S_2O_3$	E = Encore
K/E = Zn Ac/NaOH	D = BOD Bottle
O = Other	

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type								
Preservative								

Relinquished By:	Date/Time	Received By:	Date/Time

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance (QA) Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

5.10 LABORATORY SAMPLE STORAGE PROCEDURES

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the data quality objectives of the project. When irregularities do exist, the environmental consultant must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Samples for VOCs will be maintained in satellite storage areas within the VOC laboratory. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 INTRODUCTION

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

6.2 DATA REDUCTION

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of the site contamination condition.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQuIS. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

6.3 DATA VALIDATION

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:

- Verification of the QC sample results,
- Verification of the identification of sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and
- Preparation of Data Usability Summary Reports (DUSR).

A DUSR will be prepared and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each SDG will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;

- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" - Not detected. Quantitation limit may be inaccurate or imprecise;
- "J" - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method
- "N" – Tentative identification. Analyte is considered present in the sample;
- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and
- No Flag - Result accepted without qualification.

7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

7.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

7.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

7.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

7.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

8.0 CORRECTIVE ACTION

8.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

8.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 12.1 or similar). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

FIGURE 8.1

CORRECTIVE ACTION REQUEST
Number: _________________________ Date: ____________
TO: ____ You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _______________
CONDITION:
REFERENCE DOCUMENTS:
RECOMMENDED CORRECTIVE ACTIONS:
__________ ______ __________ ________ ___________ ________ Originator Date Approval Date Approval Date
RESPONSE
CAUSE OF CONDITION
CORRECTIVE ACTION (A) RESOLUTION (B) PREVENTION (C) AFFECTED DOCUMENTS
C.A. FOLLOWUP: CORRECTIVE ACTION VERIFIED BY: ____________________________ DATE:_____________

9.0 REFERENCES

1. NYSDEC. Division of Environmental Remediation. DER-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.
2. NYSDOH. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006.
3. USEPA, 2014. "Test Method for Evaluating Solid Waste," Update V dated July 2014 U.S. Environmental Protection Agency, Washington, D.C.
4. USEPA, 2016. Region II Standard Operating Procedure (SOP) #HW-34, "Trace Volatile Data Validation" (September 2016, Revision 1), USEPA Hazardous Waste Support Section. USEPA Region II
5. USEPA, 2016. Region II SOP #HW-35A, "Semivolatile Data Validation" (September 2016, Revision 1), USEPA Hazardous Waste Support Section. USEPA Region II
6. USEPA, 2016. Region II SOP #HW-36A, "Pesticide Data Validation" (October 2016, Revision 1), USEPA Hazardous Waste Support Section. USEPA Region II
7. USEPA, 2015. Region II SOP #HW-37A, "PCB Aroclor Data Validation" (June 2015, Revision 0), USEPA Hazardous Waste Support Section. USEPA Region II
8. USEPA 2016. Region II SOP #HW-3a, "ICP-AES Data Validation" (September 2016, Revision 1), USEPA Hazardous Waste Support Section. USEPA Region II
9. USEPA 2014. Hazardous Waste Support Section. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15. SOP No. HW-31, Revision 6, dated June 2014.
10. USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-2017-002, January 2017.
11. USEPA 2017b. National Functional Guidelines for Superfund Inorganic Methods Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-201 7-001, January 2017.

ATTACHMENT A

Resumes

WILLIAM BOHRER, PG

PROJECT GEOLOGIST

GEOLOGIST

Mr. Bohrer is an experienced geologist responsible for managing Langan's environmental standards and Health and Safety compliance for projects throughout New York City. His services include dissemination of environmental protocols, troubleshooting at project sites, in-house/field training, and maintenance of quality standards across the environmental discipline. Mr. Bohrer has a diverse and extensive background in geophysics, hydrogeology, mining and petroleum, and geotechnical engineering. He has developed conceptual site models for public, industrial and commercial facilities nationwide.

SELECTED PROJECTS

- NYU Poly – 122 Johnson Street, Brooklyn, NY
- Con Edison of New York at Governor's Island, NY, NY
- 535 4th Avenue, Brooklyn, NY
- 27 Wooster Street, New York, NY
- 42 West Street, Brooklyn, NY
- 455 West 19th Street, New York, NY
- Kings Plaza Mall, Brooklyn, NY
- Hudson Yards "Terra Firma", New York, NY
- Hudson Yards, Platform Special Inspection, New York, NY
- PSAC II, Bronx, NY
- 595-647 Smith Street, Brooklyn, NY
- New York University, 7-13 Washington Square North Investigation, New York, NY
- NYU 4 Washington Square Village, New York, NY
- 125th Street and Lenox Avenue, New York, NY
- Sullivan Street Development, New York, NY
- Hudson Crossing II, New York, NY
- New York Aquarium, Shark Tank & Animal Care Facility, Brooklyn, NY
- 209-219 Sullivan Street, New York, NY
- 261 Hudson Street, New York, NY
- 460 Washington Street, New York, NY
- 552 West 24th Street, New York, NY
- Brooklyn Bridge Park Pier 1, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- 203 East 92nd Street, New York, NY
- HighLine 28-29, New York, NY
- 539 Smith Street Bulkhead, Brooklyn, NY
- Willets Point, Corona, NY
- Plume Migration and Fracture Flow Aquifer Investigation, Brunswick, MD
- Plume Migration and Fracture Flow Aquifer Investigation, Fallston, MD
- Emergency Response Site Investigation & Remediation, Wappingers Falls, NY
- Emergency Response Site Investigation & Remediation, Allentown, PA

EDUCATION

Post Graduate Studies in Geophysics
Cornell University

B.S., Geology
Tufts University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40 Hour OSHA HazWOPER

OSHA Construction Safety & Health

OSHA Supervisory Certification Credential (TWIC)

Transportation Worker Identification

NYS DEC- Protecting New York's Natural Resources with Better Construction Site Management

AFFILIATIONS

American Association of Petroleum Geologists

National Groundwater Association

Geological Society of America

LANGAN

- Emergency Response Site Investigation & Remediation, Shamokin, PA
- Bermuda International Airport, Jet Fuel Release Investigation, Bermuda
- Little Missouri River Basin, Geotechnical Site Evaluation (Horizontal Drilling Pipeline Install), ND
- Seismic Susceptibility Evaluation (Class 2 Injection Wells), Litchfield, OH
- Bedrock Mapping, Bradford and Sullivan Counties, PA
- Soil Solidification, Carteret, NJ

PA Council of Professional Geologists

MICHAEL D. BURKE, PG, CHMM, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING AND REMEDIATION

Mr. Burke is a geologist/environmental scientist whose practice involves site investigation and remediation, transactional due diligence, environmental site assessments, in-situ remedial technology, and manufactured gas plant (MGP) site characterization and remediation. His additional services include multi-media compliance audits, sub-slab depressurization system design, non-hazardous and hazardous waste management, emergency response, community air monitoring programs, environmental and geotechnical site investigations, and health and safety monitoring. He has experience with projects in the New York State Department of Environmental Conservation (NYSDEC) and New York State Brownfield Cleanup (NYS BCP) Programs; Inactive Hazardous Waste, and Spill Programs, and New York City Office of Environmental Remediation (OER) e-designated and New York City Voluntary Cleanup Program (NYC VCP) sites.

SELECTED PROJECTS

- 227-14 North Conduit Avenue, Industrial Wastewater Compliance, Jamaica, NY
- 420 Kent Avenue, NYS Brownfield Cleanup Program, Brooklyn, NY
- 572 Eleventh Avenue, NYC VCP, New York, NY
- Monian Site A, OER E-Designated Site, New York, NY
- 537 Sackett Street, Gowanus Canal Due Diligence/MGP Site, Brooklyn, NY
- ABC Blocks 25, 26 and 27, NYS Brownfield Cleanup Program Sites, Long Island City, NY
- 432 Rodney Street, NYS Brownfield Cleanup Program, Petroleum and Chlorinated Volatile Organic Compound Investigation and Remediation, Brooklyn, NY
- 787 Eleventh Avenue, NYS Brownfield Cleanup Program Site, New York, NY
- President Street at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 22-36 Second Avenue at Gowanus Canal, NYS Brownfield Cleanup Program Site, Brooklyn, NY
- 563 Sacket Street, NYS Brownfield Cleanup Program Site, MGP Investigation, and Remediation, Brooklyn, NY
- 156-162 Perry Street, NYS Brownfield Cleanup Program Site, New York, NY
- Christopher and Weehawken Streets, NYS Brownfield Cleanup Program, New York, NY
- Phelps Dodge Block 2529 (Lots 40, 50, and 45), Inactive Hazardous Waste Disposal Site, Maspeth NY
- 42-50 24th Street, NYS Brownfield Cleanup Program Site, Long Island City, NY
- Storage Deluxe (163 6th Street), OER E-Designation Site, New York, NY

EDUCATION

M.S., Environmental Geology
Rutgers University

B.S., Geological Sciences
Rutgers University

B.S., Environmental Science
Rutgers University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

Certified Hazardous Materials Manager – CHMM No. 15998

LEED Accredited Professional (LEED AP)

OSHA Certification for Hazardous Waste Site Supervisor

OSHA 29 CFR 1910.120 Certification for Hazardous Waste Operations and Emergency Response

NJDEP Certification for Community Noise Enforcement

Troxler Certification for Nuclear Densometer Training

LANGAN

- Prospect Park Redevelopment, Landfill Reclamation, Prospect Park, NJ
- 431 Carroll Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 76 4th Street Property, Gowanus Due Diligence, Brooklyn, NY
- Foxgate/MREC, Due Diligence and Solid Waste Compliance, Central Islip, NY
- 175-225 3rd Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- New York University Tandon School of Engineering, Spill Investigation/Remediation Dual Phase Recovery, and Laser Fluorescence Investigation, Brooklyn, NY
- 2420-2430 Amsterdam Avenue, NYS Brownfield Cleanup Program/Board of Standards and Appeals Variance, New York, NY
- 170 Amsterdam Avenue, NYC VCP, New York, NY
- 538-540 Hudson Street, NYS Brownfield Cleanup Program (Former Gas Station), New York, NY
- 234 Butler Street, Gowanus Canal Due Diligence, Brooklyn, NY
- 550 Clinton Street, NYS Brownfield Cleanup Program E-Designation, Brooklyn, NY
- 111 Leroy Street, OER E-Designation Site, New York, NY
- 335 Bond Street, NYS Brownfield Cleanup Program, New York, NY
- Gowanus Canal Northside, NYS BCP Former Fuel Oil Terminal, Brooklyn, NY
- Multiple Buildings, Major Oil Storage Facility, Gowanus Canal Location, Brooklyn, NY
- 197-205 Smith Street at Gowanus Canal, MGP Due Diligence, Brooklyn, NY
- 450 Union Street at Gowanus Canal, NYS Brownfield Cleanup Program, Brooklyn, NY
- 86 Fleet Place, NYC VCP E-Designation, Brooklyn, NY
- New York University College of Nursing at 433 1st Avenue, NYS BCP, Bronx, NY
- Retail Building at 225 3rd Street, Brooklyn, NY
- 29-37 41st Avenue, NYS Brownfield Cleanup Program, Long Island City, NY
- 43-01 22nd Street, NYS Brownfield Cleanup Program, Long Island City, NY
- Compliance Audit for NYU at Washington Square Park, New York, NY
- Former Watermark Locations, NYS Brownfield Cleanup Program, Chlorinated Volatile Organic Compound Investigation and Remediation; AS/SVE, Brooklyn, NY
- Former Gas Station (1525 Bedford Avenue), Brooklyn, NY
- NYS Brownfield Cleanup Program at 514 West 24th Street, New York, NY
- Gowanus Canal Due Diligence at 76 4th Street, Brooklyn, NY
- Urban Health Plan, Medical Building, NYS Brownfield Cleanup Program CVOC Investigation and Remediation, Bronx, NY
- 420 East 54th Street, NYS Spill Closure, New York, NY
- Equity Residential at 160 Riverside Boulevard, NYS Spill Closure, New York, NY
- 357-359 West Street and 156 Leroy Street, NYC VCP, New York, NY
- Emergency Spill Response at 322 West 57th Street, Investigation and Closure, New York, NY

- Hurricane Sandy, Emergency Response at 21 West Street, New York, NY
- Hurricane Sandy, Emergency Response at 71 Pine Street, New York, NY
- Greenpoint Landing, NYC E-Designation, Brooklyn, NY
- 23-01 42nd Road, NYS Brownfield Cleanup Program, Long Island City, NY
- Greenpoint Waterfront Development, NYS Brownfield Cleanup Program, Brooklyn, NY
- 125th Street and Lenox Avenue, NYC VCP, New York, NY
- Whitehead Realty Solvent Site, Inactive Hazardous Waste site, CVOC
  Investigation and Remediation, Brooklyn, NY
- SunCap Property Group Environmental On-Call Consulting, Various Locations, Nationwide
- Consolidated Edison Company of New York, Underground Storage Tank On-Call Contract, Five Boroughs of New York City, NY
- Consolidated Edison Company of New York, Appendix B Spill Sites On-Call Contract, Five Boroughs of New York City, NY
- Meeker Avenue Plume Trackdown Site, Brooklyn, NY
- Distribution Facility, Superfund Redevelopment, Long Island City, NY
- Edison Properties, West 17th Street Development Site (Former MGP Site), New York, NY
- Con Edison on Governors Island, Dielectric Fluid Spill, Investigation and Remediation, New York, NY
- 144-150 Barrow Street, NYS Brownfield Cleanup Program, New York, NY
- West 17th Street Development, NYS Brownfield Cleanup Program, MGP Investigation and Remediation, New York, NY
- Montefiore Medical Center, Emergency Response, PCB Remediation, Bronx, NY
- New York University, 4 Washington Square Village Fuel Oil Remediation, New York, NY
- NYCSCA, Proposed New York City School Construction Sites, Five Boroughs of New York City, NY
- Con Edison, East 60th Street Generating Station, New York, NY
- Residential Building at 82 Irving Place, Environmental Remediation, New York, NY
- 1113 York Avenue, Storage Tank Closures, New York, NY
- Peter Cooper Village/Stuyvesant Town, Phase I ESA, New York, NY
- Superior Ink, Waste Characterization and Remedial Action Plans, New York, NY
- Bronx Mental Health Redevelopment Project, Phase I ESA, Bronx, NY
- 2950 Atlantic Avenue, Site Characterization Investigation, Brooklyn, NY
- Con Edison, East 74th Street Generating Station, Sediment Investigation, New York, NY
- Con Edison, First Avenue Properties, New York, NY
- Queens West Development Corp. Stage II, Long Island City, NY
- Article X Project Environmental Reviews, Various New York State Electrical Generation Sites, NY
- Poletti Generating Station, Astoria, NY
- Arthur Kill Generating Station, Staten Island, NY

- Distribution Facility, Phase I & Phase II ESA and Regulatory Compliance, Bohemia, NY
- Huntington Station Superfund Due Diligence, Huntington Station, NY
- Garvies Point Bulkhead, Glen Cove, NY
- Johnson & Hoffman Metal Stamping Facility, Environmental Compliance, Carle Place, NY
- Floral Park Storage Facility, Phase I and Phase II ESA
- Garden City Phase I ESAs at two sites, including part of a Superfund Site, Garden City, NY
- Huntington Station Storage Facility, Phase I and II ESA, Huntington Station, NY

BRIAN GOCHENAUR, QEP

SENIOR PROJECT MANAGER

ENVIRONMENTAL SCIENTIST

Mr. Gochenaur is an environmental project manager whose experience includes environmental due diligence, site investigation and remediation, fuel oil storage tank investigation and removal, soil vapor intrusion assessments, in-situ remedial technology, spill closure, vapor barrier and sub-slab depressurization system design and construction, emergency response, environmental and geotechnical site investigations, and health and safety monitoring. He has extensive experience with the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup, Voluntary Cleanup and Spill Programs and New York City Department of Environmental Protection (NYCDEP) "E" Designated and New York City Voluntary Cleanup Program (BCP) sites. His areas of expertise include Phase I Environmental Site Assessments, Phase II Site Investigations, and environmental consulting and oversight on large scale construction projects.

