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# EXCAVATION WORK PLAN

**691 Lenox Avenue – Phase 1  
New York, New York  
BCP Site No. C231145**

*Prepared for:*

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55 Broadway  
New York, New York, 10002**

*Prepared by:*

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***LANGAN***

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Langan Project No. 170635401**

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Figure 3	Proposed Excavation Area
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## **APPENDICES**

Appendix A	Construction Health and Safety Plan
Appendix B	Proposed Construction Schedule

### CERTIFICATION

I, Jason J. Hayes, certify that I am currently a Qualified Environmental Professional as defined in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 and that this Excavation Work Plan (EWP) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation.



Jason J. Hayes, P.E., LEED AP<sup>®</sup>

## **1.0 INTRODUCTION**

This Excavation Work Plan (EWP) was prepared on behalf of One45 Lenox LLC (the Volunteer) for the property known as 691 Lenox Avenue – Phase 1 in New York, New York (the site). The site was accepted into the New York State Brownfield Cleanup Program (BCP) as a Volunteer and was assigned BCP Site No. C231145. A Brownfield Cleanup Agreement (BCA) was executed on February 1, 2022.

This EWP presents the approach for managing and disposing of fill excavated from the site before the approval of a Remedial Action Work Plan (RAWP) by the New York State Department of Environmental Conservation (NYSDEC). A Change of Use notification will be submitted to the NYSDEC at least 60 days prior to the commencement of work in accordance with Title 6 of New York Codes, Rules, and Regulations (NYCRR). This EWP was developed in accordance with the process and requirements identified in the NYSDEC Division of Environmental Remediation (DER)-10 *Technical Guidance for Site Investigation and Remediation* (May 2010) and 6 NYCRR Part 375.

## 2.0 SITE BACKGROUND

### 2.1 Site Description

The site is located in the Harlem neighborhood of New York, New York and encompasses part of Manhattan Block 2013, Lot 29 (formerly Lots 29 and 33 and part of Lot 38). The site is about 34,400 square feet ( $\pm$  0.79 acres) in area and is part of a larger, two-part development property known as “One45”. The second half of the development property, known as “691 Lenox Avenue – Phase 2”, adjoins the site to the west and comprises the remainder of Block 2013, Lot 29 (formerly Lots 44, 50, and the remainder of Lot 38). The New York City Department of Finance (NYCDOF) approved a tax lot merger to combine Block 2013, Lots 29, 33, 38, 44 and 50 on June 23, 2021.

The site is currently improved with one-story commercial buildings with storage mezzanines and partial cellars (former Lots 29 and 38) and vacant land (former Lot 33). Tenants/uses include retail stores, a vacant former nail salon, an Islamic religious center, a vacant former pharmacy, a restaurant, and a community center on former Lot 29; and retail stores, a vacant former laundromat, and restaurants on former Lot 38. A site location map is presented as Figure 1 and a site plan is presented as Figure 2.

The site is bound by West 145<sup>th</sup> Street followed by a multi-story mixed-use residential and commercial buildings and a self-storage facility to the north; Lenox Avenue followed by Colonel Charles Young Playground to the east; multi-story residential buildings (owned and operated by the New York City Housing Authority [NYCHA]) and West 144<sup>th</sup> Street, followed by multi-family residential buildings and a church and community center to the south; and an out-of-service gas station, followed by an active gas station and multi-story residential buildings to the west.

### 2.2 Notification

The NYSDEC will be notified at least 14 days prior to excavation and earthwork activities subject to this EWP. Site contact information is included in the following table:

Personnel	Role	Contact Information
Bruce Teitelbaum One45 Lenox LLC	Owner	Phone – 646-228-4080 Email – <a href="mailto:tnadal@pointsfive.com">tnadal@pointsfive.com</a>
Tristan Nadal Lenox 145 DM LLC	Owners Representative	Phone – 646-228-4080 Email – <a href="mailto:tnadal@pointsfive.com">tnadal@pointsfive.com</a>
Mimi S. Raygorodetsky Langan Engineering	Project Director	Phone – 212-479-5441 Email – <a href="mailto:mraygorodetsky@langan.com">mraygorodetsky@langan.com</a>
Gregory C. Wyka, PG Langan Engineering	Project Manager	Phone – 212-479-5476 Email – <a href="mailto:gwyka@langan.com">gwyka@langan.com</a>
Jason J. Hayes, PE Langan Engineering	Project Engineer / Qualified Environmental Professional	Phone – 212-479-5427 Email – <a href="mailto:jhayes@langan.com">jhayes@langan.com</a>
Tony Moffa, CHMM Langan Engineering	Langan Health & Safety Officer	Phone – 215-491-6500 Email – <a href="mailto:tmoffa@langan.com">tmoffa@langan.com</a>
Bill Bohrer, PG Langan Engineering	Field Safety Officer	Phone – 410-984-3068 Email – <a href="mailto:wbohrer@langan.com">wbohrer@langan.com</a>
Michael Burke, PG, CHMM Langan Engineering	Quality Assurance Officer	Phone – 212-479-5413 Email – <a href="mailto:mburke@Langan.com">mburke@Langan.com</a>

<b>Personnel</b>	<b>Role</b>	<b>Contact Information</b>
Contractor Not Yet Identified	Contractor	To Be Determined
Manfred Magloire NYSDEC Project Manager	NYSDEC	Email – manfred.magloire@dec.ny.gov
Arunesh Ghosh New York State Department of Health (NYSDOH) Project Manager	NYSDOH	Email – Arunesh.ghosh@health.ny.gov

The contact information in this table will be updated as necessary. The initial notification to the NYSDEC will include the following:

- A description of the work to be performed, including the location and extent of excavation areas and plans/drawings, if different from this EWP
- A summary of environmental conditions anticipated to be encountered during excavation and earthwork activities, if different from this EWP
- An estimated schedule for the work
- A summary of the applicable components of this EWP
- A statement that the work will be performed in compliance with this EWP
- A copy of the updated Construction Health and Safety Plan (CHASP), if necessary, included as Appendix A of this EWP
- Solid waste disposal facility documentation, if available
- Imported fill documentation, if available

## **2.3 Site Physical Conditions**

### 2.3.1 Topography

According to a site survey prepared by TrueNorth Surveyors (dated August 13, 2020), the topography of the site slopes down from the west to the east resulting in an elevation change of about 6 feet. The elevations (el) range from about 18 feet North American Vertical Datum of 1988 (NAVD88<sup>1</sup>) to about 12 feet NAVD88.

### 2.3.2 Site Geology

Based on a Phase II Environmental Site Investigation (ESI) completed by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) in November 2020 and the Supplemental Soil Sampling Event completed by Langan in October 2021, subsurface stratigraphy generally consists of non-native fill composed of varying amounts of sand, silt, and gravel and anthropogenic materials (brick, coal, slag, asphalt, ceramics, wood, and concrete) extending to depths ranging from 9 to 18 feet below sidewalk grade (bsg). The fill layer

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<sup>1</sup> Elevations are with respect to the North American Vertical Datum of 1988 (NAVD88), which is 1.1 feet above the Mean Sea Level at Sandy Hook, New Jersey, 1929 (NGVD 1929).

is underlain by native soil consisting of varying amounts of sand, clay, gravel, silt and organic matter.

Bedrock was not encountered during the Phase II ESI; however, bedrock was observed at depths ranging from 50 to 80 feet bsg at the site during Langan's geotechnical investigation completed in September-October 2020.

### 2.3.3 Hydrogeology

Based on Langan's geotechnical investigation and Phase II ESI, depth to groundwater ranges from about 12 to 18 feet bsg. Groundwater in the area is expected to generally flow northeast towards the Harlem River based on groundwater elevation data for surrounding sites and hydrogeological principles.

Groundwater flow is typically topographically influenced because shallow groundwater tends to originate in areas of topographic highs and flows toward areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeologic network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeological and anthropogenic variables such as precipitation, evaporation, extent of vegetative cover, coverage by impervious surfaces, and subsurface structures. Other factors influencing groundwater include depth to bedrock, the presence of anthropogenic fill, and variability in local geology and groundwater sources or sinks.

### 2.3.4 Wetlands and Floodplain

Wetlands on and near the site were evaluated by reviewing the National Wetlands Inventory and NYSDEC regulated wetlands map. There are no wetlands on the site. The closest mapped waterbody is the Harlem River, which is approximately 850 feet to the east of the site.

According to the Federal Emergency Management Agency (FEMA) preliminary flood insurance rate map (PFIRM) map (3604970083G) dated December 5, 2013, most of the site is located within Zone X with the balance of the site located outside of the flood zone. Zone X is designated for areas of 0.2 percent annual chance flood (500-year flood zone); areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood.



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### **3.0 EXCAVATION PLAN**

The proposed excavation and earthwork activities include removal of non-native fill to accommodate installation of one foundation element consisting of a drilled micropile and 3-foot-wide by 3-foot-long concrete pile cap. Prior to excavation, limited concrete floor slab demolition will be completed to expose the fill. A 5-foot-wide by 5-foot-long area will be excavated to about 2 feet bsg to form and pour the concrete pile cap around the drilled micropile. The foundation element will be installed near the southwestern corner of site where there is no evidence of grossly-impacted soil as determined by the Phase II ESI. The construction work is not expected to disturb more than 5 cubic yards of non-native soil, which will be characterized and transported off-site for disposal. The proposed excavation area is illustrated on Figure 3.

After the installation of the foundation element, imported recycled concrete aggregate (RCA) or virgin gravel will be used to backfill remaining excavated areas to original grade and cover the pile cap until it is exposed as required for continued foundation construction.. The duration of this work is estimated to be about four weeks. A proposed construction schedule is included as Appendix B.

All ground intrusive work associated with this activity will be performed in accordance with this EWP, the Construction Health and Safety Plan (CHASP, Appendix A) and applicable federal, state and city regulations. The NYSDEC will be promptly notified of proposed changes, delays, or deviations to the excavation/earthwork plan and schedule.

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## **4.0 SOIL/MATERIALS MANAGEMENT PLAN**

### **4.1 Site Preparation**

Site preparation will be completed by the Contractor, and will include, but not be limited to, the establishment of work zones, setup of support facilities, construction of decontamination facilities, and implementation of site security measures (i.e., erection of security fencing around work zones and staging areas).

Langan will be responsible for preparation and implementation of environmental oversight required by this EWP. The Contractor will obtain necessary permits before commencement of construction activities. Dig Safely New York (811) will be contacted by the Contractor a minimum of three business days in advance of intrusive work to inform the agency of the nature of the work and the intent to perform ground-intrusive activities.