SELECTED PROJECTS

- 440 Washington Street, E-Designated services, New York, NY
- 3514 Surf Avenue, Tall Residential and Retail Building, Brooklyn, NY
- ARO 242 West 53, Tall Residential Building, New York, NY
- NY Aquarium Shark Exhibit, Soil Characterization and Excavation Oversight, Coney Island Neighborhood, Brooklyn, NY
- 60 West Street, Site Investigation and Redevelopment, Brooklyn, NY
- 535 4th Avenue, BCP Auto Repair Cleanup and Redevelopment, Brooklyn, NY
- 1525 Bedford Avenue, BCP Gas Station Cleanup and Redevelopment, Brooklyn, NY
- 220 Eleventh Avenue, Residential Building, New York, NY
- 432 Rodney Street, Residential Building, Brooklyn, NY
- 563 Sackett Street, Brooklyn, NY
- 362 West 125th Street, Residential Building, New York, NY
- Bedford Armory Redevelopment, Brooklyn, NY
- 268 West Street, BCP Redevelopment of Former Commercial and Industrial Site, New York, NY
- 110 125th Street, Soil Excavation and Remediation, New York, NY
- Former Roseland Ballroom Redevelopment, Soil Characterization and Excavation Oversight, New York, NY
- 42 Crosby Street, "E" Designated Site Investigation and Remediation, New York, NY
- New York School Construction Authority, Various Locations, In-House Environmental Consulting, Five Boroughs of New York City
- EZ Serve Portfolio, GE Capital, Various Phase II Site Investigations, FL, GA, LA, and MS
- Beth Elohim Child Daycare Center, Lead Based Paint Abatement, Brooklyn, NY
- Price Battery, Environmental Protection Agency (EPA) Lead Fallout Superfund Site, Hamburg, PA

EDUCATION

B.S., Environmental Science
University of Florida

PROFESSIONAL REGISTRATION

Qualified Environmental Professional (QEP) certified by the Institute of Professional Environmental Practice

40-Hour OSHA (HAZWOPER)

LANGAN

- Clark Portfolio, GE Capital, Various Phase II Locations, MI, IL, ID, and OH
- Tops Plaza Portfolio, Prudential Real Estate Investors, Various Phase II Locations, NY
- Cingular Wireless Portfolio, Cingular Wireless, Various Locations Phase I and II Locations, WA
- Queens Center Mall Expansion, Remedial Oversight, Elmhurst, NY
- Soka Gakkai International-USA, Cultural Center, Brooklyn, NY

JASON J. HAYES, PE, LEED AP

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING

Mr. Hayes has experience in New York, New Jersey, Washington D.C., California, Washington, Oregon, Alaska, and Internationally. His experience includes Environmental Protection Agency (EPA), New York State (NYS) Brownfields applications, investigation, and remediation; New York City Department of Environmental Protection (NYCDEP) and New York City Office of Environmental Remediation (OER) E-designated site applications, investigations, and remediation. His expertise also includes Phase I and II Environmental Site Investigations and Assessments; contaminated building cleanup and demolition; Underground Storage Tank (UST) permitting, removal specifications, and closure reporting; soil vapor intrusion investigation and mitigation system design (depressurization systems, etc.); development of groundwater contaminant plume migration models; environmental analysis; and oversight, design and specification generation for remediation operations with contaminants of concern to include polychlorinated biphenyls (PCBs), solvents, mercury, arsenic, petroleum products, asbestos, mold and lead.

SELECTED PROJECTS

- Confidential Location (Remediation for Mercury-Contaminated Site), New York, NY
- Confidential Location (Phase II ESI and Remedial Design for Mercury Impacted Site), Brooklyn, NY
- NYC School Construction Authority (PCB Remediation), Various Locations, New York, NY
- 28-29 High Line (Phase I ESA, Phase II ESI, and Environmental Remediation), New York, NY
- Georgetown Heating Plant (Phase II ESI and Remedial Design for Mercury Impacted Site), Washington D.C.
- 268 West Street (BCP Application, RI and RIWP), New York, NY
- Confidential Multiple Mixed-Use Tower Location (BCP Application, RI, Phase I ESA, and Phase II ESI), New York, NY
- Dock 72 at Brooklyn Navy Yard, (NYS Voluntary Cleanup Program), Brooklyn, NY
- 27-21 44th Drive (BCP Application, Remedial Investigation Phase I ESA, and Phase II ESI), Long Island City, NY
- Purves Street Development, BCP Application, RAWP, and Phase II ESI, Long Island City, NY
- 267-273 West 87th Street (BCP Application, Remedial Investigation, RIWP, RAWP), New York, NY
- New York Aquarium, Shark Tank and Animal Care Facility (Environmental Remediation), Coney Island, NY
- International Leadership Charter School (Environmental Remediation), Bronx, NY
- West & Watts (BCP Application), New York, NY
- Hudson Yards Redevelopment (Phase I ESA and Phase II ESI), New York, NY

EDUCATION

M.S., Environmental Engineering Columbia University

B.S., Chemistry, Environmental Toxicology Humboldt State University

Business Administration (minor) Humboldt State University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

LEED Accredited Professional (LEED AP)

Troxler Certification for Nuclear Densometer Training

CPR and First Aid Certification

OSHA 40-Hour HAZWOPER

OSHA HAZWOPER Site Supervisor

AFFILIATIONS

US Green Building Council, NYC Chapter (USGBC), Communications Committee

LANGAN

- 627 Smith Street (RI and Report), Brooklyn, NY
- Gateway Center II Retail (Phase I ESA and Phase II ESI), Brooklyn, NY
- 261 Hudson Street (Phase I ESA, Phase II ESI, BCP, and RAWP), New York, NY
- Riverside Center, Building 2 (BCP, Phase I ESA and Phase II ESI), New York, NY
- New York Police Academy, (Sub-Slab Depressurization and Vapor Barrier System), College Point, NY
- Bronx Terminal Market (BCP, RIWP, RAWP, Phase I ESA and Phase II ESI), Bronx, NY
- Jacob Javits Convention Center (Phase I ESA and Phase II ESI), New York, NY
- Yankee Stadium Development Waterfront Park (NYSDEC Spill Sites), Bronx, NY
- Bushwick Inlet Park (Phase I ESA, Approvals for NYC E-Designation), Brooklyn, NY
- Silvercup West (BCP, RIWP, RIR, RAWP, and RAA), Long Island City, NY
- 29 Flatbush, Tall Residential Building (Groundwater Studies, RIR and RAWP), Brooklyn, NY
- Gowanus Village I (BCP, RIWP and RIR), Brooklyn, NY
- Sullivan Street Hotel (Site Characterization Study and Owner Representation), New York, NY
- Riker's Island Co-Generation Plant (Soil and Soil Vapor Quality Investigations), Bronx, NY
- The Shops at Atlas Park (Sub-Slab Depressurization and Vapor Barrier Design), Glendale, NY
- Memorial Sloan-Kettering Cancer Center (Subsurface and Soil Vapor Intrusion Investigations), New York, NY
- Element West 59th Street (Oversight and Monitoring of Sub-Slab Depressurization and Vapor Barrier Systems), New York, NY
- Teterboro Airport (Delineation and Remedial Oversight of Petroleum-Contaminated Soils), Teterboro, NJ
- Proposed New York JETS Stadium (Phase I ESA), New York, NY
- Former Con Edison Manufactured Gas Plant Sites (Research Reports), New York, NY
- 7 World Trade Center (Endpoint Sampling and Final Closure Report), New York, NY
- Peter Cooper Village, Environmental Subsurface Investigations, New York, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

NYC Mayor's Office of Environmental Remediation – Big Apple Brownfield Workshop – Presented on Soil Vapor Intrusion Remedies (e.g., SSD Systems, Vapor Barriers, Modified HVAC)

New York City Brownfield Partnership – Presented on environmental considerations and complications of the Hudson Yards Development

Urban Land Institute (ULI), member

Commercial Real Estate Development Associations (NAIOP), member

NYC Brownfield Partnership, member

Waterfront Development Technical Course – Presented on Impacted Waterfront Planning Considerations

RYAN MANDERBACH, CHMM

SENIOR ASSOCIATE/VP

ENVIRONMENTAL ENGINEERING & SITE ASSESSMENTS

Mr. Manderbach has experience in New York, New Jersey, Massachusetts, Maine, Rhode Island, New Hampshire, and Connecticut. His recent experience includes New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup, Voluntary Cleanup and Spill Programs, and New York City Office of Environmental Remediation (OER) E-designated site investigation, and remediation. He has managed and performed Phase I and II Environmental Site Assessments; Underground Storage Tank (UST) removals and closures; soil vapor intrusion investigations; and site investigations and remediation. He also has extensive experience with Hazard Ranking System (HRS) evaluations, site assessments, removal actions, and emergency response activities under the EPA Regions I and II Superfund program.

SELECTED PROJECTS

- Brownfield Redevelopment, 520 West 41st Street, New York, NY
- Riverside Parcel 1, 3, 4 and 5, Mixed-Use Development, New York, NY
- Brownfield Redevelopment, 267-273 West 87th Street, New York, NY
- Brownfield Redevelopment, 225 33rd Street, Brooklyn, NY
- River Place Residential, SMP Implementation, New York, NY
- Mixed-Use Educational/Residential Development, New York, NY
- Public Safety Answering Center (PSAC) II, Bronx, NY
- American Copper Buildings (616 First Avenue), New York, NY
- Environmental Assessments at 430 East 92nd Street, New York, NY
- Environmental Assessments at 125th Street and Lenox, New York, NY
- Hotel at 70 Park Avenue, New York, NY
- Environmental Due Diligence at Mixed-Use Development, 85 Jay Street, Brooklyn, NY
- 346 Broadway Due Diligence, New York, NY
- Liberty Brass Site, 38-01 Queens Boulevard, Long Island City, NY
- Environmental Remediation, 42 West Street Residential, Brooklyn, NY
- Brownfield Redevelopment, 335 Bond Street, Brooklyn, NY
- Residences at 540 West 21st Street, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- President Street Properties, Brooklyn, NY
- Residential Development, 43-30 24th Street, Long Island City, NY
- Mixed-Use Condominium, 505-513 West 43rd Street, New York, NY
- 685 First Avenue, New York, NY
- Columbia University, Manhattanville Development, New York, NY
- The Shops at Atlas Park, Glendale, NY
- 536 West 41st Street, New York, NY
- Shore Parkway, Brooklyn, NY
- 100 West 125th Street, New York, NY

EDUCATION

B.A., Environmental Analysis and Policy
Boston University

PROFESSIONAL REGISTRATION

Certified Hazardous Materials Manager (CHMM)

40 Hour HAZWOPER

AFFILIATIONS

New York Building Congress (NYBC), Young Professionals Committee

American Council of Engineering Companies of New York (ACEC NY) – Emerging Leaders Committee

LANGAN

- 11 North Moore Street, New York, NY
- 290 West Street, New York, NY
- City University of New York (CUNY), John Jay College Expansion, New York, NY
- Queens West Development, Long Island City, NY
- United Nations Capital Master Plan, New York, NY
- Former Air Products and Chemicals, Inc. Facility, Middlesex, NJ
- Lower Manhattan Indoor Dust Test and Clean Program, New York, NY
- Former Buckbee-Mears Facility, Cortland, NY
- Old Landfill, Norton, MA
- Boulter Farm Area, Cumberland, RI
- Hollingsworth & Vose Co., Walpole, MA
- Chlor-Alkali Facility (Former), Berlin, NH
- Limerick Mill Complex, Limerick, ME
- Danielson Pike Chlorinated Solvent Sites, Scituate, RI
- Tiogue Lake Sediment Contamination Site, Coventry, RI
- Atlas Copco Sites, Holyoke, MA
- Fisherville Mill, Grafton MA
- Hurricane Katrina Federal Disaster Response, New Orleans, LA
- Hurricane Ike Federal Disaster Response, Pasadena, TX

Anthony Moffa, Jr., ASP, CHMM, COSS

Associate/Corporate Health and Safety Manager

20 years in the industry

Mr. Moffa is Langan's Corporate Health & Safety Manager and is responsible for managing health and safety compliance in all Langan office locations. He has over 20 years' experience in the health and safety field. He is responsible for ensuring compliance with all federal and state occupational health and safety laws and development and implementation of corporate health and safety policies. Responsibilities include reviewing and updating Langan's Corporate Health and Safety Program and assisting employees in the development of site specific Health & Safety Plans. He maintains and manages health and safety records for employees in all Langan office locations including medical evaluations, respirator fit testing, and Hazardous Waste Operations and Emergency Response training. He is also responsible for documentation and investigation of work-related injuries and incidents and sharing this information with employees to assist in the prevention of future incidents. He is also the chairman of the Corporate Health & Safety Committee and Health & Safety Leadership Team that meet periodically throughout the year. He is responsible for coordinating and providing health and safe training to Langan employees. He was formerly the Environmental, Health and Safety Coordinator at a chemical manufacturer. His experience included employee hazard communications, development of material safety data sheets for developed products, respirator fit testing and conducting required Occupational Health & Safety Association and Department of Transportation training.

Selected Projects

Verizon - Pennsylvania, Inc. Philadelphia Naval Yard, PA
Confidential Client, Philadelphia, PA
Penn Color, Doylestown, PA
Verizon - Pennsylvania, Inc., Phase I Environmental Assessment, Lansdowne, PA
Verizon - Pennsylvania, Inc. (formerly Bell Atlantic Corporation), Various Locations, PA
Kinder Morgan Bulk Terminals, Inc. Fairless Hills, PA
PP&L – Martins Creek, Bangor, PA
Concord Beverage Company, Concordville, PA
Penn Color, Hatfield, PA
National Starch & Chemical Company, Bloomfield, NJ
Air Products and Chemicals, Inc.., Middlesex, NJ
PSEG Services Corporation, Jersey City, NJ
Sampson Coatings, Richmond, VA
Custom Chemicals Corporation, Elmwood Park, NJ

Education

B.S., Physics
West Chester University

Professional Registration

Associate Safety Professional (ASP)

Certified Hazardous Material Manager (CHMM)

Certified Occupational Safety Specialist (COSS)

Affiliations

Pennsylvania Chamber of Business & Industry

Chemical Council of New Jersey

New Jersey Business & Industry Association

Geoprofessional Business Association

Certifications and Training

Hazardous Waste Operations and Emergency Response Training

OSHA Site Supervisor Training

10 & 30-Hour Construction Safety & Health Training

30-Hour Construction Safety & Health Training

10-Hour Industry Safety & Health Training

Confined Space Awareness & Entry

Competent Person in Excavations

Hazard Communications

Defensive Driving Training

LANGAN

EMILY L. SNEAD, PG

PROJECT SCIENTIST

ENVIRONMENTAL ENGINEERING

Ms. Snead brings field experience and technical expertise to environmental investigations and remediation projects. She has independently performed Phase I and Phase II assessments and investigations, UST removals and closures, remedial excavations, vapor extractions, and ISCO injections. She excels at project research, environmental sampling, remedial oversight, proposal and report preparation. Her projects have included hospital centers, day care facilities, residential buildings, chemical plants, and commercial/industrial sites throughout New York City and the Tri-State area. Prior to her career in Environmental Consulting, Ms. Snead conducted research with NASA and performed construction oversight management in the Cayman Islands.

SELECTED PROJECTS

- Silvercup West, Brownfield Cleanup Site, Long Island City, NY
- Highline 28-29 Development, PCE-Contaminated Soil Delineation and Implementation of Bioaugmentation Remediation, New York, NY
- 295 Locust Avenue, Soil Excavation/Trucking, Monitoring Well Decommissioning, Groundwater Sampling and SMP inspections, Bronx, NY
- Hotel Trades Union (620 Fulton Street), Hazardous Lead Soil removal, UST closure and Soil Management Report Brooklyn, NY
- 743 Fifth Avenue, Soil Management Report, New York, NY
- Suncap Facility, UST Investigations and Test Pit Explorations, Yonkers, NY
- New York University (383 Lafayette Street), Hazardous Lead Soil Removal and UST Closure New York, NY
- 601 Washington Street, Remedial Excavation, Groundwater ISCO Treatment, and Installation of an Active SMD System, New York, NY
- NYC OER E-Designated site (50 Hudson Yards/2 Hudson Boulevard), Remedial Investigation, Remedial Excavation Oversight, and Closure Reporting, New York, NY
- Riverside Center Parcel 1, VCP Site Remedial Excavation, UST Closure, Spill Investigation and Closure, and Reporting, New York, NY
- Riverside Center Parcels 3 and 4, VCP Site Remedial Excavation, UST Closure, New York, NY
- Bronx Terminal Market, Triennial SMP Reporting and Annual Inspections, Bronx, NY
- 616 First Avenue, VCP Program Includes Remedial Excavation Oversight, SMP Annual Inspections, Reporting, New York, NY
- Luxury Car Dealership (787 Eleventh Avenue), Spill Investigation and UST Closure, New York, NY
- 335 Bold Street, Phase II and BCP Application, Brooklyn, NY
- President Street Properties, Phase II Investigation and BCP Application, Brooklyn, NY
- 38-01 Queens Boulevard Due Diligence, Long Island City, NY

EDUCATION

B.S., Environmental Science & Geology
Northeastern University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40-Hour OSHA HAZWOPER

8-Hour OSHA HAZWOPER Refresher

10-Hour OSHA Construction Safety Training

DOT Hazardous Materials Shipping Training

First Aid/ CPR Training

AFFILIATIONS

NAIOP New York City Chapter, member

Urban Land Institute (ULI), Member

LANGAN

- 250 Water Street, Phase II Investigation, New York, NY
- 139 East 56th Street, Joint Geotechnical and Environmental Waste Characterization, New York, NY
- Le Soleil d'Or Boutique Hotel, Cayman Brac, Cayman Islands
- Columbia University Medical Center, Phase I and II Environmental Site Investigation Nursing School, New York, NY
- Consolidated Edison of NY, Remedial Investigation and RIR Investigation, New York, NY
- 11-09 Borden Avenue, MTA Bridges and Tunnels/Borden Avenue ISCO Remediation, Disposal of Petroleum-Impacted Soil, Long Island City, NY
- Columbia University Medical Center, Removal of a 1,000-gal UST and Closure Report, New York, NY
- Children's Aid Society (910 East 172nd Street), Oversight of the VEFR and Collection of Groundwater Samples New York, NY
- New York City Housing Authority, Community Air Monitoring Program and Environmental Oversight, Bronx, NY
- YRC Freight Newtown Creek EPA RFI, Brooklyn, NY
- 522-532 West 29th Street Redevelopment, Phase II Site Investigation and RAWP New York, NY
- Memorial Sloan-Kettering Cancer Center Ambulatory Surgery Building, Community Air Monitoring Program, New York, NY
- Keith Hilltop Terrace Apartments, Phase I and II Environmental Site Assessment, Altoona, PA
- Southern Boulevard Phase II ESA, Bronx, NY
- Former Auto Dealership, Remedial Investigation and Delineation of Polycyclic Aromatic Hydrocarbons (PAHs), Paramus, NJ
- 711 11th Avenue, Former Auto Dealership, Chrysler Group LLC, Phase I and Limited Phase II Due Diligence Investigation, New York, NY
- 37-14 36th Street, Field Investigations Silver Star-Mercedes Benz, Long Island City, NY
- Otto Pehle Park, Bergen County Health Department, Groundwater Sampling and Ecological Surveys, Paramus, NJ
- Bay Park Brownfield Redevelopment, Installation of Sub-Slab Depressurization System, Coney Island, Brooklyn, NY
- PQ Corporation, Oversight of Remedial Action Field Activities, Rahway, NJ
- Post-Graduate Center for Mental Health (304 Echo Place), Phase I and Limited Phase II Due Diligence Investigation, Bronx, NY
- Air Quality Monitoring, Sweeny & Conroy, Inc., New York, NY
- Former Auto Dealership, Chrysler Group LLC, Phase I and Limited Phase II Due Diligence Investigation, New York, NY
- New York Life Investment Management, Phase II Environmental Site Assessment, Jessup, MD
- 366 Broadway, Former Brunswick Hospital Campus, 25,000-Gallon UST Removal, Amityville, NY

EMILY G. STRAKE

PROJECT CHEMIST / RISK ASSESSOR

ENVIRONMENTAL ENGINEERING

Ms. Strake has 17 years of environmental chemistry, risk assessment, auditing, and quality assurance experience. Most recently, she has focused her efforts on human health risk assessment, and has been the primary author or key contributor of risk assessment reports and screening evaluations for projects governed under RCRA, CERCLA, NJDEP, DNREC, SWRCB, DTSC, PADEP, CTDEEP, ODEQ, NYSDEC and MDE. She has experience in site-specific strategy development, which has enabled her to perform assessments to focus areas of investigation and identify risk-based alternatives for reducing remediation costs. Ms. Strake is a member of the Interstate Technology and Regulatory Council Risk Assessment Team responsible for the development and review of organizational risk assessment guidance documents and serves as a National Trainer in risk assessment for the organization.

Ms. Strake has extensive experience in environmental data validation, focused on ensuring laboratory deliverables follow specific guidelines as described by regulatory agencies and the analytical methods employed. In addition, she has experience in EQuIS chemical database management. She also has a broad range of environmental field experience and maintains current OSHA HAZWOPER certification. Ms. Strake is experienced in auditing laboratory and field-sampling activities for compliance with Quality Assurance Project Plans (QAPPs), the National Environmental Laboratory Accreditation Conference Standards Quality Systems manual, and applicable USEPA Guidance. Ms. Strake has also audited on-site laboratories in support of groundwater treatment operations and implemented corrective actions. Her responsibilities include writing reports on the value of laboratory work, writing/editing QAPPs for clients and project-specific sites, peer reviewing colleague's work, and mentoring staff within the office. She has also served as the Quality Assurance officer for several long-term projects, responsible for the achievement of all forms of Quality Control/Quality Assurance by onsite personnel relating to sampling, analysis, and data evaluation.

SELECTED PROJECTS

- Sunoco Refineries, Various Locations
- PECO/Exelon, Various Locations
- Avon, Rye, NY
- Honeywell, Highland Park, NJ
- Delaware City Refinery, DE
- Major League Soccer's San Jose Earthquakes Stadium, Santa Clara, CA
- DuPont, Waynesboro, VA
- Texas Instruments, San Francisco, CA
- Regency, Philadelphia, PA
- Veteran's Affairs, Palo Alto, CA
- DOW Chemical, Various Locations
- Golden Gate National Parks Conservancy, San Francisco, CA
- Occidental Chemical, Bakersfield, CA

EDUCATION

MBA
The University of Scranton

B.S., Chemistry
Cedar Crest College

PROFESSIONAL REGISTRATION

Board Certified Environmental Professional (CEP)

TRAINING

40 HR OSHA HAZWOPER Training/Nov 2002

8 HR HAZWOPER Supervisor/June 2004

8 HR OSHA HAZWOPER Refresher/2013

AFFILIATIONS

The Society for Risk Analysis

Interstate Technology and Regulatory Council

- Floreffe Terminal, Pittsburgh, PA
- Ryder, Hartford, CT
- Rohm and Haas, Philadelphia, PA

ATTACHMENT B

Laboratory Reporting and Method Detection Limits

Alpha Analytical
World Class Chemistry

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Langan Engineering & Environmental

TCL Volatiles - EPA 8260C/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	5	2.29	ug/kg	70-130	30	70-130	30	30			
1,1-Dichloroethane	75-34-3	1	0.145	ug/kg	70-130	30	70-130	30	30			
Chloroform	67-66-3	1.5	0.14	ug/kg	70-130	30	70-130	30	30			
Carbon tetrachloride	56-23-5	1	0.23	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloropropane	78-87-5	1	0.125	ug/kg	70-130	30	70-130	30	30			
Dibromochloromethane	124-48-1	1	0.14	ug/kg	70-130	30	70-130	30	30			
1,1,2-Trichloroethane	79-00-5	1	0.267	ug/kg	70-130	30	70-130	30	30			
Tetrachloroethene	127-18-4	0.5	0.196	ug/kg	70-130	30	70-130	30	30			
Chlorobenzene	108-90-7	0.5	0.127	ug/kg	70-130	30	70-130	30	30			
Trichlorofluoromethane	75-69-4	4	0.695	ug/kg	70-139	30	70-139	30	30			
1,2-Dichloroethane	107-06-2	1	0.257	ug/kg	70-130	30	70-130	30	30			
1,1,1-Trichloroethane	71-55-6	0.5	0.167	ug/kg	70-130	30	70-130	30	30			
Bromodichloromethane	75-27-4	0.5	0.109	ug/kg	70-130	30	70-130	30	30			
trans-1,3-Dichloropropene	10061-02-6	1	0.273	ug/kg	70-130	30	70-130	30	30			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.158	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropene, Total	542-75-6	0.5	0.158	ug/kg				30	30			
1,3-Dichloropropene, Total	542-75-6	0.5	0.158	ug/kg				30	30			
1,1-Dichloropropene	563-58-6	0.5	0.159	ug/kg	70-130	30	70-130	30	30			
Bromoform	75-25-2	4	0.246	ug/kg	70-130	30	70-130	30	30			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Benzene	71-43-2	0.5	0.166	ug/kg	70-130	30	70-130	30	30			
Toluene	108-88-3	1	0.543	ug/kg	70-130	30	70-130	30	30			
Ethylbenzene	100-41-4	1	0.141	ug/kg	70-130	30	70-130	30	30			
Chloromethane	74-87-3	4	0.932	ug/kg	52-130	30	52-130	30	30			
Bromomethane	74-83-9	2	0.581	ug/kg	57-147	30	57-147	30	30			
Vinyl chloride	75-01-4	1	0.335	ug/kg	67-130	30	67-130	30	30			
Chloroethane	75-00-3	2	0.452	ug/kg	50-151	30	50-151	30	30			
1,1-Dichloroethene	75-35-4	1	0.238	ug/kg	65-135	30	65-135	30	30			
trans-1,2-Dichloroethene	156-60-5	1.5	0.137	ug/kg	70-130	30	70-130	30	30			
Trichloroethene	79-01-6	0.5	0.137	ug/kg	70-130	30	70-130	30	30			
1,2-Dichlorobenzene	95-50-1	2	0.144	ug/kg	70-130	30	70-130	30	30			
1,3-Dichlorobenzene	541-73-1	2	0.148	ug/kg	70-130	30	70-130	30	30			
1,4-Dichlorobenzene	106-46-7	2	0.171	ug/kg	70-130	30	70-130	30	30			
Methyl tert butyl ether	1634-04-4	2	0.201	ug/kg	66-130	30	66-130	30	30			
p/m-Xylene	179601-23-1	2	0.56	ug/kg	70-130	30	70-130	30	30			
o-Xylene	95-47-6	1	0.291	ug/kg	70-130	30	70-130	30	30			
Xylene (Total)	1330-20-7	1	0.291	ug/kg				30	30			
Xylene (Total)	1330-20-7	1	0.291	ug/kg				30	30			
cis-1,2-Dichloroethene	156-59-2	1	0.175	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethene (total)	540-59-0	1	0.137	ug/kg				30	30			
1,2-Dichloroethene (total)	540-59-0	1	0.137	ug/kg				30	30			
Dibromomethane	74-95-3	2	0.238	ug/kg	70-130	30	70-130	30	30			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)

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Langan Engineering & Environmental