### **4.2 Soil Screening Methods**

Visual, olfactory and photoionization detector (PID) soil screening and assessment will be performed by Langan field personnel under the direct supervision of the Qualified Environmental Professional (QEP) during excavation activity or other ground-intrusive activities at the site. Field screening for evidence of contamination will be performed by Langan field personnel with a PID equipped with a 10.6 electron volt (eV) bulb that will be calibrated daily.

### **4.3 Demolition and Associated Waste Management**

Langan will monitor the limited building slab concrete demolition to document that the debris is not comingled with site fill prior to off-site disposal. Concrete debris disposal facilities will be selected and reviewed for regulatory compliance by the Contractor considering Langan is not responsible for review or approval for disposal activities associated with demolition.

### **4.4 Stockpile Methods**

Fill stockpile areas, if needed, will be constructed for staging of soil, pending direct loading for off-site transport or waste characterization sampling. Stockpile areas will meet the following minimum requirements:

- Excavated fill will be placed onto an impermeable surface or on minimum thickness of 8-mil low-permeability plastic sheeting or tarps of sufficient strength to prevent puncture during use (use of multiple layers of thinner liners equating to a minimum thickness of 8-mils is permissible).
- Equipment and procedures will be used to place and remove the fill or debris so as to minimize the potential to jeopardize the integrity of the liner.
- Separate stockpile areas will be constructed as needed to stage excavated fill with the intent to more efficiently manage and characterize the fill and to avoid commingling different waste streams.

- 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 practical capacity until it is time for direct loading of the excavated fill for off-site transport.
- Active stockpiles (e.g. stockpiles that have not reached their capacity) will be covered at the end of each workday.
- Each stockpile area will be encircled with silt fences and hay bales, as needed, to contain and filter particulates from rainwater draining off the stockpile, and to mitigate the potential for this stormwater runoff to migrate off-site.
- Stockpiles will be inspected at a minimum once each day and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

#### **4.5 Fill Characterization**

Excavated fill will be characterized for off-site disposal in a manner suitable to receiving facilities consistent with their applicable operating permits. Sampling and analytical methods, sampling frequency, analytical parameters and quality assurance/quality control (QA/QC) sampling will be consistent with disposal facility requirements. Sampling will be coordinated by Langan and/or the Contractor.

Waste characterization samples will be submitted to a NYSDOH Environmental Laboratory Approval Program (ELAP)-approved laboratory for analysis. Waste characterization samples will be analyzed for parameters typically required by disposal facilities, including, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), polychlorinated biphenyls (PCB), pesticides, herbicides, Resource Conservation and Recovery Act (RCRA) metals, toxicity characteristic leaching procedure (TCLP) VOCs, TCLP SVOCs, TCLP metals, ignitability, corrosivity, and reactivity. Additional sampling and analyses may be required to meet selected disposal facility requirements.

#### **4.6 Fill Excavation, Load Out, Transportation, and Off-Site Disposal**

The Contractor is solely responsible for safe execution of invasive work, excavation stability, structures that may be affected by excavations, and other work performed under this EWP. Sheeting, shoring, or sloping may be used for excavations, as needed.

Excavated fill will be handled, transported and disposed by a licensed hauler in accordance with applicable Part 360, Part 361, and Part 364 regulations and other applicable local, state, federal regulations. The Contractor will provide the appropriate permits, certifications, and written commitments from disposal facilities to accept the fill as submittals to the QEP for review to document that the facility is licensed to accept the waste. Waste manifests and scale tickets will be used to track the fill transported off-site for disposal. If loads contain wet waste, truck liners will be used. Waste disposal documentation including, but not limited to, facility permits, waste

profiles/applications, pre-approval letters, facility-signed manifests and scale tickets, will be maintained by the QEP.

If disposal of fill is proposed for unregulated management (not expected), a formal request with an associated plan will be submitted to the NYSDEC. Unregulated off-site management of fill from this site is prohibited without formal NYSDEC approval.

Trucks will be utilized as transport vehicles for the transport and off-site disposal of excavated fill generated from work performed under this EWP. Loaded transport vehicles leaving the site will be appropriately lined, securely covered, manifested, and placarded in accordance with appropriate federal, state, and local requirements, including 6 NYCRR Part 364. Trucks will enter and exit the site using dedicated ingress/egress points. Trucks loaded with fill will exit the vicinity of the site using only approved truck routes. Trucks will be prohibited from stopping and idling unnecessarily in the neighborhood outside the site. 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. Transport vehicles entering or leaving the site will be securely covered with tight-fitting covers. Transport vehicles hauling impacted fill will be lined if the fill exhibits free liquids or is grossly-impacted with petroleum or other contamination.

A truck wash/cleaning area will be operated on-site, as needed. Langan field personnel will be responsible for monitoring egress points to verify that outbound trucks are washed and cleaned at the truck wash before leaving the site and inspecting locations where vehicles enter or exit the site for evidence of off-site fill tracking until the construction program is completed. Cleaning of the adjacent streets will be performed by the Contractor as needed to maintain a clean condition with respect to site-derived fill. A truck route map is included as Figure 4.

#### **4.7 Reuse On-Site**

Reuse of excavated fill is not planned. If reuse is considered, excavated fill will only be reused if certain conditions are met, and reuse will be coordinated in advance with the NYSDEC BCP Project Manager. Excavated fill will be acceptable for reuse if it is not grossly-contaminated (including soil with non-aqueous phase liquid (NAPL)) and it is sampled and meets the lower of the Restricted Use Restricted-Residential Use (RURR) Soil Cleanup Objectives (SCO) and Protection of Groundwater (PGW) SCOs. The PGW SCOs apply to compounds or analytes that were detected in groundwater at concentrations exceeding 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 (SGV) for Class GA water (collectively the NYSDEC SGVs) on the site. Waste fill used for an end use specified in 6 NYCRR Part 360.12 will not be considered a solid waste. Excavated fill that cannot be reused will be appropriately characterized and transported for off-site disposal at a facility with a permit to accept the waste.

#### **4.8 Import and Backfill**

Excavations will be backfilled with imported soil meeting the lower of the RURR and PGW SCOs, crushed aggregate from a virgin source, recycled aggregate, or on-site fill approved for reuse by the NYSDEC.

Imported fill to the site must be approved by the NYSDEC before it is imported and placed into service. Sources of the fill and/or aggregate proposed for import to the site will be evaluated in accordance with NYSDEC DER-10, including an examination of source location, current and historical use(s), and any applicable documentation. Virgin, crushed aggregate will be obtained from a New York state or out-of-state mine/quarry with a valid operating permit or registration. Recycled aggregates will be obtained from a New York state recycling facility with a valid operating permit or registration. If the permitted facility is not permitted by New York State, the facility will provide a state issued certification or permit. Fill material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the site. The imported fill will not include solid waste, including brick, concrete, glass, ash, wood, or other debris.

Imported fill will be subject to source screening and sampled in accordance with DER-10 Table 5.4(e) (10). Samples will be analyzed for Target Compound List (TCL)/Target Analyte List (TAL)/Part 375 VOCs, SVOCs, PCBs, pesticides, herbicides, metals (including hexavalent and trivalent chromium), and emerging contaminants including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane by a NYSDOH ELAP-certified laboratory. Emerging contaminant sampling will be performed in accordance with the NYSDEC June 2021 Guidelines for Sampling and Analysis of PFAS. After it is determined that the fill meets the SCOs for imported fill, the fill will be loaded onto trucks with secure covers for delivery to the site. All imported fill will be segregated prior to departing the source facility until arrival at the site.

Recycled concrete aggregate (RCA) will be composed of recognizable and uncontaminated recycled concrete and conform to the requirements of Section 304 of the New York State Department of Transportation Standard Specifications Construction and Materials Volume 1 (2021). RCA imported from DEC-registered or DEC-permitted facilities and virgin gravel, rock or stone from mines, quarries or facilities permitted or registered by the NYSDEC or the applicable state of origin shall exhibit no more than 10% by weight passing through a No. 10 sieve. Imported RCA, gravel, rock and stone that exhibits no more than 10% by weight passing through a No. 80 sieve will not require additional testing unless required by NYSDEC under its terms for operation of the facility. Additional exemptions from testing requirements may be approved by NYSDEC BCP Project Manager.

#### **4.9 Fluids Management**

The construction program is not anticipated to generate any liquid wastes requiring special management or disposal. If necessary, liquid wastes will be handled, transported, and disposed of in accordance with applicable local, state, and federal regulations. Liquids can be discharged into the New York City sewer system with approval by the New York City Department of Environmental Protection (NYCDEP).

#### **4.10 Stormwater Pollution Prevention**

Stormwater pollution prevention measures may be implemented during the construction program, as needed. Silt fencing and/or hay bales will be used in the construction area, as

required. Barriers and hay bale checks will be installed and inspected once a week and after every storm event; necessary repairs shall be made immediately. Accumulated sediment will be removed as needed to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill. Manufacturer's recommendations will be followed for replacing silt fence damaged because of weathering.

#### **4.11 Spill/Release Contingency Procedures**

The Contractor involved with the construction program will be informed that the site is enrolled in the NYSDEC BCP and that they must take all necessary precautions to prevent spills, and be ready, in the event spills occur, to implement contingency procedures to remediate the spills. If a spill or release is observed during the course of work, the following actions will take place:

- The Contractor and QEP will account for and evaluate the safety of site personnel and estimate the approximate quantity of material released and/or size of the spill.
- The QEP field representative will notify the QEP immediately via cell phone or email. The QEP will report a spill to the NYSDEC Spill Hotline (1-800-457-7362) if a reportable quantity of a hazardous substance or petroleum is released to the environment and contact the NYSDEC.
- Sources of ignition will be identified and removed from the spilled material if flammable.
- Evaluation of the hazard(s), identification of the source of the discharge, and isolation, containment and/or stopping the spill or leak using appropriate means.
- Spill control activities will take precedence over normal site-related activities. Entry to the release area will be limited to personnel with proper training, personal protective equipment (PPE), and equipment necessary to perform the work. Additional oil absorbent booms may be deployed for containment purposes and/or absorbent pads may be used to collect spilled liquid. Mechanical removal methods such as skimming and vacuuming may be needed.
- An emergency response Contractor may need to be called in for assistance depending on the size and extent of the release or spill.
- Personnel will be kept upwind of the spill area. Potential vapor and dust hazards will be evaluated, and implementation of appropriate suppression operations will take place.
- Spent cleanup materials will be properly containerized and disposed of in accordance with applicable regulations.
- The NYSDEC will be kept informed of response actions in a timely manner.

#### **4.12 Particulate Matter, Odor, Vapor and Nuisance Control Plan**

Community air monitoring will be conducted in compliance with the NYSDOH Generic Community Air Monitoring Plan (CAMP) outlined below. Special consideration will be given to implementing planned activities when potentially exposed population occupancy is at a minimum, and when necessary, the use of engineering controls such as vapor/dust barriers or special ventilation devices will be considered.

The CAMP includes real-time monitoring for VOCs and particulates at the upwind and downwind perimeter of each designated work area when certain activities are in progress. CAMP stations will be relocated, to the extent practical, based on prevailing wind directions observed at the site during soil intrusive activities. Continuous monitoring is required for all ground intrusive activities, soil handling activities and during demolition of contaminated or potentially contaminated structures (not planned). Periodic monitoring for VOCs and particulates is required during non-intrusive activities such as the collection of soil samples. Periodic monitoring during sample collection will likely consist of taking a reading upon arrival at a sample location, monitoring while overturning soil, and taking a reading before leaving a sample location.

CAMP monitoring for VOC levels will be conducted with PIDs, and monitoring for dust/particulates will be conducted with particulate sensors equipped with filters to detect particulates less than 10 microns in diameter (PM10). Monitoring for particulates and odors will be conducted during all ground intrusive activities by the Langan field personnel. 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 of VOCs during activities such as soil and groundwater sampling. The site perimeter will be visually monitored for fugitive dust emissions.

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 work 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 work 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 work zone, activities will be halted, the source of vapors identified, corrective actions taken to abate emissions and monitoring continued. Additional PPE may be required.
- If total VOC concentrations near the outside walls of occupied structures or next to intake vents exceeds 1 ppm, monitoring will occur within the occupied structure.

The following actions will be taken based on visual dust observations or PM10 measurements:

- If the downwind particulate level is 100  $\mu\text{g}/\text{m}^3$  greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work zone then additional dust suppression measures must be employed. Work may continue with additional dust suppression techniques provided that downwind PM10 levels do not

exceed 150  $\mu\text{g}/\text{m}^3$  above the background level and provided that no visible dust is migrating from the work zone.

- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150  $\mu\text{g}/\text{m}^3$  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  $\mu\text{g}/\text{m}^3$  of the upwind level and in preventing visible dust migration.
- If total particulate concentrations near the outside walls of occupied structures or next to intake vents exceed 150  $\mu\text{g}/\text{m}^3$ , work activities will be suspended until controls are implemented.

Exceedances observed in the CAMP will be reported to the NYSDEC, as needed.

#### Odor, Dust, and Nuisance Control Plan

Dust, odor and nuisance control will be accomplished by the Contractor as described in this section. Significant and obvious odors (organic and naphthalene-like) are not expected during ground-intrusive activities at the site.

#### Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used as needed will include application of foam suppressants, spray mist systems, or tarps over the odorous 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 are abated. The NYSDEC will be notified of all odor events and of all other complaints about the project. Implementation of odor monitoring, including notifying the Contractor of suspension of work conditions, will be the responsibility of the QEP. Application of odor controls and suppressants is the responsibility of the Contractor.

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: (a) use of chemical odorants in spray or misting systems and (b) use of staff to monitor odors in surrounding neighborhoods.

#### Dust Control Plan

Dust suppression may include, at a minimum, the controls listed below:

- Dust suppression will be implemented by the Contractor through the use of a dedicated water distribution system or an alternate source with suitable supply and pressure for use in dust control.



- Polyethylene sheeting will be placed at the base and walls of any occupied indoor areas (if any) where fill is being imported or exported and taken down at the end of each day. These areas will be vacuumed using a high-efficiency particulate air (HEPA) filter to the satisfaction of the QEP.

#### **4.13 Demobilization and Decontamination**

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that were disturbed to accommodate support areas (e.g., staging areas, decontamination areas, and fill storage areas);
- Removal and disposal of waste in accordance with applicable laws and regulations;
- Equipment decontamination; and
- General refuse disposal.

Recoverable and non-absorptive equipment and materials will be decontaminated and demobilized at the completion of field activities. Accumulated equipment rinsate and decontamination materials will be collected, commingled with other waste streams, and containerized in a 55-gallon DOT approved drum for disposal, as appropriate. If possible and applicable, decontamination derived waste will be characterized prior to off-site disposal at a permitted disposal facility in accordance with applicable regulation. Biodegradable cleaning solutions will be used to clean the interior and exterior surfaces of the equipment as needed; no cleaning solutions containing chlorinated solvents or VOCs will be used.

#### **4.14 Construction Health and Safety Plan**

The QEP prepared a site-specific CHASP for the construction program, which is included as Appendix A. The CHASP provides a mechanism for establishing on-site safe working conditions, safety organization, procedures, and PPE requirements. The CHASP meets the requirements of 29 CFR 1910 and 29 CFR 1926 (which includes 29 CFR 1910.120 and 29 CFR 1926.65). The HASP includes, but is not limited to, the following components listed below:

- Organization and Identification of key personnel
- Training requirements
- Medical surveillance requirements
- List of site hazards
- Excavation safety Work zone descriptions and monitoring procedures
- Personal safety equipment and protective clothing requirements
- Decontamination requirements
- Standard operating procedures
- Contingency Plan
- Material Safety Data Sheets

#### **4.15 Notification**

Notification will be provided to the NYSDEC prior to excavation and earthwork activities in accordance with Section 2.2 of this EWP.

#### **4.16 Reporting**

Daily reports will be prepared for the project file and for review by the NYSDEC BCP Project Manager. Daily reports will generally be emailed to the NYSDEC BCP Project Manager by the end of the following business day. Daily reports will include:

- An update of progress made during the reporting day
- Locations of work and quantities of fill imported and exported from the site
- References to map for site activities
- A summary of any and all complaints with relevant details (names, phone numbers)
- A summary of CAMP findings, including exceedances
- An explanation of notable site conditions, including erosion and sediment controls
- Actions anticipated for the next reporting day

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill) or other sensitive or time-critical information; however, such conditions will also be included in the daily reports. Emergency conditions will be addressed directly to the NYSDEC BCP Project Manager via personal communication. If site conditions warrant, the QEP may request to change from daily to weekly reports that include the above information.

#### **5.0 Construction Completion Report**

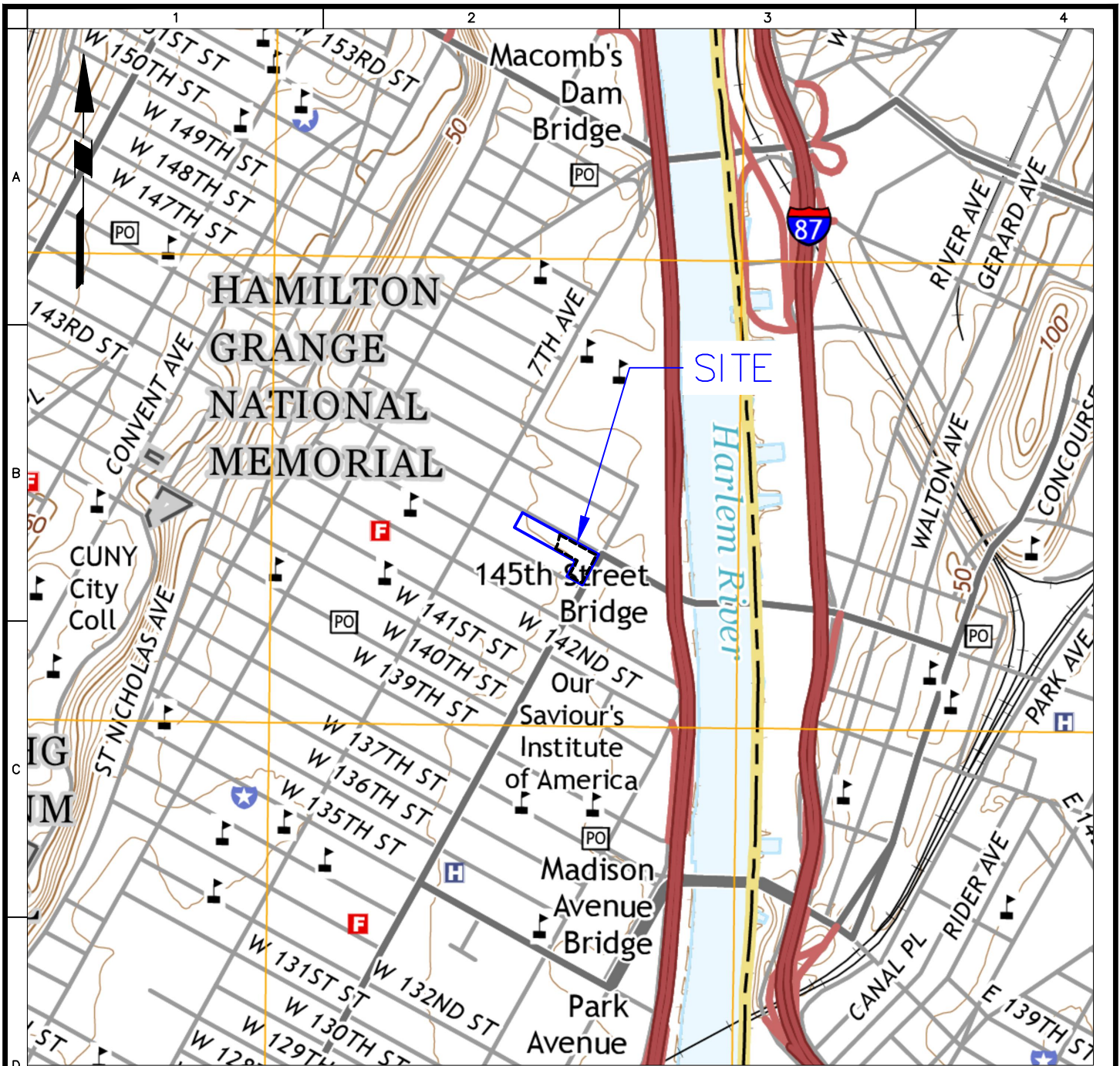
A CCR will be prepared and submitted to the NYSDEC for review and approval after installation of foundation elements. The CCR will be signed and stamped by the QEP or a professional engineer licensed in the State of New York. The QEP is Jason J. Hayes, P.E. of Langan. Should Mr. Hayes become unable to fulfill this responsibility, another suitably qualified QEP or New York State professional engineer will take his place as the signatory.