TCL Volatiles - EPA 8260C/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Styrene	100-42-5	1	0.196	ug/kg	70-130	30	70-130	30	30			
Dichlorodifluoromethane	75-71-8	10	0.915	ug/kg	30-146	30	30-146	30	30			
Acetone	67-64-1	10	4.811	ug/kg	54-140	30	54-140	30	30			
Carbon disulfide	75-15-0	10	4.55	ug/kg	59-130	30	59-130	30	30			
2-Butanone	78-93-3	10	2.22	ug/kg	70-130	30	70-130	30	30			
Vinyl acetate	108-05-4	10	2.15	ug/kg	70-130	30	70-130	30	30			
4-Methyl-2-pentanone	108-10-1	10	1.28	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichloropropane	96-18-4	2	0.127	ug/kg	68-130	30	68-130	30	30			
2-Hexanone	591-78-6	10	1.18	ug/kg	70-130	30	70-130	30	30			
Bromochloromethane	74-97-5	2	0.205	ug/kg	70-130	30	70-130	30	30			
2,2-Dichloropropane	594-20-7	2	0.202	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromoethane	106-93-4	1	0.279	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropane	142-28-9	2	0.167	ug/kg	69-130	30	69-130	30	30			
1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.132	ug/kg	70-130	30	70-130	30	30			
Bromobenzene	108-86-1	2	0.145	ug/kg	70-130	30	70-130	30	30			
n-Butylbenzene	104-51-8	1	0.167	ug/kg	70-130	30	70-130	30	30			
sec-Butylbenzene	135-98-8	1	0.146	ug/kg	70-130	30	70-130	30	30			
tert-Butylbenzene	98-06-6	2	0.118	ug/kg	70-130	30	70-130	30	30			
o-Chlorotoluene	95-49-8	2	0.191	ug/kg	70-130	30	70-130	30	30			
p-Chlorotoluene	106-43-4	2	0.108	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromo-3-chloropropane	96-12-8	3	0.998	ug/kg	68-130	30	68-130	30	30			
Hexachlorobutadiene	87-68-3	4	0.169	ug/kg	67-130	30	67-130	30	30			
Isopropylbenzene	98-82-8	1	0.109	ug/kg	70-130	30	70-130	30	30			
p-Isopropyltoluene	99-87-6	1	0.109	ug/kg	70-130	30	70-130	30	30			
Naphthalene	91-20-3	4	0.65	ug/kg	70-130	30	70-130	30	30			
Acrylonitrile	107-13-1	4	1.15	ug/kg	70-130	30	70-130	30	30			
n-Propylbenzene	103-65-1	1	0.171	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichlorobenzene	87-61-6	2	0.322	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trichlorobenzene	120-82-1	2	0.272	ug/kg	70-130	30	70-130	30	30			
1,3,5-Trimethylbenzene	108-67-8	2	0.193	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trimethylbenzene	95-63-6	2	0.334	ug/kg	70-130	30	70-130	30	30			
1,4-Dioxane	123-91-1	100	35.1	ug/kg	65-136	30	65-136	30	30			
1,4-Diethylbenzene	105-05-5	2	0.177	ug/kg	70-130	30	70-130	30	30			
4-Ethyltoluene	622-96-8	2	0.384	ug/kg	70-130	30	70-130	30	30			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.191	ug/kg	70-130	30	70-130	30	30			
Ethyl ether	60-29-7	2	0.341	ug/kg	67-130	30	67-130	30	30			
trans-1,4-Dichloro-2-butene	110-57-6	5	1.42	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
2-Chloroethoxyethane												
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

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Langan Engineering & Environmental

NYTCL Semivolatiles - EPA 8270D (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	133.6	17.3012	ug/kg	31-137	50	31-137	50	50			
1,2,4-Trichlorobenzene	120-82-1	167	19.1048	ug/kg	38-107	50	38-107	50	50			
Hexachlorobenzene	118-74-1	100.2	18.704	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethyl)ether	111-44-4	150.3	22.6452	ug/kg	40-140	50	40-140	50	50			
2-Chloronaphthalene	91-58-7	167	16.5664	ug/kg	40-140	50	40-140	50	50			
1,2-Dichlorobenzene	95-50-1	167	29.9932	ug/kg	40-140	50	40-140	50	50			
1,3-Dichlorobenzene	541-73-1	167	28.724	ug/kg	40-140	50	40-140	50	50			
1,4-Dichlorobenzene	106-46-7	167	29.1582	ug/kg	28-104	50	28-104	50	50			
3,3'-Dichlorobenzidine	91-94-1	167	44.422	ug/kg	40-140	50	40-140	50	50			
2,4-Dinitrotoluene	121-14-2	167	33.4	ug/kg	40-132	50	40-132	50	50			
2,6-Dinitrotoluene	606-20-2	167	28.6572	ug/kg	40-140	50	40-140	50	50			
Fluoranthene	206-44-0	100.2	19.1716	ug/kg	40-140	50	40-140	50	50			
4-Chlorophenyl phenyl ether	7005-72-3	167	17.869	ug/kg	40-140	50	40-140	50	50			
4-Bromophenyl phenyl ether	101-55-3	167	25.4842	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroisopropyl)ether	108-60-1	200.4	28.5236	ug/kg	40-140	50	40-140	50	50			
Bis(2-chloroethoxy)methane	111-91-1	180.36	16.7334	ug/kg	40-117	50	40-117	50	50			
Hexachlorobutadiene	87-68-3	167	24.4488	ug/kg	40-140	50	40-140	50	50			
Hexachlorocyclopentadiene	77-47-4	477.62	151.302	ug/kg	40-140	50	40-140	50	50			
Hexachloroethane	67-72-1	133.6	27.0206	ug/kg	40-140	50	40-140	50	50			
Isophorone	78-59-1	150.3	21.6766	ug/kg	40-140	50	40-140	50	50			
Naphthalene	91-20-3	167	20.3406	ug/kg	40-140	50	40-140	50	50			
Nitrobenzene	98-95-3	150.3	24.716	ug/kg	40-140	50	40-140	50	50			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	133.6	19.0046	ug/kg	36-157	50	36-157	50	50			
n-Nitrosodi-n-propylamine	621-64-7	167	25.7848	ug/kg	32-121	50	32-121	50	50			
Bis(2-Ethylhexyl)phthalate	117-81-7	167	57.782	ug/kg	40-140	50	40-140	50	50			
Butyl benzyl phthalate	85-68-7	167	42.084	ug/kg	40-140	50	40-140	50	50			
Di-n-butylphthalate	84-74-2	167	31.6632	ug/kg	40-140	50	40-140	50	50			
Di-n-octylphthalate	117-84-0	167	56.78	ug/kg	40-140	50	40-140	50	50			
Diethyl phthalate	84-66-2	167	15.4642	ug/kg	40-140	50	40-140	50	50			
Dimethyl phthalate	131-11-3	167	35.07	ug/kg	40-140	50	40-140	50	50			
Benzo(a)anthracene	56-55-3	100.2	18.8042	ug/kg	40-140	50	40-140	50	50			
Benzo(a)pyrene	50-32-8	133.6	40.748	ug/kg	40-140	50	40-140	50	50			
Benzo(b)fluoranthene	205-99-2	100.2	28.1228	ug/kg	40-140	50	40-140	50	50			
Benzo(k)fluoranthene	207-08-9	100.2	26.72	ug/kg	40-140	50	40-140	50	50			
Chrysene	218-01-9	100.2	17.368	ug/kg	40-140	50	40-140	50	50			
Acenaphthylene	208-96-8	133.6	25.7848	ug/kg	40-140	50	40-140	50	50			
Anthracene	120-12-7	100.2	32.565	ug/kg	40-140	50	40-140	50	50			
Benzo(ghi)perylene	191-24-2	133.6	19.6392	ug/kg	40-140	50	40-140	50	50			
Fluorene	86-73-7	167	16.2324	ug/kg	40-140	50	40-140	50	50			
Phenanthrene	85-01-8	100.2	20.3072	ug/kg	40-140	50	40-140	50	50			
Dibenzo(a,h)anthracene	53-70-3	100.2	19.3052	ug/kg	40-140	50	40-140	50	50			
Indeno(1,2,3-cd)Pyrene	193-39-5	133.6	23.2798	ug/kg	40-140	50	40-140	50	50			

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Langan Engineering & Environmental

NYTCL Semivolatiles - EPA 8270D (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Pyrene	129-00-0	100.2	16.5998	ug/kg	35-142	50	35-142	50	50			
Biphenyl	92-52-4	380.76	38.744	ug/kg	54-104	50	54-104	50	50			
4-Chloroaniline	106-47-8	167	30.394	ug/kg	40-140	50	40-140	50	50			
2-Nitroaniline	88-74-4	167	32.1976	ug/kg	47-134	50	47-134	50	50			
3-Nitroaniline	99-09-2	167	31.4962	ug/kg	26-129	50	26-129	50	50			
4-Nitroaniline	100-01-6	167	69.138	ug/kg	41-125	50	41-125	50	50			
Dibenzofuran	132-64-9	167	15.7982	ug/kg	40-140	50	40-140	50	50			
2-Methylnaphthalene	91-57-6	200.4	20.1736	ug/kg	40-140	50	40-140	50	50			
Acetophenone	98-86-2	167	20.6746	ug/kg	14-144	50	14-144	50	50			
2,4,6-Trichlorophenol	88-06-2	100.2	31.6632	ug/kg	30-130	50	30-130	50	50			
P-Chloro-M-Cresol	59-50-7	167	24.883	ug/kg	26-103	50	26-103	50	50			
2-Chlorophenol	95-57-8	167	19.7394	ug/kg	25-102	50	25-102	50	50			
2,4-Dichlorophenol	120-83-2	150.3	26.8536	ug/kg	30-130	50	30-130	50	50			
2,4-Dimethylphenol	105-67-9	167	55.11	ug/kg	30-130	50	30-130	50	50			
2-Nitrophenol	88-75-5	360.72	62.792	ug/kg	30-130	50	30-130	50	50			
4-Nitrophenol	100-02-7	233.8	68.136	ug/kg	11-114	50	11-114	50	50			
2,4-Dinitrophenol	51-28-5	801.6	77.822	ug/kg	4-130	50	4-130	50	50			
4,6-Dinitro-o-cresol	534-52-1	434.2	80.16	ug/kg	10-130	50	10-130	50	50			
Pentachlorophenol	87-86-5	133.6	36.74	ug/kg	17-109	50	17-109	50	50			
Phenol	108-95-2	167	25.217	ug/kg	26-90	50	26-90	50	50			
2-Methylphenol	95-48-7	167	25.885	ug/kg	30-130.	50	30-130.	50	50			
3-Methylphenol/4-Methylphenol	106-44-5	240.48	26.1522	ug/kg	30-130	50	30-130	50	50			
2,4,5-Trichlorophenol	95-95-4	167	31.9972	ug/kg	30-130	50	30-130	50	50			
Benzoic Acid	65-85-0	541.08	169.004	ug/kg	10-110	50	10-110	50	50			
Benzyl Alcohol	100-51-6	167	51.102	ug/kg	40-140	50	40-140	50	50			
Carbazole	86-74-8	167	16.2324	ug/kg	54-128	50	54-128	50	50			
2-Fluorophenol	*367-12-4*									*25-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*30-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-136*		
4-Terphenyl-d14	*1718-51-0*									*18-120*		

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TCL Pesticides - EPA 8081B (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria
Delta-BHC	319-86-8	7.992	1.5651	ug/kg	30-150	30	30-150	50	50	
Lindane	58-89-9	3.33	1.48851	ug/kg	30-150	30	30-150	50	50	
Alpha-BHC	319-84-6	3.33	0.94572	ug/kg	30-150	30	30-150	50	50	
Beta-BHC	319-85-7	7.992	3.0303	ug/kg	30-150	30	30-150	50	50	
Heptachlor	76-44-8	3.996	1.79154	ug/kg	30-150	30	30-150	50	50	
Aldrin	309-00-2	7.992	2.81385	ug/kg	30-150	30	30-150	50	50	
Heptachlor epoxide	1024-57-3	14.985	4.4955	ug/kg	30-150	30	30-150	50	50	
Endrin	72-20-8	3.33	1.3653	ug/kg	30-150	30	30-150	50	50	
Endrin aldehyde	7421-93-4	9.99	3.4965	ug/kg	30-150	30	30-150	50	50	
Endrin ketone	53494-70-5	7.992	2.05794	ug/kg	30-150	30	30-150	50	50	
Dieldrin	60-57-1	4.995	2.4975	ug/kg	30-150	30	30-150	50	50	
4,4'-DDE	72-55-9	7.992	1.84815	ug/kg	30-150	30	30-150	50	50	
4,4'-DDD	72-54-8	7.992	2.85048	ug/kg	30-150	30	30-150	50	50	
4,4'-DDT	50-29-3	14.985	6.4269	ug/kg	30-150	30	30-150	50	50	
Endosulfan I	959-98-8	7.992	1.88811	ug/kg	30-150	30	30-150	50	50	
Endosulfan II	33213-65-9	7.992	2.67066	ug/kg	30-150	30	30-150	50	50	
Endosulfan sulfate	1031-07-8	3.33	1.58508	ug/kg	30-150	30	30-150	50	50	
Methoxychlor	72-43-5	14.985	4.662	ug/kg	30-150	30	30-150	50	50	
Toxaphene	8001-35-2	149.85	41.958	ug/kg	30-150	30	30-150	50	50	
cis-Chlordane	5103-71-9	9.99	2.78388	ug/kg	30-150	30	30-150	50	50	
trans-Chlordane	5103-74-2	9.99	2.63736	ug/kg	30-150	30	30-150	50	50	
Chlordane	57-74-9	64.935	26.4735	ug/kg	30-150	30	30-150	50	50	
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*
Decachlorobiphenyl	*2051-24-3*									*30-150*

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Herbicides -EPA 8151A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	0.1665	0.0104895	mg/kg	30-150	30	30-150	30	30			
2,4,5-T	93-76-5	0.1665	0.0051615	mg/kg	30-150	30	30-150	30	30			
2,4,5-TP (Silvex)	93-72-1	0.1665	0.0044289	mg/kg	30-150	30	30-150	30	30			
DCAA	*19719-28-9*									*30-150*		

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Langan Engineering & Environmental

TCL PCBs - EPA 8082A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	33.5	3.7989	ug/kg	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	33.5	5.0987	ug/kg	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	33.5	3.2964	ug/kg	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	33.5	4.1004	ug/kg	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	33.5	3.7587	ug/kg	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	33.5	2.7336	ug/kg	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	33.5	3.4974	ug/kg	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	33.5	2.7537	ug/kg	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	33.5	2.3718	ug/kg	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	33.5	1.541	ug/kg				50	50			
PCBs, Total	1336-36-3	33.5	1.541	ug/kg				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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METALS by 6010D (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Aluminum, Total	7429-90-5	4	1.08	mg/kg	48-151		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Antimony, Total	7440-36-0	2	0.152	mg/kg	1-208		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Arsenic, Total	7440-38-2	0.4	0.0832	mg/kg	79-121		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Barium, Total	7440-39-3	0.4	0.0696	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Beryllium, Total	7440-41-7	0.2	0.0132	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Cadmium, Total	7440-43-9	0.4	0.0392	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Calcium, Total	7440-70-2	4	1.4	mg/kg	81-119		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Chromium, Total	7440-47-3	0.4	0.0384	mg/kg	80-120		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Cobalt, Total	7440-48-4	0.8	0.0664	mg/kg	84-115		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Copper, Total	7440-50-8	0.4	0.1032	mg/kg	81-118		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Iron, Total	7439-89-6	2	0.3612	mg/kg	45-155		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Lead, Total	7439-92-1	2	0.1072	mg/kg	81-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Magnesium, Total	7439-95-4	4	0.616	mg/kg	76-124		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Manganese, Total	7439-96-5	0.4	0.0636	mg/kg	81-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Nickel, Total	7440-02-0	1	0.0968	mg/kg	83-117		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Potassium, Total	7440-09-7	100	5.76	mg/kg	71-129		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Selenium, Total	7782-49-2	0.8	0.1032	mg/kg	78-122		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Silver, Total	7440-22-4	0.4	0.1132	mg/kg	75-124		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Sodium, Total	7440-23-5	80	1.26	mg/kg	72-127		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Thallium, Total	7440-28-0	0.8	0.126	mg/kg	80-120		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Vanadium, Total	7440-62-2	0.4	0.0812	mg/kg	78-122		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved
Zinc, Total	7440-66-6	2	0.1172	mg/kg	82-118		75-125	20	20		180 days	1 - Metals Only-Glass 60mL/2oz unpreserved

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Langan Engineering & Environmental

METALS by 7471B (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Mercury, Total	7439-97-6	0.08	0.016896	mg/kg	72-128		80-120	20	20		28 days	1 - Metals Only-Glass 60mL/2oz unpreserved

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WETCHEM (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container/Sample Preservation
Cyanide, Reactive	57-12-5	10	10	mg/kg	30-125	40		40	40	7.3	14 days	1 - Glass 250ml/8oz unpreserved
Sulfide, Reactive	NONE	10	10	mg/kg	60-125	40		40	40	7.3	14 days	1 - Glass 250ml/8oz unpreserved
Chromium, Hexavalent	18540-29-9	0.8	0.16	mg/kg	80-120	20	75-125	20	20	7196A	30 days	1 - Glass 120ml/4oz unpreserved
Cyanide, Total	57-12-5	1	0.212	mg/kg	80-120	35	75-125	35	35	9010C/9012B	14 days	1 - Glass 250ml/8oz unpreserved
pH	12408-02-5	0		SU	99-101			5	5	9045D	24 hours	1 - Glass 250ml/8oz unpreserved

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Langan Engineering & Environmental

TPH by GC-FID Quantitation Only (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
TPH	NONE	33350	3835.25	ug/kg	40-140	40	40-140	40	40			
Total Petroleum Hydrocarbons (C9-C44)	NONE	33350	3341.67	ug/kg	40-140	40	40-140	40	40			
o-Terphenyl	*84-15-1*									*40-140*		

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Langan Engineering & Environmental

TPH - Gasoline Range Organics (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Vial MeOH preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Gasoline Range Organics	NONE	2500	48.15	ug/kg	80-120	20	80-120	20	20			
1,1,1-Trifluorotoluene	*98-08-8*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		

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TCLP Volatile Organics - EPA 8260C (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Vial Large Septa unpreserved (4oz)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria
Chloroform	67-66-3	7.5	2.22	ug/l	70-130	20	70-130	20	20	
Carbon tetrachloride	56-23-5	5	1.34	ug/l	63-132	20	63-132	20	20	
Tetrachloroethene	127-18-4	5	1.81	ug/l	70-130	20	70-130	20	20	
Chlorobenzene	108-90-7	5	1.78	ug/l	75-130	25	75-130	25	25	
1,2-Dichloroethane	107-06-2	5	1.32	ug/l	70-130	20	70-130	20	20	
Benzene	71-43-2	5	1.59	ug/l	70-130	25	70-130	25	25	
Vinyl chloride	75-01-4	10	0.714	ug/l	55-140	20	55-140	20	20	
1,1-Dichloroethene	75-35-4	5	1.69	ug/l	61-145	25	61-145	25	25	
Trichloroethene	79-01-6	5	1.75	ug/l	70-130	25	70-130	25	25	
1,4-Dichlorobenzene	106-46-7	25	1.87	ug/l	70-130	20	70-130	20	20	
2-Butanone	78-93-3	50	19.4	ug/l	63-138	20	63-138	20	20	
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*
Toluene-d8	*2037-26-5*									*70-130*
4-Bromofluorobenzene	*460-00-4*									*70-130*
Dibromofluoromethane	*1868-53-7*									*70-130*

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TCLP ABN Compounds - EPA 8270D/1311 (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Hexachlorobenzene	118-74-1	10	2.895	ug/l	40-140	30	40-140	30	30			
2,4-Dinitrotoluene	121-14-2	25	4.225	ug/l	40-132	30	40-132	30	30			
Hexachlorobutadiene	87-68-3	10	3.585	ug/l	28-111	30	28-111	30	30			
Hexachloroethane	67-72-1	10	3.41	ug/l	21-105	30	21-105	30	30			
Nitrobenzene	98-95-3	10	3.765	ug/l	40-140	30	40-140	30	30			
2,4,6-Trichlorophenol	88-06-2	25	3.405	ug/l	30-130	30	30-130	30	30			
Pentachlorophenol	87-86-5	50	17.15	ug/l	9-103	30	9-103	30	30			
2-Methylphenol	95-48-7	25	5.1	ug/l	30-130	30	30-130	30	30			
3-Methylphenol/4-Methylphenol	106-44-5	25	5.55	ug/l	30-130	30	30-130	30	30			
2,4,5-Trichlorophenol	95-95-4	25	3.575	ug/l	30-130	30	30-130	30	30			
Pyridine	110-86-1	17.5	9.35	ug/l	10-66	30	10-66	30	30			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*33-120*		

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TCLP Pesticides - EPA 8081B (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Lindane	58-89-9	0.02	0.00434	ug/l	30-150	20	30-150	30	30			
Heptachlor	76-44-8	0.02	0.0031	ug/l	30-150	20	30-150	30	30			
Heptachlor epoxide	1024-57-3	0.02	0.00415	ug/l	30-150	20	30-150	30	30			
Endrin	72-20-8	0.04	0.00429	ug/l	30-150	20	30-150	30	30			
Methoxychlor	72-43-5	0.2	0.00684	ug/l	30-150	20	30-150	30	30			
Toxaphene	8001-35-2	0.2	0.0627	ug/l	30-150	20	30-150	30	30			
Chlordane	57-74-9	0.2	0.0463	ug/l	30-150	20	30-150	30	30			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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TCLP Herbicides - EPA 8151A (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - Glass 250ml/8oz unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	0.025	0.001245	mg/l	30-150	25	30-150	25	25			
2,4,5-TP (Silvex)	93-72-1	0.005	0.0013475	mg/l	30-150	25	30-150	25	25			
DCAA	*19719-28-9*									*30-150*		

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METALS by 6010D (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Arsenic, TCLP	7440-38-2	1	0.019	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Barium, TCLP	7440-39-3	0.5	0.021	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Cadmium, TCLP	7440-43-9	0.1	0.01	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Chromium, TCLP	7440-47-3	0.2	0.021	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Lead, TCLP	7439-92-1	0.5	0.027	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Selenium, TCLP	7782-49-2	0.5	0.035	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved
Silver, TCLP	7440-22-4	0.1	0.028	mg/l	75-125	20	75-125	20	20		180 days	1 - Glass 250ml/8oz unpreserved

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METALS by 7470A (SOIL)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Mercury, TCLP	7439-97-6	0.001	0.00033	mg/l	80-120		80-120	20	20		28 days	1 - Glass 250ml/8oz unpreserved

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TCL Volatiles - EPA 8260C (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,1-Dichloroethane	75-34-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Chloroform	67-66-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Carbon tetrachloride	56-23-5	0.5	0.134	ug/l	63-132	20	63-132	20	20			
1,2-Dichloropropane	78-87-5	1	0.137	ug/l	70-130	20	70-130	20	20			
Dibromochloromethane	124-48-1	0.5	0.149	ug/l	63-130	20	63-130	20	20			
1,1,2-Trichloroethane	79-00-5	1.5	0.5	ug/l	70-130	20	70-130	20	20			
Tetrachloroethene	127-18-4	0.5	0.181	ug/l	70-130	20	70-130	20	20			
Chlorobenzene	108-90-7	2.5	0.7	ug/l	75-130	20	75-130	20	20			
Trichlorofluoromethane	75-69-4	2.5	0.7	ug/l	62-150	20	62-150	20	20			
1,2-Dichloroethane	107-06-2	0.5	0.132	ug/l	70-130	20	70-130	20	20			
1,1,1-Trichloroethane	71-55-6	2.5	0.7	ug/l	67-130	20	67-130	20	20			
Bromodichloromethane	75-27-4	0.5	0.192	ug/l	67-130	20	67-130	20	20			
trans-1,3-Dichloropropene	10061-02-6	0.5	0.164	ug/l	70-130	20	70-130	20	20			
cis-1,3-Dichloropropene	10061-01-5	0.5	0.144	ug/l	70-130	20	70-130	20	20			
1,3-Dichloropropene, Total	542-75-6	0.5	0.144	ug/l				20	20			
1,3-Dichloropropene, Total	542-75-6	0.5	0.144	ug/l				20	20			
1,1-Dichloropropene	563-58-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Bromoform	75-25-2	2	0.65	ug/l	54-136	20	54-136	20	20			
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.167	ug/l	67-130	20	67-130	20	20			
Benzene	71-43-2	0.5	0.159	ug/l	70-130	20	70-130	20	20			
Toluene	108-88-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Ethylbenzene	100-41-4	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Chloromethane	74-87-3	2.5	0.7	ug/l	64-130	20	64-130	20	20			
Bromomethane	74-83-9	2.5	0.7	ug/l	39-139	20	39-139	20	20			
Vinyl chloride	75-01-4	1	0.0714	ug/l	55-140	20	55-140	20	20			
Chloroethane	75-00-3	2.5	0.7	ug/l	55-138	20	55-138	20	20			
1,1-Dichloroethene	75-35-4	0.5	0.169	ug/l	61-145	20	61-145	20	20			
trans-1,2-Dichloroethene	156-60-5	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Trichloroethene	79-01-6	0.5	0.175	ug/l	70-130	20	70-130	20	20			
1,2-Dichlorobenzene	95-50-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,3-Dichlorobenzene	541-73-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,4-Dichlorobenzene	106-46-7	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Methyl tert butyl ether	1634-04-4	2.5	0.7	ug/l	63-130	20	63-130	20	20			
p/m-Xylene	179601-23-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
o-Xylene	95-47-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Xylene (Total)	1330-20-7	2.5	0.7	ug/l				20	20			
Xylene (Total)	1330-20-7	2.5	0.7	ug/l				20	20			
cis-1,2-Dichloroethene	156-59-2	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2-Dichloroethene (total)	540-59-0	2.5	0.7	ug/l				20	20			
1,2-Dichloroethene (total)	540-59-0	2.5	0.7	ug/l				20	20			
Dibromomethane	74-95-3	5	1	ug/l	70-130	20	70-130	20	20			

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TCL Volatiles - EPA 8260C (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,2,3-Trichloropropane	96-18-4	2.5	0.7	ug/l	64-130	20	64-130	20	20			
Acrylonitrile	107-13-1	5	1.5	ug/l	70-130	20	70-130	20	20			
Styrene	100-42-5	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Dichlorodifluoromethane	75-71-8	5	1	ug/l	36-147	20	36-147	20	20			
Acetone	67-64-1	5	1.46	ug/l	58-148	20	58-148	20	20			
Carbon disulfide	75-15-0	5	1	ug/l	51-130	20	51-130	20	20			
2-Butanone	78-93-3	5	1.94	ug/l	63-138	20	63-138	20	20			
Vinyl acetate	108-05-4	5	1	ug/l	70-130	20	70-130	20	20			
4-Methyl-2-pentanone	108-10-1	5	1	ug/l	59-130	20	59-130	20	20			
2-Hexanone	591-78-6	5	1	ug/l	57-130	20	57-130	20	20			
Bromochloromethane	74-97-5	2.5	0.7	ug/l	70-130	20	70-130	20	20			
2,2-Dichloropropane	594-20-7	2.5	0.7	ug/l	63-133	20	63-133	20	20			
1,2-Dibromoethane	106-93-4	2	0.65	ug/l	70-130	20	70-130	20	20			
1,3-Dichloropropane	142-28-9	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,1,1,2-Tetrachloroethane	630-20-6	2.5	0.7	ug/l	64-130	20	64-130	20	20			
Bromobenzene	108-86-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
n-Butylbenzene	104-51-8	2.5	0.7	ug/l	53-136	20	53-136	20	20			
sec-Butylbenzene	135-98-8	2.5	0.7	ug/l	70-130	20	70-130	20	20			
tert-Butylbenzene	98-06-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
o-Chlorotoluene	95-49-8	2.5	0.7	ug/l	70-130	20	70-130	20	20			
p-Chlorotoluene	106-43-4	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2-Dibromo-3-chloropropane	96-12-8	2.5	0.7	ug/l	41-144	20	41-144	20	20			
Hexachlorobutadiene	87-68-3	2.5	0.7	ug/l	63-130	20	63-130	20	20			
Isopropylbenzene	98-82-8	2.5	0.7	ug/l	70-130	20	70-130	20	20			
p-Isopropyltoluene	99-87-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
Naphthalene	91-20-3	2.5	0.7	ug/l	70-130	20	70-130	20	20			
n-Propylbenzene	103-65-1	2.5	0.7	ug/l	69-130	20	69-130	20	20			
1,2,3-Trichlorobenzene	87-61-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2,4-Trichlorobenzene	120-82-1	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,3,5-Trimethylbenzene	108-67-8	2.5	0.7	ug/l	64-130	20	64-130	20	20			
1,2,4-Trimethylbenzene	95-63-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,4-Dioxane	123-91-1	250	60.8	ug/l	56-162	20	56-162	20	20			
1,4-Diethylbenzene	105-05-5	2	0.7	ug/l	70-130	20	70-130	20	20			
4-Ethyltoluene	622-96-8	2	0.7	ug/l	70-130	20	70-130	20	20			
1,2,4,5-Tetramethylbenzene	95-93-2	2	0.542	ug/l	70-130	20	70-130	20	20			
Ethyl ether	60-29-7	2.5	0.7	ug/l	59-134	20	59-134	20	20			
trans-1,4-Dichloro-2-butene	110-57-6	2.5	0.7	ug/l	70-130	20	70-130	20	20			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