The CCR will include the following items:

1. The following statement from the QEP:
  - I, Jason J. Hayes, certify that I am currently a NYS registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Excavation Work Plan was implemented and that all construction activities were completed in substantial conformance with the DER-approved Excavation Work Plan.
2. A detailed description of the work completed under the EWP.
3. A photographic log of work completed under the EWP
4. As-built drawings illustrating the completed work

5. A detailed description of and reasons for any changes or deviations from the approved EWP
6. A detailed account of exported fill, including but not limited to, type, quantities, waste characterization data, receiving facilities, waste profiles/applications, facility pre-approvals, facility-signed manifests, and scale tickets
7. A detailed account of imported soil, RCA, stone, rock and gravel, including but not limited to, type, source, analytical data, quantities, manifests, and scale tickets
8. A description of any residual fill left on the site
9. Copies of submitted daily reports

## FIGURES



**LEGEND**

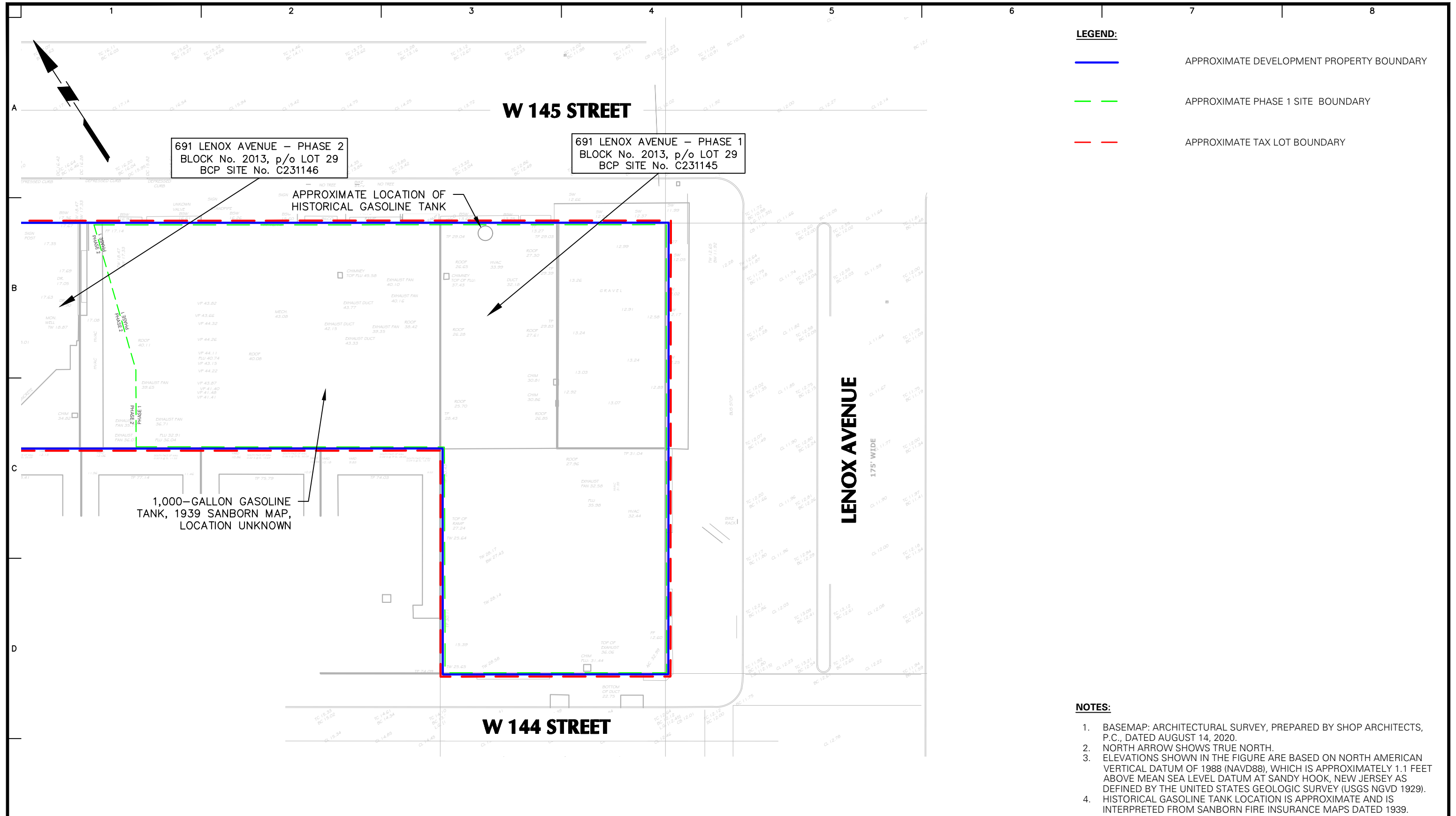
- APPROXIMATE DEVELOPMENT PROPERTY BOUNDARY
- APPROXIMATE PHASE 1 SITE BOUNDARY

**NOTES:**

1. BASE MAP SOURCE: UNITED STATES GEOLOGICAL SURVEY TOPOGRAPHIC MAP, CENTRAL PARK QUADRANGLE, 2016
2. NORTH ARROW SHOWS TRUE NORTH.
3. NOT TO SCALE.

**WARNING:** IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

<p><b>LANGAN</b> 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</p>	<p>Project <b>691 LENOX AVENUE - PHASE 1</b> BLOCK No. 2013, p/o LOT No. 29 (FORMER LOT Nos. 29, 33, &amp; p/o 38) MANHATTAN NEW YORK</p>	<p>Figure Title <b>SITE LOCATION MAP</b></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Project No. 170635401</td> <td style="width: 50%;">Figure No. <b>1</b></td> </tr> <tr> <td>Date 12/15/2021</td> <td></td> </tr> <tr> <td>Drawn By EMS</td> <td></td> </tr> <tr> <td>Checked By WK</td> <td></td> </tr> </table>	Project No. 170635401	Figure No. <b>1</b>	Date 12/15/2021		Drawn By EMS		Checked By WK	
	Project No. 170635401	Figure No. <b>1</b>									
	Date 12/15/2021										
	Drawn By EMS										
Checked By WK											



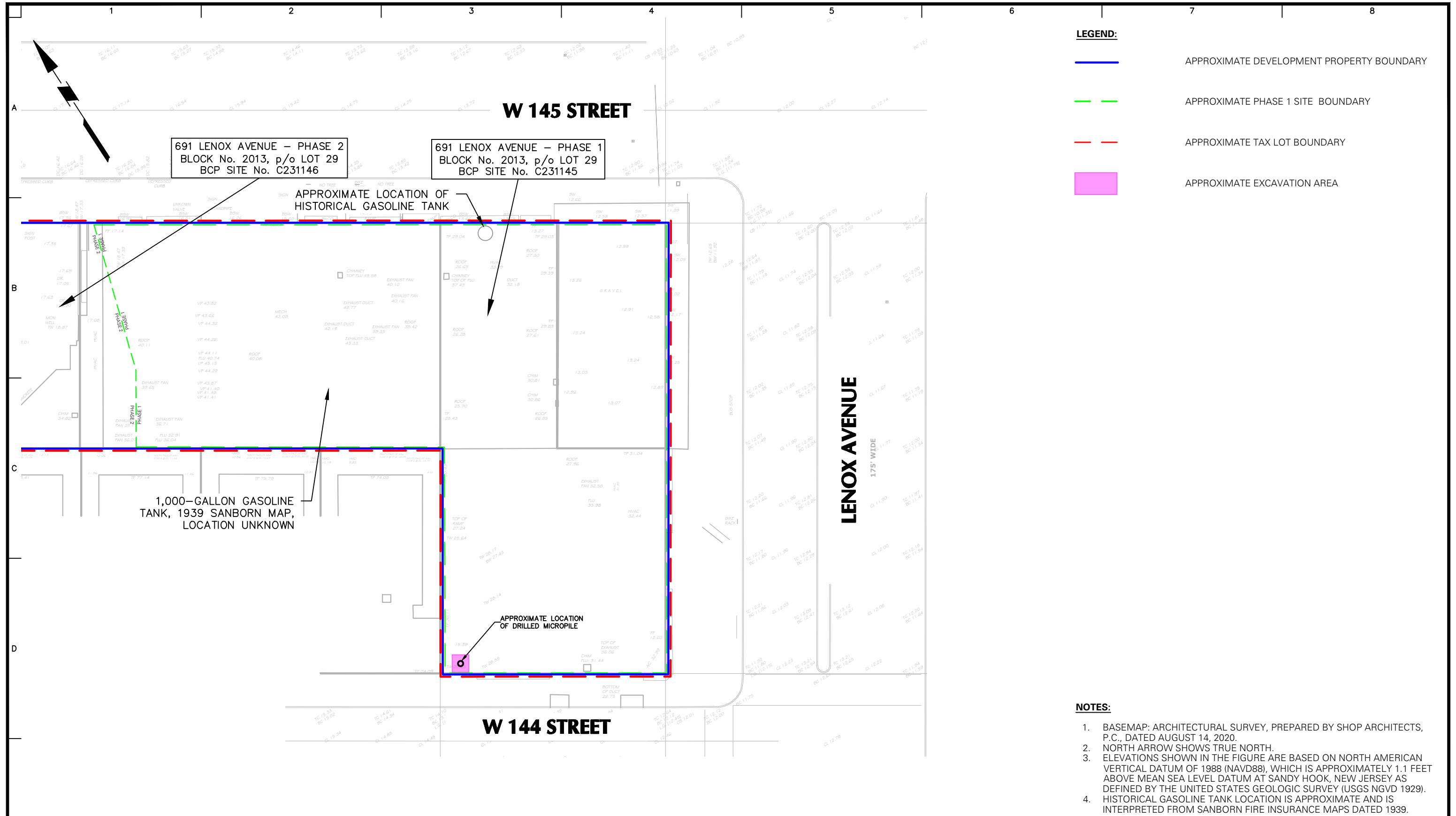
- LEGEND:**
- APPROXIMATE DEVELOPMENT PROPERTY BOUNDARY
  - APPROXIMATE PHASE 1 SITE BOUNDARY
  - APPROXIMATE TAX LOT BOUNDARY

- NOTES:**
1. BASEMAP: ARCHITECTURAL SURVEY, PREPARED BY SHOP ARCHITECTS, P.C., DATED AUGUST 14, 2020.
  2. NORTH ARROW SHOWS TRUE NORTH.
  3. ELEVATIONS SHOWN IN THE FIGURE ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), WHICH IS APPROXIMATELY 1.1 FEET ABOVE MEAN SEA LEVEL DATUM AT SANDY HOOK, NEW JERSEY AS DEFINED BY THE UNITED STATES GEOLOGIC SURVEY (USGS NGVD 1929).
  4. HISTORICAL GASOLINE TANK LOCATION IS APPROXIMATE AND IS INTERPRETED FROM SANBORN FIRE INSURANCE MAPS DATED 1939.