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NYTCL Semivolatiles - EPA 8270D (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	2	0.591	ug/l	37-111	30	37-111	30	30			
1,2,4-Trichlorobenzene	120-82-1	5	0.661	ug/l	39-98	30	39-98	30	30			
Hexachlorobenzene	118-74-1	2	0.579	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethyl)ether	111-44-4	2	0.669	ug/l	40-140	30	40-140	30	30			
2-Chloronaphthalene	91-58-7	2	0.64	ug/l	40-140	30	40-140	30	30			
1,2-Dichlorobenzene	95-50-1	2	0.732	ug/l	40-140	30	40-140	30	30			
1,3-Dichlorobenzene	541-73-1	2	0.688	ug/l	40-140	30	40-140	30	30			
1,4-Dichlorobenzene	106-46-7	2	0.708	ug/l	36-97	30	36-97	30	30			
3,3'-Dichlorobenzidine	91-94-1	5	1.39	ug/l	40-140	30	40-140	30	30			
2,4-Dinitrotoluene	121-14-2	5	0.845	ug/l	48-143	30	48-143	30	30			
2,6-Dinitrotoluene	606-20-2	5	1.12	ug/l	40-140	30	40-140	30	30			
Fluoranthene	206-44-0	2	0.568	ug/l	40-140	30	40-140	30	30			
4-Chlorophenyl phenyl ether	7005-72-3	2	0.625	ug/l	40-140	30	40-140	30	30			
4-Bromophenyl phenyl ether	101-55-3	2	0.731	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroisopropyl)ether	108-60-1	2	0.696	ug/l	40-140	30	40-140	30	30			
Bis(2-chloroethoxy)methane	111-91-1	5	0.626	ug/l	40-140	30	40-140	30	30			
Hexachlorobutadiene	87-68-3	2	0.717	ug/l	40-140	30	40-140	30	30			
Hexachlorocyclopentadiene	77-47-4	20	7.84	ug/l	40-140	30	40-140	30	30			
Hexachloroethane	67-72-1	2	0.682	ug/l	40-140	30	40-140	30	30			
Isophorone	78-59-1	5	0.601	ug/l	40-140	30	40-140	30	30			
Naphthalene	91-20-3	2	0.68	ug/l	40-140	30	40-140	30	30			
Nitrobenzene	98-95-3	2	0.753	ug/l	40-140	30	40-140	30	30			
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	2	0.644	ug/l	40-140	30	40-140	30	30			
n-Nitrosodi-n-propylamine	621-64-7	5	0.7	ug/l	29-132	30	29-132	30	30			
Bis(2-Ethylhexyl)phthalate	117-81-7	3	0.91	ug/l	40-140	30	40-140	30	30			
Butyl benzyl phthalate	85-68-7	5	1.26	ug/l	40-140	30	40-140	30	30			
Di-n-butylphthalate	84-74-2	5	0.689	ug/l	40-140	30	40-140	30	30			
Di-n-octylphthalate	117-84-0	5	1.14	ug/l	40-140	30	40-140	30	30			
Diethyl phthalate	84-66-2	5	0.628	ug/l	40-140	30	40-140	30	30			
Dimethyl phthalate	131-11-3	5	0.65	ug/l	40-140	30	40-140	30	30			
Benzo(a)anthracene	56-55-3	2	0.61	ug/l	40-140	30	40-140	30	30			
Benzo(a)pyrene	50-32-8	2	0.539	ug/l	40-140	30	40-140	30	30			
Benzo(b)fluoranthene	205-99-2	2	0.635	ug/l	40-140	30	40-140	30	30			
Benzo(k)fluoranthene	207-08-9	2	0.597	ug/l	40-140	30	40-140	30	30			
Chrysene	218-01-9	2	0.543	ug/l	40-140	30	40-140	30	30			
Acenaphthylene	208-96-8	2	0.658	ug/l	45-123	30	45-123	30	30			
Anthracene	120-12-7	2	0.645	ug/l	40-140	30	40-140	30	30			
Benzo(ghi)perylene	191-24-2	2	0.611	ug/l	40-140	30	40-140	30	30			
Fluorene	86-73-7	2	0.619	ug/l	40-140	30	40-140	30	30			
Phenanthrene	85-01-8	2	0.613	ug/l	40-140	30	40-140	30	30			
Dibenzo(a,h)anthracene	53-70-3	2	0.548	ug/l	40-140	30	40-140	30	30			
Indeno(1,2,3-cd)Pyrene	193-39-5	2	0.707	ug/l	40-140	30	40-140	30	30			

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NYTCL Semivolatiles - EPA 8270D (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria
Pyrene	129-00-0	2	0.569	ug/l	26-127	30	26-127	30	30	
Biphenyl	92-52-4	2	0.757	ug/l	40-140	30	40-140	30	30	
4-Chloroaniline	106-47-8	5	0.632	ug/l	40-140	30	40-140	30	30	
2-Nitroaniline	88-74-4	5	1.14	ug/l	52-143	30	52-143	30	30	
3-Nitroaniline	99-09-2	5	1.22	ug/l	25-145	30	25-145	30	30	
4-Nitroaniline	100-01-6	5	1.3	ug/l	51-143	30	51-143	30	30	
Dibenzofuran	132-64-9	2	0.656	ug/l	40-140	30	40-140	30	30	
2-Methylnaphthalene	91-57-6	2	0.72	ug/l	40-140	30	40-140	30	30	
Acetophenone	98-86-2	5	0.847	ug/l	39-129	30	39-129	30	30	
2,4,6-Trichlorophenol	88-06-2	5	0.681	ug/l	30-130	30	30-130	30	30	
P-Chloro-M-Cresol	59-50-7	2	0.617	ug/l	23-97	30	23-97	30	30	
2-Chlorophenol	95-57-8	2	0.631	ug/l	27-123	30	27-123	30	30	
2,4-Dichlorophenol	120-83-2	5	0.769	ug/l	30-130	30	30-130	30	30	
2,4-Dimethylphenol	105-67-9	5	1.64	ug/l	30-130	30	30-130	30	30	
2-Nitrophenol	88-75-5	10	1.52	ug/l	30-130	30	30-130	30	30	
4-Nitrophenol	100-02-7	10	1.77	ug/l	10-80	30	10-80	30	30	
2,4-Dinitrophenol	51-28-5	20	5.47	ug/l	20-130	30	20-130	30	30	
4,6-Dinitro-o-cresol	534-52-1	10	2.1	ug/l	20-164	30	20-164	30	30	
Pentachlorophenol	87-86-5	10	3.43	ug/l	9-103	30	9-103	30	30	
Phenol	108-95-2	5	1.89	ug/l	12-110	30	12-110	30	30	
2-Methylphenol	95-48-7	5	1.02	ug/l	30-130	30	30-130	30	30	
3-Methylphenol/4-Methylphenol	106-44-5	5	1.11	ug/l	30-130	30	30-130	30	30	
2,4,5-Trichlorophenol	95-95-4	5	0.715	ug/l	30-130	30	30-130	30	30	
Benzoic Acid	65-85-0	50	12.9	ug/l	10-164	30	10-164	30	30	
Benzyl Alcohol	100-51-6	2	0.725	ug/l	26-116	30	26-116	30	30	
Carbazole	86-74-8	2	0.627	ug/l	55-144	30	55-144	30	30	
2-Fluorophenol	*367-12-4*									*21-120*
Phenol-d6	*13127-88-3*									*10-120*
Nitrobenzene-d5	*4165-60-0*									*23-120*
2-Fluorobiphenyl	*321-60-8*									*15-120*
2,4,6-Tribromophenol	*118-79-6*									*10-120*
4-Terphenyl-d14	*1718-51-0*									*41-149*

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NYTCL Semivolatiles -EPA 8270D-SIM (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Acenaphthene	83-32-9	0.1	0.035	ug/l	40-140	40	40-140	40	40			
2-Chloronaphthalene	91-58-7	0.2	0.035	ug/l	40-140	40	40-140	40	40			
Fluoranthene	206-44-0	0.1	0.038	ug/l	40-140	40	40-140	40	40			
Hexachlorobutadiene	87-68-3	0.5	0.036	ug/l	40-140	40	40-140	40	40			
Naphthalene	91-20-3	0.1	0.043	ug/l	40-140	40	40-140	40	40			
Benzo(a)anthracene	56-55-3	0.1	0.018	ug/l	40-140	40	40-140	40	40			
Benzo(a)pyrene	50-32-8	0.1	0.039	ug/l	40-140	40	40-140	40	40			
Benzo(b)fluoranthene	205-99-2	0.1	0.016	ug/l	40-140	40	40-140	40	40			
Benzo(k)fluoranthene	207-08-9	0.1	0.042	ug/l	40-140	40	40-140	40	40			
Chrysene	218-01-9	0.1	0.038	ug/l	40-140	40	40-140	40	40			
Acenaphthylene	208-96-8	0.1	0.035	ug/l	40-140	40	40-140	40	40			
Anthracene	120-12-7	0.1	0.035	ug/l	40-140	40	40-140	40	40			
Benzo(ghi)perylene	191-24-2	0.1	0.042	ug/l	40-140	40	40-140	40	40			
Fluorene	86-73-7	0.1	0.037	ug/l	40-140	40	40-140	40	40			
Phenanthrene	85-01-8	0.1	0.015	ug/l	40-140	40	40-140	40	40			
Dibenzo(a,h)anthracene	53-70-3	0.1	0.039	ug/l	40-140	40	40-140	40	40			
Indeno(1,2,3-cd)Pyrene	193-39-5	0.1	0.04	ug/l	40-140	40	40-140	40	40			
Pyrene	129-00-0	0.1	0.04	ug/l	40-140	40	40-140	40	40			
2-Methylnaphthalene	91-57-6	0.1	0.045	ug/l	40-140	40	40-140	40	40			
Pentachlorophenol	87-86-5	0.8	0.22	ug/l	40-140	40	40-140	40	40			
Hexachlorobenzene	118-74-1	0.8	0.032	ug/l	40-140	40	40-140	40	40			
Hexachloroethane	67-72-1	0.8	0.03	ug/l	40-140	40	40-140	40	40			
2-Fluorophenol	*367-12-4*									*21-120*		
Phenol-d6	*13127-88-3*									*10-120*		
Nitrobenzene-d5	*4165-60-0*									*23-120*		
2-Fluorobiphenyl	*321-60-8*									*15-120*		
2,4,6-Tribromophenol	*118-79-6*									*10-120*		
4-Terphenyl-d14	*1718-51-0*									*41-149*		

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TCL Pesticides - EPA 8081B (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 120ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria
Delta-BHC	319-86-8	0.02	0.00467	ug/l	30-150	20	30-150	30	30	
Lindane	58-89-9	0.02	0.00434	ug/l	30-150	20	30-150	30	30	
Alpha-BHC	319-84-6	0.02	0.00439	ug/l	30-150	20	30-150	30	30	
Beta-BHC	319-85-7	0.02	0.0056	ug/l	30-150	20	30-150	30	30	
Heptachlor	76-44-8	0.02	0.0031	ug/l	30-150	20	30-150	30	30	
Aldrin	309-00-2	0.02	0.00216	ug/l	30-150	20	30-150	30	30	
Heptachlor epoxide	1024-57-3	0.02	0.00415	ug/l	30-150	20	30-150	30	30	
Endrin	72-20-8	0.04	0.00429	ug/l	30-150	20	30-150	30	30	
Endrin aldehyde	7421-93-4	0.04	0.0081	ug/l	30-150	20	30-150	30	30	
Endrin ketone	53494-70-5	0.04	0.00477	ug/l	30-150	20	30-150	30	30	
Dieldrin	60-57-1	0.04	0.00429	ug/l	30-150	20	30-150	30	30	
4,4'-DDE	72-55-9	0.04	0.00381	ug/l	30-150	20	30-150	30	30	
4,4'-DDD	72-54-8	0.04	0.00464	ug/l	30-150	20	30-150	30	30	
4,4'-DDT	50-29-3	0.04	0.00432	ug/l	30-150	20	30-150	30	30	
Endosulfan I	959-98-8	0.02	0.00345	ug/l	30-150	20	30-150	30	30	
Endosulfan II	33213-65-9	0.04	0.00519	ug/l	30-150	20	30-150	30	30	
Endosulfan sulfate	1031-07-8	0.04	0.00481	ug/l	30-150	20	30-150	30	30	
Methoxychlor	72-43-5	0.2	0.00684	ug/l	30-150	20	30-150	30	30	
Toxaphene	8001-35-2	0.2	0.0627	ug/l	30-150	20	30-150	30	30	
cis-Chlordane	5103-71-9	0.02	0.00666	ug/l	30-150	20	30-150	30	30	
trans-Chlordane	5103-74-2	0.02	0.00627	ug/l	30-150	20	30-150	30	30	
Chlordane	57-74-9	0.2	0.0463	ug/l	30-150	20	30-150	30	30	
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*
Decachlorobiphenyl	*2051-24-3*									*30-150*

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Herbicides -EPA 8151A (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
2,4-D	94-75-7	10	0.498	ug/l	30-150	25	30-150	25	25			
2,4,5-T	93-76-5	2	0.531	ug/l	30-150	25	30-150	25	25			
2,4,5-TP (Silvex)	93-72-1	2	0.539	ug/l	30-150	25	30-150	25	25			
DCAA	*19719-28-9*									*30-150*		

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TCL PCBs - EPA 8082A (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Aroclor 1016	12674-11-2	0.083	0.019588	ug/l	40-140	50	40-140	50	50			
Aroclor 1221	11104-28-2	0.083	0.031872	ug/l	40-140	50	40-140	50	50			
Aroclor 1232	11141-16-5	0.083	0.027058	ug/l	40-140	50	40-140	50	50			
Aroclor 1242	53469-21-9	0.083	0.029548	ug/l	40-140	50	40-140	50	50			
Aroclor 1248	12672-29-6	0.083	0.022576	ug/l	40-140	50	40-140	50	50			
Aroclor 1254	11097-69-1	0.083	0.034611	ug/l	40-140	50	40-140	50	50			
Aroclor 1260	11096-82-5	0.083	0.01992	ug/l	40-140	50	40-140	50	50			
Aroclor 1262	37324-23-5	0.083	0.017098	ug/l	40-140	50	40-140	50	50			
Aroclor 1268	11100-14-4	0.083	0.027058	ug/l	40-140	50	40-140	50	50			
PCBs, Total	1336-36-3	0.083	0.017098	ug/l				50	50			
PCBs, Total	1336-36-3	0.083	0.017098	ug/l				50	50			
2,4,5,6-Tetrachloro-m-xylene	*877-09-8*									*30-150*		
Decachlorobiphenyl	*2051-24-3*									*30-150*		