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			<p>Date</p> <p>01/20/2022</p>	<p>Drawn By</p> <p>EMS</p>
			<p>Checked By</p> <p>GCW</p>	



- LEGEND:**
- APPROXIMATE DEVELOPMENT PROPERTY BOUNDARY
  - - - APPROXIMATE PHASE 1 SITE BOUNDARY
  - - - APPROXIMATE TAX LOT BOUNDARY
  - APPROXIMATE EXCAVATION AREA

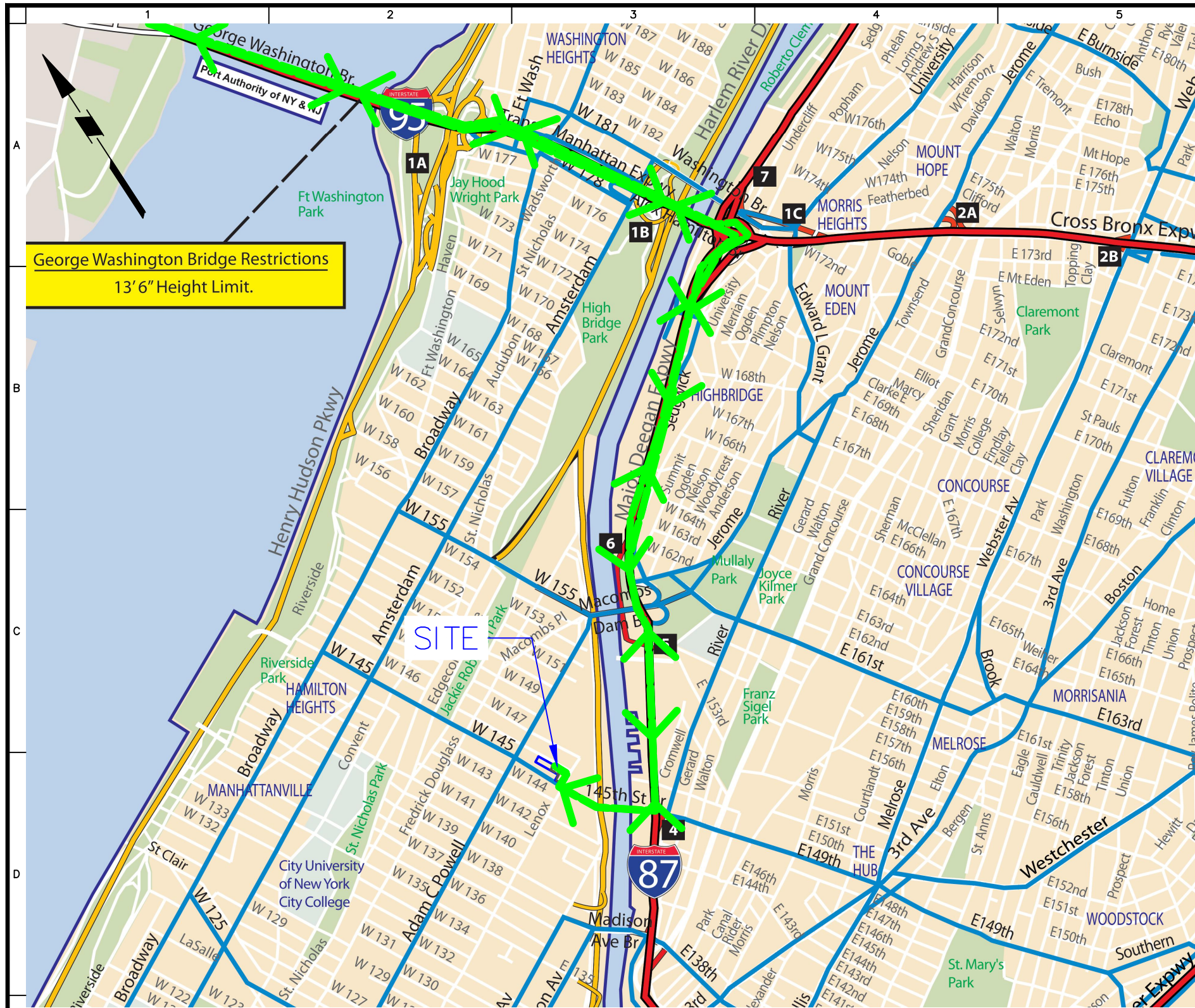
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	<p>© 2020 Langan</p>			





**LEGEND:**

- APPROXIMATE DEVELOPMENT SITE PROPERTY BOUNDARY
- APPROXIMATE PHASE 1 SITE BOUNDARY
- PREFERRED TRUCK ROUTE
- THROUGH TRUCK ROUTE
- LOCAL TRUCK ROUTE

**NOTES:**

1. BASE MAP TAKEN FROM THE 2011-2012 NEW YORK CITY DEPARTMENT OF TRANSPORTATION "NEW YORK CITY TRUCK ROUTE MAP."

**WARNING:** IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

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Project  
**691 LENOX AVENUE -  
 PHASE 1**  
 BLOCK No. 2013, p/o LOT No. 29  
 (FORMER LOT Nos. 29, 33, & p/o 38)  
 MANHATTAN NEW YORK

Figure Title  
**TRUCK ROUTE MAP**

Project No.  
 170635401  
 Date  
 01/20/2022  
 Drawn By  
 EMS  
 Checked By  
 GCW

Figure No.  
**4**



## **APPENDIX A**

### **CONSTRUCTION HEALTH AND SAFETY PLAN**

---

# CONSTRUCTION HEALTH AND SAFETY PLAN

for

**691 Lenox Avenue – Phase 1  
New York, NEW YORK  
Manhattan Borough Tax Map  
Block 2013, Lot 29**

*Prepared for*

**One 45 Lenox LLC  
55 Broadway  
New York, New York, 10002**

*Prepared By:*

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

**January 2022  
Langan Project No. 170635401**

**LANGAN**

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\* 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 on portions of 691 Lenox Avenue in New York, New York (Tax Map Block 2013, Lot 29) (“the site”). This CHASP provides the minimum requirements for implementing site operations during environmental remediation activities. All contractors performing work on this site shall implement their own Health and Safety Plans that, at a minimum, adhere to this CHASP. The contractor is solely responsible for their own health and safety and that of their subcontractors. Langan personnel will implement this CHASP while on-site.

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 691 Lenox Avenue in the Harlem neighborhood of the Bronx, New York. The site encompasses Bronx Tax Map Block 2013, Lot 29 (formerly Lots 29 and 33 and part of Lot 38) and occupies a total area of about 34,400 square feet ( $\pm$  0.79 acres). The site is currently improved with one-story commercial buildings with storage mezzanines and partial cellars (former Lots 29 and 38) and vacant land (former Lot 33). The site is currently owned by One45 Lenox LLC. The site is bound by West 145<sup>th</sup> Street followed by a multi-story mixed-use residential and commercial buildings and a self-storage facility to the north; Lenox Avenue followed by Colonel Charles Young Playground to the east; multi-story residential buildings (owned and operated by the New York City Housing Authority [NYCHA]) and West 144<sup>th</sup> Street, followed by multi-family residential buildings and a church and community center to the south; and an out-of-service gas station, followed by an active gas station and multi-story residential buildings to the west. The site was accepted into the New York State Brownfield Cleanup Program (BCP) as a Participant and was assigned BCP Site No. C231145. A site location map is included as Figure 1.

Historical operations at the site include a hotel on former lot 33 (about 1900-2019) and auto garages and auto repair shops on former lots 29 and 38 (1939-1950). In 1950, the auto repair shop on former Lot 29 was no longer depicted and the remaining lots remain unchanged through 2005. The hotel on former Lot 33 was demolished in 2019 and the former lot remains vacant. Former Lots 29 and 38 are currently occupied by one-story buildings with various commercial tenants including restaurants, retail stores (some vacant), and community/religious centers.

### **1.3 Summary of Work Tasks**

The general categories of work tasks being performed during implementation of the work plan include:

#### **1.3.1 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 properly disposed in accordance with federal, state, and city regulations, criteria and guidelines.

#### **1.3.2 Soil Screening**

As a 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 help photoionization detector (PID, or equivalent).

#### **1.3.3 Soil Sampling**

Soil samples for excavation endpoint or delineation sampling (along with quality assurance/quality control [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).

#### **1.3.4 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 Soil/Materials Management Plan [SMMP], where applicable).

### **1.3.5 Characterization of Excavated Material**

When required by the SMMP, Langan personnel will characterize excavated soil or clean backfill in accordance with Langan standards. Langan will compare as-built to design and work plans. Data recorded will be incorporated into subsequent reports.

### **1.3.6 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 components). 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 applicable 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 requirement 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.

### **1.3.7 Drum Sampling**

Excess or impacted soil and water will be drummed in New York State Department of Transportation (NYSDOT) approved 55-gallon drums during the remedial action activities and 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 Greg Wyka. Their responsibilities include:

- Ensuring that this CHASP is developed 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 *Health and Safety Program for Hazardous Waste Operations*.
- Assisting the site 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 personal protective equipment (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 FTL is to be determined prior to the start of site 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 solely 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;
- 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 adhere to all federal, state, and local regulatory requirements.

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### **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. Known and suspected chemical contaminant hazards that could be encountered during site operations are included in Table 2. A 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 PPE.

##### **3.1.2 Stockpile Sampling**

Langan personnel are not to 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 loader).

##### **3.1.3 Removal of Underground Storage Tank**

If underground storage tank (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 with 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 not 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.

##### **3.1.4 Demolition**

The Contractor is responsible for all activity related to the demolition proposed. Langan personnel will observe and record pertinent information as the contractor implements demolition.

### **3.1.5 Drum Sampling**

Drilling fluid, rinse water, grossly-contaminated soil samples and cuttings will be containerized in 55-gallon drums for disposed off-site. Each drum must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP-#9). Sampling drums requires the donning of work gloves when opening the drums and chemical resistant gloves when sampling in addition to standard PPE.

Langan personnel and contractors are not to move or opened 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°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°F (37.6°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°F. If oral temperature still exceeds 99.6°F (37.6°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°F (38.1°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, i.e., 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° to 60°F (10° to 16.6°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°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°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 FTL'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°F, or wind-chill less than 30°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°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 Non-Aqueous Phase Liquids (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 groundwater 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-gallon 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 are 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 will be conducted for VOCs. A 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 will 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 will occur during intrusive work in the areas of concern (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 at least 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 parts per million (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 metal. 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 should 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<sup>3</sup> 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 shut down.

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 ( $\mu\text{g}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind PM10 levels do not exceed  $150 \mu\text{g}/\text{m}^3$  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  $150 \mu\text{g}/\text{m}^3$  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  $150 \mu\text{g}/\text{m}^3$  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.

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## **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 will be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes shall 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

<b>Hand Signal</b>	<b>Meaning</b>
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:

Harlem Hospital Center  
506 Lenox Avenue  
New York, New York  
212-939-1000

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 PM 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 and Vehicles
- Emergency Eye Wash: Contractor Mobile office and 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 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 advise on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed 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.

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### **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 PM 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) or 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.



## TABLES

**TABLE 1  
TASK HAZARD ANALYSES**

<b>Task</b>	<b>Hazard</b>	<b>Description</b>	<b>Control Measures</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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 – 1.3.7	Noise	Excavation equipment, hand tools, drilling equipment.	Wear hearing protection; maintain safe distance from construction activities	Seek medical attention as required
1.3.1 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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**

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	1,1'-Biphenyl 1,1-Biphenyl Biphenyl Phenyl benzene Diphenyl	92-52-4	None	1 mg/m <sup>3</sup> 100 mg/m <sup>3</sup>	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 – 1.3.7	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 – 1.3.7	1,3,5-Trimethylbenzene Mesitylene sym-Trimethylbenzene	108-67-8	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	1,3-Butadiene Biethylene Biviny Butadiene Divinyl Erythrene Vinylethylene	106-99-0	PID	1 ppm 2000 ppm	Vapor	inhalation, skin and/or eye contact (liquid)	irritation to the eyes, nose, throat; drowsiness, dizziness; liquid: frostbite; teratogenic, reproductive effects; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.7	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
1.3.1 – 1.3.7	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 – 1.3.7	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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
1.3.1 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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
1.3.1 – 1.3.7	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Anthracene	120-12-7	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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
1.3.1 – 1.3.7	Antimony	7440-36-0	None	0.5 mg/m <sup>3</sup> 50 mg/m <sup>3</sup>	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 – 1.3.7	Arsenic	NA	None	0.5 mg/m <sup>3</sup> 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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/ IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Barium	10022-31-8	None	0.5 mg/m <sup>3</sup> 50 mg/m <sup>3</sup>	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 – 1.3.7	Benzene Benzol Phenyl hydride	71-43-2	PID	3.19 mg/m <sup>3</sup> 1,595 mg/mg	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 – 1.3.7	Benzo(a)anthracene Benzanthracene Benzanthrene 1,2-Benzanthracene Benzo[b]phenanthrene Tetraphene	56-55-3	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/ IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Benzo(a)pyrene	50-32-8	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	Benzo(b)fluoranthene	205-99-2	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	Benzo(g,h,i)perylene Benzo(ghi)perylene	191-24-2	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	Benzo(k)fluoranthene	207-08-9	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	Benzyl butyl phthalate Butyl benzyl phthalate Butylbenzylphthalate	86-66-7	None	NA NA	Groundwater Soil Vapor	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 – 1.3.7	Beryllium	7440-41-7	None	0.002 mg/m <sup>3</sup> 4 mg/m <sup>3</sup>	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



<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Bis(2-ethylhexyl)phthalate Di-sec octyl phthalate DEHP Di(2-ethylhexyl)phthalate Octyl phthalate	117-81-7	None	5 mg/m <sup>3</sup> 5000 mg/m <sup>3</sup>	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
1.3.1 – 1.3.7	Cadmium	7440-43- 9	None	0.005 mg/m <sup>3</sup> 9 mg/m <sup>3</sup>	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 – 1.3.7	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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
1.3.1 – 1.3.7	Chromium Total Chromium	7440-47-3	None	1.0 mg/m <sup>3</sup> 250 mg/m <sup>3</sup>	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	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 – 1.3.7	Chrysene Benzo[a]phenanthrene 1,2-Benzphenanthrene	218-01-9	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	cis-1,2-Dichloroethene	156-59-2	PID	200 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, respiratory system; central nervous system depression	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.7	Cis-Chlordane a-Chlordane alpha 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 <sup>3</sup> 100 mg/m <sup>3</sup>	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

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1.3.1 – 1.3.7	Cobalt	7440-48-4	None	0.1 mg/m <sup>3</sup> 20 mg/m <sup>3</sup>	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
1.3.1 – 1.3.7	Copper	7440-50-8	None	1.0 mg/m <sup>3</sup> 100 mg/m <sup>3</sup>	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 – 1.3.7	Cyclohexane Benzene hexahydride Hexahydrobenzene Hexamethylene Hexanaphthene	110-82-7	PID	300 ppm 1300 ppm	Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.7	Dibenz(a,h)anthracene Dibenzo(a,h)anthracene	53-70-3	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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 – 1.3.7	Dichlorodifluoromethane Difluorodichloromethane, Fluorocarbon 12 Freon 12 Freon® 12 Genetron® 12 Halon® 122 Propellant 12 Refrigerant 12 Dichlorodifluoromethane	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 – 1.3.7	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

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1.3.1 – 1.3.7	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 – 1.3.7	Ethyl benzene Ethylbenzene Ethylbenzol Phenylethane	100-40-4	PID	435 mg/m <sup>3</sup> 3,472 mg/m <sup>3</sup>	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 – 1.3.7	Ethyl chloride Chloroethane Hydrochloric ether Monochloroethane Muriatic ether Hydrochloric ether	75-00-3	PID	1000 ppm 3800 ppm	Groundwater Soil Vapor	inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact	incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Fluoranthene Benzo(j, k)fluorene	206-44-0	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	Fluorene	86-73-7	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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 – 1.3.7	Helium	7440-59-7	Helium Detector	NA NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.7	Heptane n-Heptane	142-82-5	PID	500 ppm 750 ppm	Groundwater 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 – 1.3.7	Hexachlorobenzene Perchlorobenzene Pentachlorophenylchloride Benzene hexachloride Phenyl perchloryl HCB BHC	118-74-1	NA	NA NA	Groundwater Soil	inhalation, ingestion, skin and/or eye contact	Irritating to eyes, skin and mucous membranes. Prolonged periods of ingestion may cause cutaneous porphyria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately



<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/ IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Indeno(1,2,3-cd)pyrene	193-39-5	None	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	Iron	7439-89-6	None	10 mg/m <sup>3</sup> 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
1.3.1 – 1.3.7	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Lead	7439-92-1	None	0.050 mg/m <sup>3</sup> 100 mg/m <sup>3</sup>	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 – 1.3.7	Magnesium	7439-95-4	None	15 mg/m <sup>3</sup> 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 – 1.3.7	Manganese	7439-96-5	None	5 mg/m <sup>3</sup> 500 mg/m <sup>3</sup>	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
1.3.1 – 1.3.7	Mercury	7439-97-6	None	0.1 mg/m <sup>3</sup> 10 mg/m <sup>3</sup>	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

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.7	Methyl Acetate	79-20-9	PID	200 ppm 3100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin and/or eye contact	irritation to the eyes, skin, nose, throat; headache, drowsiness; optic nerve atrophy; chest tightness; in animals: narcosis	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.7	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
1.3.1 – 1.3.7	Methyl <i>tert</i> -butyl ether MTBE Methyl tertiary-butyl ether Methyl t-butyl ether <i>tert</i> -Butyl methyl ether tBME <i>tert</i> -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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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 – 1.3.7	Naphthalene Naphthalin Tar camphor White tar	91-20-3	PID	50 mg/m <sup>3</sup> 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 – 1.3.7	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 – 1.3.7	Nickel	7440-02-0	None	NA 10 mg/m <sup>3</sup>	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 – 1.3.7	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 – 1.3.7	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 – 1.3.7	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 – 1.3.7	p-Ethyltoluene 4-Ethyltoluene 1-ethyl-4-methyl-benzene 1-methyl-4-ethylbenzene	622-96-8	NA	NA NA	Soil	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

Task	Contaminant	CAS Number	Monitoring Device	PEL/IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.7	Phenanthrene	85-01-8	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	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.

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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
1.3.1 – 1.3.7	Pyrene benzo[def]phenanthrene	129-00-0	PID	0.2 mg/m <sup>3</sup> 80 mg/m <sup>3</sup> (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 – 1.3.7	Selenium	7782-49-2	None	1 mg/m <sup>3</sup> 0.2 mg/m <sup>3</sup>	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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
1.3.1 – 1.3.7	Styrene Ethenyl benzene Phenylethylene Styrene monomer Styrol Vinyl benzene	100-42-5	PID	100 ppm 700 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation to the eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; possible liver injury; reproductive effects	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.7	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



<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	Tetrachloroethylene Perchloroethylene Perchloroethylene PCE Perk Tetrachloroethylene 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
1.3.1 – 1.3.7	Tetrahydrofuran Diethylene oxide 1,4-Epoxybutane Tetramethylene oxide THF	109-99-9	PID	200 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, skin and/or eye contact, ingestion	irritation to the eyes, upper respiratory system; nausea, dizziness, headache, central nervous system depression	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immedi
1.3.1 – 1.3.7	Thallium	7440-28-0	None	0.1 mg/m <sup>3</sup> 15 mg/m <sup>3</sup>	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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 – 1.3.7	Trans-Chlordane gamma-Chlordane Gamma Chlordane	5103-74-2	None	0.5 mg/m <sup>3</sup> 100 mg/m <sup>3</sup>	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 – 1.3.7	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

<b>Task</b>	<b>Contaminant</b>	<b>CAS Number</b>	<b>Monitoring Device</b>	<b>PEL/IDLH</b>	<b>Source of Concentration on Site</b>	<b>Route of Exposure</b>	<b>Symptoms</b>	<b>First Aid</b>
1.3.1 – 1.3.7	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
1.3.1 – 1.3.7	Vanadium	7440-62-2	None	0.1 mg/m <sup>3</sup> 15 mg/m <sup>3</sup>	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 – 1.3.7	Zinc	7440-62-2	None	15 mg/m <sup>3</sup> 500 mg/m <sup>3</sup>	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<sup>3</sup> = milligrams per cubic meter