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METALS by 6020B (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Aluminum, Total	7429-90-5	0.01	0.00327	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Antimony, Total	7440-36-0	0.004	0.000429	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Arsenic, Total	7440-38-2	0.0005	0.000165	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Barium, Total	7440-39-3	0.0005	0.000173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Beryllium, Total	7440-41-7	0.0005	0.000107	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cadmium, Total	7440-43-9	0.0002	0.0000599	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Calcium, Total	7440-70-2	0.1	0.0394	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Chromium, Total	7440-47-3	0.001	0.000178	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Cobalt, Total	7440-48-4	0.0005	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Copper, Total	7440-50-8	0.001	0.000384	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Iron, Total	7439-89-6	0.05	0.0191	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Lead, Total	7439-92-1	0.001	0.000343	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Magnesium, Total	7439-95-4	0.07	0.0242	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Manganese, Total	7439-96-5	0.001	0.00044	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Nickel, Total	7440-02-0	0.002	0.000556	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Potassium, Total	7440-09-7	0.1	0.0309	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Selenium, Total	7782-49-2	0.005	0.00173	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Silver, Total	7440-22-4	0.0004	0.000163	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Sodium, Total	7440-23-5	0.1	0.0293	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Thallium, Total	7440-28-0	0.0005	0.000143	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Vanadium, Total	7440-62-2	0.005	0.00157	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved
Zinc, Total	7440-66-6	0.01	0.00341	mg/l	80-120		75-125	20	20		180 days	1 - Plastic 500ml HNO3 preserved

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METALS by 7470A (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria	Holding Time	Container/Sample Preservation
Mercury, Total	7439-97-6	0.0002	0.000066	mg/l	80-120		75-125	20	20		28 days	1 - Plastic 500ml HNO3 preserved

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WETCHEM (WATER)

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Method	Holding Time	Container/Sample Preservation
Chromium, Hexavalent	18540-29-9	0.01	0.003	mg/l	85-115	20	85-115	20	20	7196A	24 hours	1 - Plastic 500ml unpreserved
Cyanide, Total	57-12-5	0.005	0.0018	mg/l	85-115	20	80-120	20	20	9010C/9012B	14 days	1 - Plastic 250ml NaOH preserved

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TPH by GC-FID Quantitation Only (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 1000ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
TPH	NONE	200	42	ug/l	40-140	40	40-140	40	40			
Total Petroleum Hydrocarbons (C9-C44)	NONE	500	43.1	ug/l	40-140	40	40-140	40	40			
o-Terphenyl	*84-15-1*									*40-140*		

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TPH - Gasoline Range Organics (WATER)

Holding Time: 14 days
Container/Sample Preservation: 3 - Vial HCl preserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Gasoline Range Organics	NONE	50	3.048	ug/l	80-120	20	80-120	20	20			
1,1,1-Trifluorotoluene	*98-08-8*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		

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1,4 Dioxane via EPA 8270D-SIM (WATER)

Holding Time: 7 days
Container/Sample Preservation: 2 - Amber 500ml unpreserved

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,4-Dioxane	123-91-1	150	75	ng/l	40-140	30	40-140	30	30			
1,4-Dioxane-d8	*17647-74-4*									*15-110*		
1,4-Dioxane-d8 (IS)	17647-74-4			ng/l								

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NY PFAAs via EPA 537(M)-Isotope Dilution (WATER)

Holding Time: 14 days
Container/Sample Preservation: 1 - 3 Plastic Trizma/1 Plastic/1 H20+Trizma

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Perfluorobutanoic Acid (PFBA)	375-22-4	2	0.1312	ng/l	50-150	30	50-150	30	30			
Perfluoropentanoic Acid (PFPeA)	2706-90-3	2	0.0856	ng/l	50-150	30	50-150	30	30			
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	2	0.11	ng/l	50-150	30	50-150	30	30			
Perfluorohexanoic Acid (PFHxA)	307-24-4	2	0.1264	ng/l	50-150	30	50-150	30	30			
Perfluoroheptanoic Acid (PFHpA)	375-85-9	2	0.0924	ng/l	50-150	30	50-150	30	30			
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4	2	0.1076	ng/l	50-150	30	50-150	30	30			
Perfluorooctanoic Acid (PFOA)	335-67-1	2	0.0504	ng/l	50-150	30	50-150	30	30			
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	27619-97-2	2	0.194	ng/l	50-150	30	50-150	30	30			
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	2	0.1552	ng/l	50-150	30	50-150	30	30			
Perfluorononanoic Acid (PFNA)	375-95-1	2	0.1008	ng/l	50-150	30	50-150	30	30			
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	2	0.1116	ng/l	50-150	30	50-150	30	30			
Perfluorodecanoic Acid (PFDA)	335-76-2	2	0.1904	ng/l	50-150	30	50-150	30	30			
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	39108-34-4	2	0.2908	ng/l	50-150	30	50-150	30	30			
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSA	2355-31-9	2	0.2504	ng/l	50-150	30	50-150	30	30			
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	2	0.1912	ng/l	50-150	30	50-150	30	30			
Perfluorodecanesulfonic Acid (PFDS)	335-77-3	2	0.2224	ng/l	50-150	30	50-150	30	30			
Perfluorooctanesulfonamide (FOSA)	754-91-6	2	0.2268	ng/l	50-150	30	50-150	30	30			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6	2	0.3728	ng/l	50-150	30	50-150	30	30			
Perfluorododecanoic Acid (PFDoA)	307-55-1	2	0.0916	ng/l	50-150	30	50-150	30	30			
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8	2	0.0904	ng/l	50-150	30	50-150	30	30			
Perfluorotetradecanoic Acid (PFTA)	376-06-7	2	0.072	ng/l	50-150	30	50-150	30	30			
Perfluoro[13C4]Butanoic Acid (MPFBA)	*NONE*									*50-150*		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	*NONE*									*50-150*		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	*NONE*									*50-150*		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	*NONE*									*50-150*		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	*NONE*									*50-150*		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	*NONE*									*50-150*		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	*NONE*									*50-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-	*NONE*									*50-150*		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	*NONE*									*50-150*		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	*NONE*									*50-150*		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	*NONE*									*50-150*		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-	*NONE*									*50-150*		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid	*NONE*									*50-150*		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	*NONE*									*50-150*		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	*NONE*									*50-150*		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (	*NONE*									*50-150*		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	*NONE*									*50-150*		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	*NONE*									*50-150*		

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Volatile Organics in Air: TO-15 (SOIL_VAPOR)

Holding Time: 30 days
Container/Sample Preservation: 1 - Canister - 2.7 Liter

Analyte	CAS #	RL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,1,1-Trichloroethane	71-55-6	1.09	$\mu g/m^3$	70-130			25	25			
1,1,2,2-Tetrachloroethane	79-34-5	1.37	$\mu g/m^3$	70-130			25	25			
1,1,2-Trichloroethane	79-00-5	1.09	$\mu g/m^3$	70-130			25	25			
1,1-Dichloroethane	75-34-3	0.809	$\mu g/m^3$	70-130			25	25			
1,1-Dichloroethene	75-35-4	0.793	$\mu g/m^3$	70-130			25	25			
1,2,3-Trimethylbenzene	526-73-8		$\mu g/m^3$	70-130			25	25			
1,2,4-Trichlorobenzene	120-82-1	1.48	$\mu g/m^3$	70-130			25	25			
1,2,4-Trimethylbenzene	95-63-6	0.983	$\mu g/m^3$	70-130			25	25			
1,2,4,5-Tetramethylbenzene	95-93-2		$\mu g/m^3$	70-130			25	25			
1,2-Dibromoethane	106-93-4	1.54	$\mu g/m^3$	70-130			25	25			
1,2-Dichlorobenzene	95-50-1	1.2	$\mu g/m^3$	70-130			25	25			
1,2-Dichloroethane	107-06-2	0.809	$\mu g/m^3$	70-130			25	25			
1,2-Dichloropropane	78-87-5	0.924	$\mu g/m^3$	70-130			25	25			
1,3,5-Trimethylbenzene	108-67-8	0.983	$\mu g/m^3$	70-130			25	25			
1,3-Butadiene	106-99-0	0.442	$\mu g/m^3$	70-130			25	25			
1,3-Dichlorobenzene	541-73-1	1.2	$\mu g/m^3$	70-130			25	25			
1,4-Dichlorobenzene	106-46-7	1.2	$\mu g/m^3$	70-130			25	25			
1,4-Dioxane	123-91-1	0.721	$\mu g/m^3$	70-130			25	25			
2,2,4-Trimethylpentane	540-84-1	0.934	$\mu g/m^3$	70-130			25	25			
2-Butanone	78-93-3	1.47	$\mu g/m^3$	70-130			25	25			
2-Hexanone	591-78-6	0.82	$\mu g/m^3$	70-130			25	25			
2-Methylthiophene	554-14-3		$\mu g/m^3$	70-130			25	25			
3-Methylthiophene	616-44-4		$\mu g/m^3$	70-130			25	25			
3-Chloropropene	107-05-1	0.626	$\mu g/m^3$	70-130			25	25			
2-Ethylthiophene	872-55-9		$\mu g/m^3$	70-130			25	25			
4-Ethyltoluene	622-96-8	0.983	$\mu g/m^3$	70-130			25	25			
Acetone	67-64-1	2.38	$\mu g/m^3$	70-130			25	25			
Benzene	71-43-2	0.639	$\mu g/m^3$	70-130			25	25			
Benzyl chloride	100-44-7	1.04	$\mu g/m^3$	70-130			25	25			
Benzothiophene	95-15-8		$\mu g/m^3$	70-130			25	25			
Bromodichloromethane	75-27-4	1.34	$\mu g/m^3$	70-130			25	25			
Bromoform	75-25-2	2.07	$\mu g/m^3$	70-130			25	25			
Bromomethane	74-83-9	0.777	$\mu g/m^3$	70-130			25	25			
Carbon disulfide	75-15-0	0.623	$\mu g/m^3$	70-130			25	25			
Carbon tetrachloride	56-23-5	1.26	$\mu g/m^3$	70-130			25	25			
Chlorobenzene	108-90-7	0.921	$\mu g/m^3$	70-130			25	25			
Chloroethane	75-00-3	0.528	$\mu g/m^3$	70-130			25	25			
Chloroform	67-66-3	0.977	$\mu g/m^3$	70-130			25	25			
Chloromethane	74-87-3	0.413	$\mu g/m^3$	70-130			25	25			
cis-1,2-Dichloroethene	156-59-2	0.793	$\mu g/m^3$	70-130			25	25			
cis-1,3-Dichloropropene	10061-01-5	0.908	$\mu g/m^3$	70-130			25	25			
Cyclohexane	110-82-7	0.688	$\mu g/m^3$	70-130			25	25			

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Volatile Organics in Air: TO-15 (SOIL_VAPOR)

Holding Time: 30 days
Container/Sample Preservation: 1 - Canister - 2.7 Liter

Analyte	CAS #	RL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Dibromochloromethane	124-48-1	1.7	$\mu g/m^3$	70-130			25	25			
Dichlorodifluoromethane	75-71-8	0.989	$\mu g/m^3$	70-130			25	25			
Ethyl Alcohol	GCDAI06	9.42	$\mu g/m^3$	70-130			25	25			
Ethyl Acetate	141-78-6	1.8	$\mu g/m^3$	70-130			25	25			
Ethylbenzene	100-41-4	0.869	$\mu g/m^3$	70-130			25	25			
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	1.53	$\mu g/m^3$	70-130			25	25			
1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	1.4	$\mu g/m^3$	70-130			25	25			
Hexachlorobutadiene	87-68-3	2.13	$\mu g/m^3$	70-130			25	25			
iso-Propyl Alcohol	67-63-0	1.23	$\mu g/m^3$	70-130			25	25			
Methylene chloride	75-09-2	1.74	$\mu g/m^3$	70-130			25	25			
4-Methyl-2-pentanone	108-10-1	2.05	$\mu g/m^3$	70-130			25	25			
Methyl tert butyl ether	1634-04-4	0.721	$\mu g/m^3$	70-130			25	25			
Methyl Methacrylate	80-62-6	2.05	$\mu g/m^3$	70-130			25	25			
p/m-Xylene	179601-23-1	1.74	$\mu g/m^3$	70-130			25	25			
o-Xylene	95-47-6	0.869	$\mu g/m^3$	70-130			25	25			
Xylene (Total)	1330-20-7		$\mu g/m^3$	70-130			25	25			
Heptane	142-82-5	0.82	$\mu g/m^3$	70-130			25	25			
n-Heptane	142-82-5		$\mu g/m^3$	70-130			25	25			
n-Hexane	110-54-3	0.705	$\mu g/m^3$	70-130			25	25			
Propylene	115-07-1	0.861	$\mu g/m^3$	70-130			25	25			
Styrene	100-42-5	0.852	$\mu g/m^3$	70-130			25	25			
Tetrachloroethene	127-18-4	1.36	$\mu g/m^3$	70-130			25	25			
Thiophene	110-02-1		$\mu g/m^3$	70-130			25	25			
Tetrahydrofuran	109-99-9	1.47	$\mu g/m^3$	70-130			25	25			
Toluene	108-88-3	0.754	$\mu g/m^3$	70-130			25	25			
trans-1,2-Dichloroethene	156-60-5	0.793	$\mu g/m^3$	70-130			25	25			
1,2-Dichloroethene (total)	540-59-0		$\mu g/m^3$	70-130			25	25			
trans-1,3-Dichloropropene	10061-02-6	0.908	$\mu g/m^3$	70-130			25	25			
1,3-Dichloropropene, Total	542-75-6		$\mu g/m^3$	70-130			25	25			
Trichloroethene	79-01-6	1.07	$\mu g/m^3$	70-130			25	25			
Trichlorofluoromethane	75-69-4	1.12	$\mu g/m^3$	70-130			25	25			
Vinyl acetate	108-05-4	3.52	$\mu g/m^3$	70-130			25	25			
Vinyl bromide	593-60-2	0.874	$\mu g/m^3$	70-130			25	25			
Vinyl chloride	75-01-4	0.511	$\mu g/m^3$	70-130			25	25			
Naphthalene	91-20-3	1.05	$\mu g/m^3$	70-130			25	25			
Total HC As Hexane	NONE		$\mu g/m^3$	70-130			25	25			
Total VOCs As Toluene	NONE		$\mu g/m^3$	70-130			25	25			
Propane	74-98-6	0.902	$\mu g/m^3$	70-130			25	25			
Acrylonitrile	107-13-1	1.09	$\mu g/m^3$	70-130			25	25			
Acrolein	107-02-8	1.15	$\mu g/m^3$	70-130			25	25			
1,1,1,2-Tetrachloroethane	630-20-6	1.37	$\mu g/m^3$	70-130			25	25			
Isopropylbenzene	98-82-8	0.983	$\mu g/m^3$	70-130			25	25			