500 mg/m<sup>3</sup>

**TABLE 3**  
**Summary of Monitoring Equipment**

Instrument	Operation Parameters
Photoionization Detector (PID) MultiRAE	<p><b>Hazard Monitored:</b> Many organic and some inorganic gases and vapors.</p> <p><b>Application:</b> 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.</p> <p><b>Detection Method:</b> Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions.</p> <p><b>General Care/Maintenance:</b> Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories.</p> <p><b>Typical Operating Time:</b> 10 hours. 5 hours with strip chart recorder.</p>
Oxygen Meter MultiRAE	<p><b>Hazard Monitored:</b> Oxygen (O<sub>2</sub>).</p> <p><b>Application:</b> Measures the percentage of O<sub>2</sub> in the air.</p> <p><b>Detection Method:</b> Uses an electrochemical sensor to measure the partial pressure of O<sub>2</sub> in the air, and converts the reading to O<sub>2</sub> concentration.</p> <p><b>General Care/Maintenance:</b> Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to expiration of the specified interval. If the ambient air is less than 0.5% C O<sub>2</sub>, replace the detector cell frequently.</p> <p><b>Typical Operating Time:</b> 8 – 12 hours.</p>
Additional equipment (if needed, based on site conditions)	
Combustible Gas Indicator (CGI) MultiRAE	<p><b>Hazard Monitored:</b> Combustible gases and vapors.</p> <p><b>Application:</b> Measures the concentration of combustible gas or vapor.</p> <p><b>Detection Method:</b> 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.</p> <p><b>General Care/Maintenance:</b> Recharge or replace battery. Calibrate immediately before use.</p> <p><b>Typical Operating Time:</b> Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.</p>
Flame Ionization Detector (FID) with Gas Chromatography Option <i>(i.e., Foxboro Organic Vapor Analyzer (OVA))</i>	<p><b>Hazard Monitored:</b> Many organic gases and vapors (approved areas only).</p> <p><b>Application:</b> 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.</p> <p><b>General Care/Maintenance:</b> Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks.</p> <p><b>Typical Operating Time:</b> 8 hours; 3 hours with strip chart recorder.</p>
Potable Infrared (IR) Spectrophotometer	<p><b>Hazard Monitored:</b> Many gases and vapors.</p> <p><b>Application:</b> Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures.</p> <p><b>Detection Method:</b> Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound.</p> <p><b>General Care/Maintenance:</b> As specified by the manufacturer.</p>

Instrument	Operation Parameters
Direct Reading Colorimetric Indicator Tube	<p><b>Hazard Monitored:</b> Specific gas and vapors.</p> <p><b>Application:</b> Measures concentration of specific gases and vapors.</p> <p><b>Detection Method:</b> 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.</p> <p><b>General Care/Maintenance:</b> 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.</p>
Aerosol Monitor	<p><b>Hazard Monitored:</b> Airborne particulate (dust, mist, fume) concentrations</p> <p><b>Application:</b> Measures total concentration of semi-volatile organic compounds, PCBs, and metals.</p> <p><b>Detection Method:</b> 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.</p> <p><b>General Care/Maintenance:</b> 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.</p>
Monitox	<p><b>Hazard Monitored:</b> Gases and vapors.</p> <p><b>Application:</b> Measures specific gases and vapors.</p> <p><b>Detection Method:</b> Electrochemical sensor relatively specific for the chemical species in question.</p> <p><b>General Care/Maintenance:</b> Moisten sponge before use; check the function switch; change the battery when needed.</p>
Gamma Radiation Survey Instrument	<p><b>Hazard Monitored:</b> Gamma Radiation.</p> <p><b>Application:</b> Environmental radiation monitor.</p> <p><b>Detection Method:</b> Scintillation detector.</p> <p><b>General Care/Maintenance:</b> Must be calibrated annually at a specialized facility.</p> <p><b>Typical Operating Time:</b> Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.</p>

**TABLE 4  
INSTRUMENTATION ACTION LEVELS**

<b><u>Photoionization Detector Action Levels</u></b>	<b><u>Action Required</u></b>
Background to 5 ppm	No respirator; no further action required
> 1 ppm but < 5 ppm for > 5 minutes	<ol style="list-style-type: none"> <li>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.</li> <li>2. If PID readings remain above 1 ppm, temporarily discontinue work and upgrade to Level C protection.</li> <li>3. If sustained PID readings fall below 1 ppm, downgrading to Level D protection may be permitted.</li> </ol>
> 5 ppm but < 150 ppm for > 5 minutes	<ol style="list-style-type: none"> <li>1. Discontinue all work; all workers shall move to an area upwind of the jobsite.</li> <li>2. Evaluate potential causes of the excessive readings and allow work area to vent until VOC concentrations fall below 5 ppm.</li> <li>3. Level C protection will continue to be used until PID readings fall below 1 ppm.</li> </ol>
> 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**

<b>ORGANIZATION</b>	<b>CONTACT</b>	<b>TELEPHONE</b>
Local Police Department	NYPD	911
Local Fire Department	NYFD	911
Ambulance/Rescue Squad	NYFD	911
Hospital	Harlem Hospital Center	911 or 212-939-1000
Langan Incident / Injury Hotline		917-613-7234
Langan Environmental Project Manager	Greg Wyka	347-267-2679 (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	Josue Sanchez	212-233-0495
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<sup>A</sup>**

<b>Adjusted Temperature<sup>b</sup></b>	<b>Normal Work Ensemble<sup>c</sup></b>	<b>Impermeable Ensemble</b>
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:  $ta\ adj\ ^\circ F = ta\ ^\circ F + (13 \times \% \text{ sunshine})$ . 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**

RELATIVE HUMIDITY	ENVIRONMENTAL TEMPERATURE (Fahrenheit)										
	70	75	80	85	90	95	100	105	110	115	120
	<b>APPARENT TEMPERATURE*</b>										
<b>0%</b>	64	69	73	78	83	87	91	95	99	103	107
<b>10%</b>	65	70	75	80	85	90	95	100	105	111	116
<b>20%</b>	66	72	77	82	87	93	99	105	112	120	130
<b>30%</b>	67	73	78	84	90	96	104	113	123	135	148
<b>40%</b>	68	74	79	86	93	101	110	123	137	151	
<b>50%</b>	69	75	81	88	96	107	120	135	150		
<b>60%</b>	70	76	82	90	100	114	132	149			
<b>70%</b>	70	77	85	93	106	124	144				
<b>80%</b>	71	78	86	97	113	136					
<b>90%</b>	71	79	88	102	122						
<b>100%</b>	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

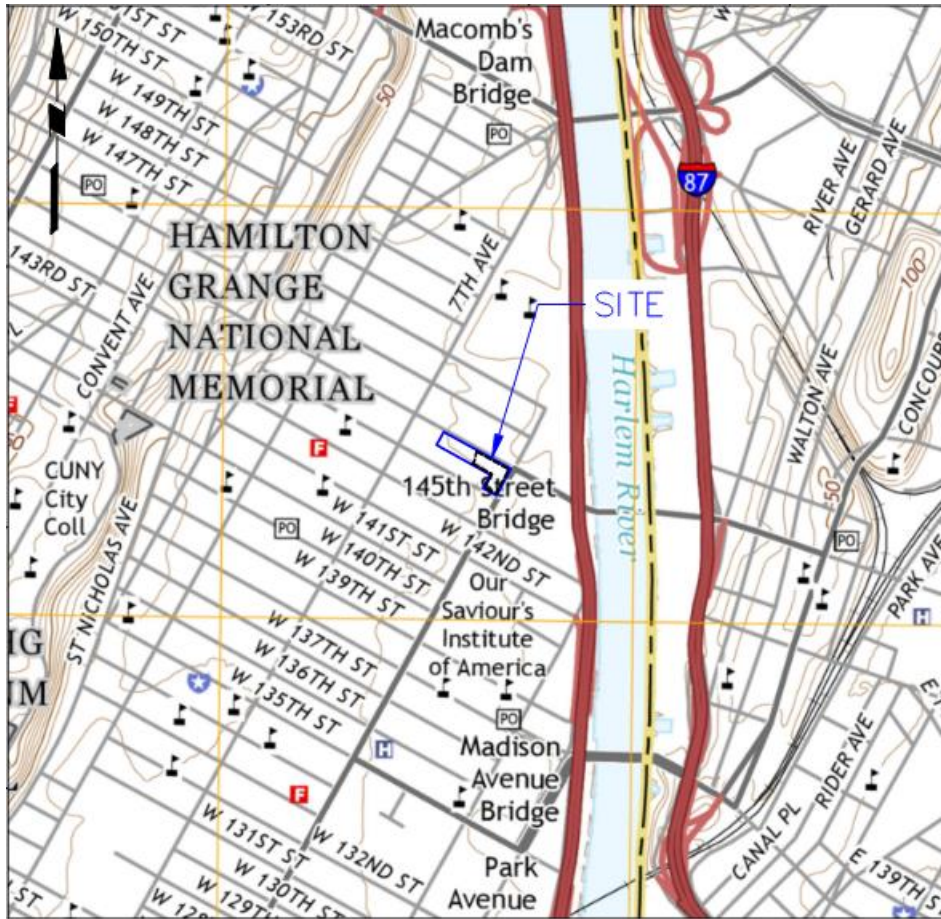
Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.



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



- LEGEND
-  APPROXIMATE DEVELOPMENT PROPERTY BOUNDARY
  -  APPROXIMATE PHASE 1 SITE BOUNDARY
- NOTES:
1. BASE MAP SOURCE: UNITED STATES GEOLOGICAL SURVEY TOPOGRAPHIC MAP, CENTRAL PARK QUADRANGLE, 2016
  2. NORTH ARROW SHOWS TRUE NORTH.
  3. NOT TO SCALE.