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Volatile Organics in Air: TO-15 (SOIL_VAPOR)

Holding Time: 30 days
Container/Sample Preservation: 1 - Canister - 2.7 Liter

Analyte	CAS #	RL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
1,2,3-Trichloropropane	96-18-4	1.21	$\mu g/m^3$	70-130			25	25			
Acetonitrile	75-05-8	0.336	$\mu g/m^3$	70-130			25	25			
Bromobenzene	108-86-1	0.793	$\mu g/m^3$	70-130			25	25			
Chlorodifluoromethane	75-45-6	0.707	$\mu g/m^3$	70-130			25	25			
Dichlorofluoromethane	75-43-4	0.842	$\mu g/m^3$	70-130			25	25			
Dibromomethane	74-95-3	1.42	$\mu g/m^3$	70-130			25	25			
Pentane	109-66-0	0.59	$\mu g/m^3$	70-130			25	25			
Octane	111-65-9	0.34	$\mu g/m^3$	70-130			25	25			
Tertiary-Amyl Methyl Ether	994-05-8	0.836	$\mu g/m^3$	70-130			25	25			
o-Chlorotoluene	95-49-8	1.04	$\mu g/m^3$	70-130			25	25			
p-Chlorotoluene	106-43-4	1.04	$\mu g/m^3$	70-130			25	25			
2,2-Dichloropropane	594-20-7	0.924	$\mu g/m^3$	70-130			25	25			
1,1-Dichloropropene	563-58-6	0.908	$\mu g/m^3$	70-130			25	25			
Isopropyl Ether	108-20-3	0.836	$\mu g/m^3$	70-130			25	25			
Ethyl-Tert-Butyl-Ether	637-92-3	0.836	$\mu g/m^3$	70-130			25	25			
1,2,3-Trichlorobenzene	87-61-6	1.48	$\mu g/m^3$	70-130			25	25			
Ethyl ether	60-29-7	0.606	$\mu g/m^3$	70-130			25	25			
n-Butylbenzene	104-51-8	1.1	$\mu g/m^3$	70-130			25	25			
sec-Butylbenzene	135-98-8	1.1	$\mu g/m^3$	70-130			25	25			
tert-Butylbenzene	98-06-6	1.1	$\mu g/m^3$	70-130			25	25			
1,2-Dibromo-3-chloropropane	96-12-8	1.93	$\mu g/m^3$	70-130			25	25			
p-Isopropyltoluene	99-87-6	1.1	$\mu g/m^3$	70-130			25	25			
n-Propylbenzene	103-65-1	0.983	$\mu g/m^3$	70-130			25	25			
1,3-Dichloropropane	142-28-9	0.924	$\mu g/m^3$	70-130			25	25			
Methanol	67-56-1	6.55	$\mu g/m^3$	70-130			25	25			
Acetaldehyde	75-07-0		$\mu g/m^3$	70-130			25	25			
Butane	106-97-8	0.475	$\mu g/m^3$	70-130			25	25			
Nonane (C9)	111-84-2	1.05	$\mu g/m^3$	70-130			25	25			
Decane (C10)	124-18-5	1.16	$\mu g/m^3$	70-130			25	25			
Undecane	1120-21-4	1.28	$\mu g/m^3$	70-130			25	25			
Indane	496-11-7		$\mu g/m^3$	70-130			25	25			
Indene	95-13-6		$\mu g/m^3$	70-130			25	25			
1-Methylnaphthalene	90-12-0		$\mu g/m^3$	70-130			25	25			
Dodecane (C12)	112-40-3	1.39	$\mu g/m^3$	70-130			25	25			
Butyl Acetate	123-86-4	2.38	$\mu g/m^3$	70-130			25	25			
tert-Butyl Alcohol	75-65-0	1.52	$\mu g/m^3$	70-130			25	25			
2-Methylnaphthalene	91-57-6		$\mu g/m^3$	70-130			25	25			
1,2-Dichloroethane-d4	*17060-07-0*								*70-130*		
Toluene-d8	*2037-26-5*								*70-130*		
Bromofluorobenzene	*460-00-4*								*70-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

ATTACHMENT C

Analytical Methods/Quality Assurance Summary Tables

ATTACHMENT C

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Field Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Soil	Total VOCs via PID	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C	Two 40-ml VOC vials with 5ml H_2O, one with MeOH or 3 En Core Samplers (separate container for % solids)	14 days	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	NA	NA	1 per 20 samples
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals + Cyanide	EPA 6010C, EPA 7470A, EPA 7196A, EPA 9014/9010C	Cool to 4°C	2 oz. amber glass jar	6 months, except mercury 28 days					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
Groundwater	Temperature, Turbidity, pH, ORP, Conductivity, DO	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2;no headspace	Three 40-mL VOC vials with Teflon®-lined cap	Analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	Two 1-Liter amber glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6010C, EPA 7470A	HNO_3	250 ml plastic	6 months, except Mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	250 ml plastic	24 hours					
		Cyanide	SM 4500 C/E	NaOH plus 0.6g ascorbic acid	250 ml plastic	14 days					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	Two 1-Liter Amber Glass for Pesticides/PCB	7 days to extract, 40 days after extraction to analysis					
		PCBs	EPA 8082A	Cool to 4°C		7 days to extract, 40 days after extraction to analysis					
		1,4-Dioxane	EPA 8270 SIM	Cool to 4°C	Two 500 ml amber glass	7 days to extract, 40 days after extraction to analysis					
		Per- and poly- fluoroalkyl substances (PFAS)	Modified EPA 537	Cool to 4°C	Two 275 ml plastic	14 days to extract, 28 days after extraction to analysis					
Soil Vapor	Total VOCs, Oxygen, LEL, CO, and H_2S, with MultiGas Meter	TO-15 Listed VOCs	TO-15	Ambient Temperature	2.7-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	NA	NA	1 per 10 samples (minimum 1)	NA
Ambient/Indoor Air	Total VOCs via PID				6-Liter Summa Canister		NA				

Notes:
1. PID - Photoionization Detector
2. VOC - Volatile organic compound
3. EPA - Environmental Protection Agency
4. TCL - Target compound list
5. TAL - Target analyte list
6. ORP - Oxidation reduction potential
7. DO - Dissolved oxygen
8. LEL - Lower explosive limit
9. CO -Carbon monoxide
10. H_2S - Hydrogen sulfide

ATTACHMENT D

Sample Nomenclature

SOP #01 – Sample Nomenclature

INTRODUCTION

The Langan Environmental Group conducts an assortment of site investigations where samples (Vapor, Solids, and Aqueous) are collected and submitted to analytical laboratories for analysis. The results of which are then evaluated and entered into a data base allowing quick submittal to the state regulatory authority (New York State Division of Environmental Conservation [NYSDEC]). In addition, Langan is linking their data management system to graphic and analytical software to enable efficient evaluation of the data as well as creating client-ready presentational material.

SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) is applicable to the general framework for labeling vapor, solid (soil) and aqueous (groundwater) samples that will be submitted for laboratory analysis. The nomenclature being introduced is designed to meet the NYSDEC EQuIS standard and has been incorporated into Langan software scripts to assist project personnel in processing the data. While this SOP is applicable to all site investigation; unanticipated conditions may arise which may require considerable flexibility in complying with this SOP. Therefore, guidance provided in this SOP is presented in terms of general steps and strategies that should be applied; but deviation from this SOP must be reported to the Project Manager (PM) immediately.

GENERAL SAMPLE IDENTIFICATION CONSIDERATIONS

Sample Labels

All sample ware must have a label. Recall that when you are using the Encore™ samples (see below); they are delivered in plastic lined foil bags. You are to label the bags[1]:

All other samples containers including Terra Cores™ must be labeled with laboratory provided self-adhesive labels.

Quick Breakdown of Sample Format

The general format for sample nomenclature is:

---

[1]Both Alpha and York laboratories permit the combining of the three Encore™ into a single bag. This may not be appropriate for all laboratories so please confirm with the labs themselves

LLNN_ID

Where

LL is a grouping of two (2) to four (4) letters signifying the sample media source. In older nomenclature SOPs this portion of the sample identification is commonly referred to as the *Sample Investigation Code*

NN represents a two digit number identifying the specific sample location or sample sequence number

_ ***(underscore)*** is required between the sample lettering and numeric identification and additional modifying data that determines the date of sampling or the depth of the sample interval

ID is a modifier specific to the sample type media (depth of soil sample or date of groundwater sample)

LL – Sample Investigation Code

Langan has devised a list of two to four letters to insure a quick ability to identify the sample investigation.

Code	Investigation
AA	Ambient Air
DS	Drum
EPB	Endpoint Location - Bottom (Excavation)
EPSW	Endpoint Location - Sidewall (Excavation)
FP	Free Product
IA	Indoor Air
IDW	Investigation Derived Waste (Soil Pile)
MW	Monitoring Well (Permanent)
SB	Soil Boring
SG	Staff Gauge (Stream Gauging)
SL	Sludge
SV	Soil Vapor Point
SVE	Soil Vapor Extraction Well
SW	Surface Water
TMW	Temporary Monitoring Well
TP	Test Pit (Excavated Material from Test Pit Not Associated With Sidewall or Bottom Samples)
WC	Waste Characterization Boring
COMP	Composite Sample
TB	Trip Blank (QA/QC Sampling – All Investigations)
FB	Field Blank (QA/QC Sampling – All Investigations)
DUP	Duplicate (QA/QC Sampling – All Investigations)

NN – Numeric Identifier

The two digit number that follows the sample investigation code (LL) identifies the specific sample based on the soil boring, monitoring well, endpoint or other location identification. For a subset of samples where there is no specific location identifier, the two digit number is the sequence number for the sample submitted. For example, an aqueous sample from a monitoring well identified as MW-1 would have the sample investigation code of MW and the numeric identifier as 01. Note there is no hyphen. The same can be done for soil borings, a soil sample collected from soil boring 9 (SB-9) would be have the LLNN identification of SB09 (again, no hyphen).

Note however that there is a subset of samples related to laboratory analytical quality assurance, among these includes TB, FB, and DUP. On many investigations, the Scope will require multiple collections of these types of samples, therefore the numerical number represents the sequence sample count where the first sample is 01, the second sample is 02, and the third sample is 03 and so on.

_ Underscore
The underscore is required. It separates the investigation code and numeric identifier from the modifier specific to the sample itself. Note that every effort should be made to insure that the underscore is clear on the sample label and chain of custody (COC).

ID – Modifier Specific to Type Media
Each sample investigation code and numeric identifier is further modified by an ID specific to the sample type media. In general, soil samples (soil borings or endpoint samples) use an ID that indicates the depth at which the sample was taken. Aqueous samples (groundwater or surface water samples) are identified by the date the sample was collected. Other types of samples including quality control (TB, FB, and DUP), Vapor samples (AA, IA, SV or SVE), other soil type samples (IDW, sludge, free product, drum, and others) are also identified by a date. The following rules apply to the ID when using sample depth or sample date.

Sample Depth
The sample depth must be whole numbers (no fractions) separated by a hyphen. Thus for a soil sample collected from the soil boring SB-1 from a depth of 6 feet to 8 feet, the sample would be identified as:

SB01_6-8

Unfortunately, the NYSDEC EQuIS system does not accept fractions. Therefore, if your sample interval is a fraction of a foot (6.5-7.5), round up to the larger interval (6-8).

Sample Date
The sample date is always in the format of MMDDYY. Note that the year is two digits. Thus for a groundwater sample collected on July 1, 2015 from the monitoring well MW-1, the sample would be identified as:

MW01_070115

Special Cases
There are a couple of specific sample types that require further explanation.

Endpoint Sampling
End point sidewall samples are sometimes modified by magnetic direction (N, S, E, and W). For example, the first sidewall endpoint sample from the north wall of an excavation at a depth of 5 feet would be written as:

EPSW01_N_5

Again, note that the N in the identification refers to north and is separated from the prefix investigation code/numeric identifier and ID modifier suffix by underscores.

Vapor Extraction Well Sample
As with the sidewall endpoint samples, the sample name is altered by inserting a middle modifier between the prefix and suffix of the sample name. The middle modifier is used to identify the source of the sample (inlet sample port, midpoint sample port or outlet sample port). For example the midpoint port of the vapor extraction well number 1 sampled on July 1, 2015 would be written as;

SVE01_MID_070115

Matrix Spike and Matrix Spike Duplicate
On occasion, a Langan investigation will collect a sample to be used to provide the lab with a site specific medium to spike to determine the quality of the analytical method. This special case of sampling requires additional information to be used in the sample name, specifically, a suffix specifying whether the sample is the matrix spike (MS) or the matrix spike duplicate (MSD). In the following example, the sample is collected from soil boring number 1 at a depth of 2-4 feet. For the matrix spike sample:

SB01_2-4_MS

and for the matrix spike duplicate sample:

SB01_2-4_MSD

Multiple Interval Groundwater Sampling
Although not currently a common practice, low flow sampling facilitates stratigraphic sampling of a monitoring well. If the scope requires stratigraphic sampling then groundwater samples will be labeled with a lower case letter following the well number. For example, placing the pump or sampling tube at 10 feet below surface in MW01 on July 1, 2015 would require the sample to be labeled as:

MW01a_070115

While a second sample where the pump or tubing intake is placed at 20 feet would be labeled as:

MW01b_070115

Note that it is important that you record what depth the intake for each sample represents in your field notes; as this information is going to be critical to interpreting the results.

APPENDIX H
REMEDIAL ACTION CONSTRUCTION SCHEDULE

Appendix H
Remediation Schedule

37-11 30th Street
Long Island City, NY
BCP Site No. C241211
Langan Project No. 170512301

Estimated Project Schedule

Item	Action	2018												2019												2020											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	Design, Investigation, and Permitting																																				
2	Site Demolition																																				
3	NYSDEC Review of BCP RAWP																																				
4	45-Day Public Comment Period for RAWP and Issuance of Decision Document																																				
5	Implementation of RAWP with Engineering Oversight																																				
6	Preparation of an Environmental Easement, FER, and SMP (if required)																																				
7	NYSDEC & NYSDOH Review of FER (and SMP, if required)																																				
8	NYSDEC Issues COC (08/31/2020)																																				

Notes:

a) This is an estimated schedule; all items are subject to change.
b) Completion of Item 5 refers to the completion of remediation and not the end of overall construction.
c) BCP = Brownfield Cleanup Program
d) NYSDEC = New York State Department of Environmental Conservation
e) NYSDOH = New York State Department of Health
f) RAWP = Remedial Action Work Plan
g) FER = Final Engineering Report
h) SMP = Site Management Plan
i) COC = Certificate of Completion