# FIGURE 2

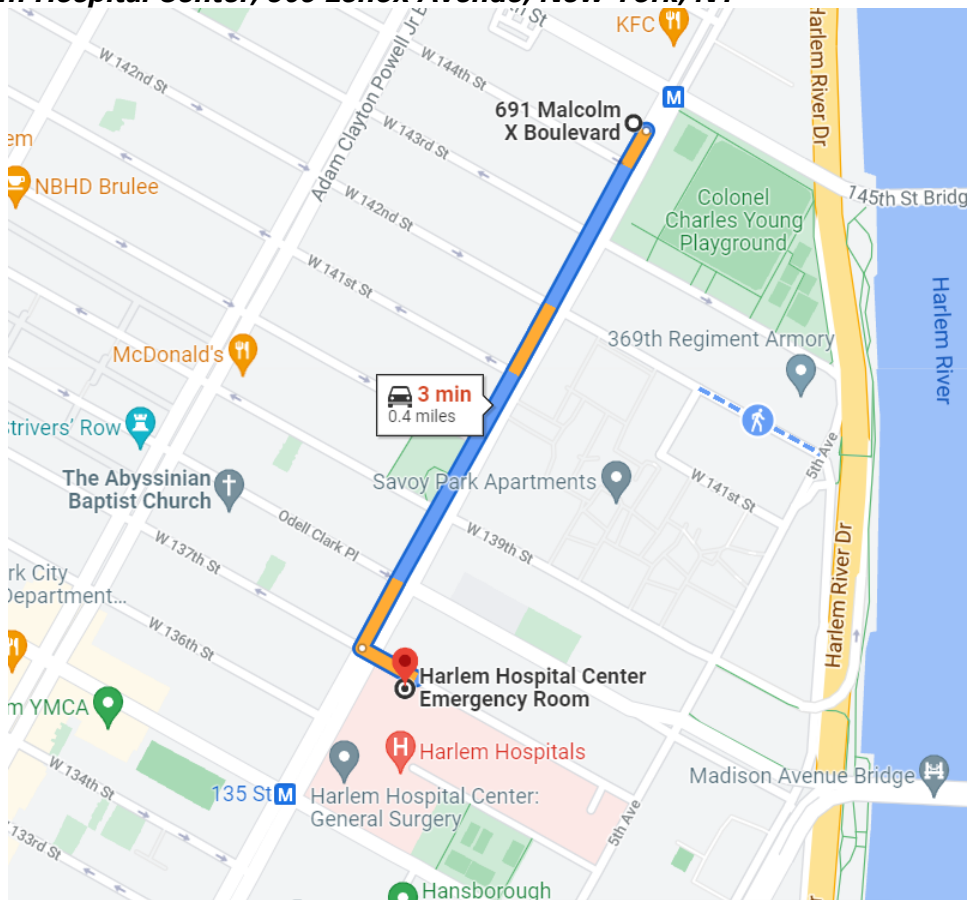
## HOSPITAL ROUTE PLAN

**Hospital Location: Harlem Hospital Center**  
**506 Lenox Avenue**  
**New York, New York**  
**212-939-1000**

**START: 691 Lenox Ave, New York, NY**

1. Head southwest on Lenox Ave/Macolm X Boulevard
2. Turn left onto W 137<sup>th</sup> St

**END: Harlem Hospital Center, 506 Lenox Avenue, New York, 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

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### LEVEL C DECONTAMINATION

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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.

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### LEVEL D DECONTAMINATION

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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: \_\_\_\_\_

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Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc.):

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Weather conditions during incident:

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**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: \_\_\_\_\_  
\_\_\_\_\_

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**HEALTH & SAFETY INFORMATION**

Was the operation being conducted under an established site specific CONSTRUCTION HEALTH AND SAFETY PLAN?

Yes     No     Not Applicable:

Describe protective equipment and clothing used by the employee:

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Did any limitations in safety equipment or protective clothing contribute to or affect exposure / injury? If so, explain:

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Employee Signature

Date

---

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Langan Representative

Date

**ATTACHMENT D**  
**CALIBRATION LOG**





**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**



## Job Safety Analysis (JSA) Health and Safety

**JSA TITLE:**

**DATE CREATED:**

**CREATED BY:**

**JSA NUMBER:**

**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:

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.**

**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):**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Dielectric Overshoes, Sun Block				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Transport equipment to work area	<ol style="list-style-type: none"> <li>Back/strain</li> <li>Slip/Trip/Falls</li> <li>Traffic</li> <li>Cuts/abrasions/contusions from equipment</li> <li>Accidents due to vehicle operations</li> </ol>	<ol style="list-style-type: none"> <li>Use proper lifting techniques/Use wheeled transport</li> <li>Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures</li> <li>Wear proper PPE (high visibility vest or clothing)</li> <li>Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes)</li> <li>Observe posted speed limits/ Wear seat belts at all times</li> </ol>
2. Traffic	<ol style="list-style-type: none"> <li>Hit by moving vehicle</li> </ol>	<ol style="list-style-type: none"> <li>Use traffic cones and signage/ Use High visibility traffic vests and clothing/ Caution tape when working near active roadways.</li> </ol>
3. Field Work (drilling, resistivity testing, and inspection)	<ol style="list-style-type: none"> <li>Biological Hazards: insects, rats, snakes, poisonous plants, and other animals</li> <li>Heat stress/injuries</li> <li>Cold Stress/injuries</li> <li>High Energy Transmission Lines</li> <li>Underground Utilities</li> <li>Electrical (soil resistivity testing)</li> </ol>	<ol style="list-style-type: none"> <li>Inspect work area to identify biological hazards. Wear light colored long sleeve shirt and long pants/ Use insect repellent 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.</li> <li>Wear proper clothing (light colored)/ drink plenty of water/ take regular breaks/use sun block</li> <li>Wear proper clothing/ dress in layers/ take regular breaks.</li> <li>Avoid direct contact with high energy transmission lines/ position equipment at least 15 feet or as required by PSE&amp;G from the transmission lines/ wear proper PPE (dielectric overshoes 15 kV minimum rating).</li> <li>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</li> <li>See AGI Sting R1 operating manual for specific concerns during operating instrument</li> </ol>



JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
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 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	7. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 8. 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 9. Wear Langan approved safety shoes 10. 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 11. Wear high visibility clothing & vest / Use cones or signs to designate work area 12. 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 13. Wear proper hearing protection 14. Wear hard hat / Avoid areas were overhead hazards exist. 15. 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 16. Wear safety glasses
Additional items.		
Additional Items identified while in the field.  (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><u>Prepared by:</u></b>		
<b><u>Reviewed by:</u></b>		

**JSA Title:** Monitoring Well Development

**JSA Number:** JSA026-01

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):**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input checked="" type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

Other: Tyvek Sleeves

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	6. Back Strains 7. Slips/Trips/Falls 8. Traffic 9. Cuts/Abrasions/Contusions from equipment	6. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 7. Minimize distance from work area/ unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 8. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 9. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
6. Measure depth of water	1. Exposure to hazardous substances 2. Pinched fingers	1. Wear proper PPE (Nitrile gloves, Safety glasses/Face shield). 2. Wear proper PPE (cut-resistant gloves).
7. Install Tremie pipe in the monitoring well and connect to water source.	1. Hand injuries during installation (pinched fingers/hands). 2. Back strain from holding Tremie pipe. 3. High pressure water spray.	1. Wear proper PPE (Nitrile gloves/cut-resistant gloves). 2. Use proper lifting techniques/ Use two personnel when lowering pump greater than 80 feet. 3. Ensure all hose connections are tight and secure/ Use proper PPE (face shield and safety glasses).
8. Install pump in to well a. Connect pump to sample tubing. b. Lower pump to desired depth in well. c. Connect sample tubing to flow cell d. Connect pump to power source (generator) e. Turn on power source (generator)	1. Hand injuries during pump installation and sample tubing cutting. 2. Back strain 3. Electric shock 4. Exhaust gases from generator 5. Burns from hot equipment	1. Wear proper PPE when installing pump and cutting sample tubing (Nitrile and cut-resistant gloves)/ Use tubing cutter. 2. Proper lifting techniques/ Two personnel when installing pump at depths greater than 80 feet/ Use buddy when lifting heavy loads (pump, generator)/Use wheeled transport. 3. Ensure equipment is ( LO/TO: locked out/tagged out) prior to performing any electrical connections/ Inspect wires for frays or cuts/Ensure generator is properly grounded prior to starting. 4. Position generator so that exhaust is flowing away from work area. 5. Do not touch exhaust or any hot part of generator/ Allow equipment time to cool down prior to carrying/ Use proper PPE (long sleeves, leather gloves)
9. Develop monitoring well	11. Hand injuries	17. Wear proper PPE (cut-resistant gloves and nitrile gloves).

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
a. Jet water into well using Tremie pipe b. Turn pump on and adjust to desired flow rate. c. Surge pump up and down well to remove sediment from screen d. Containerize all purge water from well.	12. Face injuries 13. Contaminated spray from water	18. Wear proper PPE (face shield and safety glasses)/do not stand over well opening. 19. Wear proper PPE (Face shield and safety goggles)/Tyvek over garments/ Ensure all connections are secure and tight/ Tubing outlet is contained in an overflow container.
10. Drum staging area.	1. Back, Arm, and shoulder strain. 2. Pinch points 3. Cross contamination 4. Slip/Trips/Falls	1. Use proper lifting techniques/ Use drum carts when moving drums/ use buddy system for moving of drums if needed/Move drums shortest distance needed. 2. Keep fingers and feet away from pinch points/ Use proper PPE (cut-resistant gloves, Langan approved safety shoes) 3. Use proper PPE (Nitrile gloves, Tyvek sleeves) 4. Ensure pathway is clear prior to moving equipment/ Mark all hazards/ Use additional person as a spotter if needed.
11. Equipment pack-up	1. Back Strains 2. Slips/Trips/Falls 3. Traffic 4. Cuts/Abrasions/Contusions from equipment.	1. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 2. Minimize distance from work area/ Unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 3. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 20. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
12. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. 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	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 repellent / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where 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.		

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
Additional Items identified while in the field.  (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><i>Prepared by:</i></b>		
<b><i>Reviewed by:</i></b>		



**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:**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
13. Move equipment to work site	10. Back strain when lifting equipment  11. Slips/ Trips/ Falls while moving equipment  12. Traffic (if applicable) 13. Pinched fingers or running over toes during geoprobe set-up 14. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	10. 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 11. 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 12. Wear high visibility safety vests or clothing / Exercise caution 13. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 14. 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
14. Calibration of monitoring equipment	3. Skin or eye contact with calibration chemicals 4. Pinch fingers in monitoring equipment	3. Wear proper PPE (safety glasses/ goggles) 4. Wear proper PPE (leather gloves)
15. Set-up geoprobe rig	4. Geoprobe rig movement	4. All field personnel should stay clear of the geoprobe rig while moving / Use a spotter when backing up the geoprobe
16. Advance geoprobe rods below ground surface to desired depth	6. Underground utilities 7. High noise levels	6. Clean all subsurface soil borings to a minimum of 5 feet below grade 7. Wear proper PPE (hearing protection)
17. Remove and open acetate liner	21. Pinched fingers while removing macrocore 22. Cuts/lacerations when cutting acetate liner open 23. 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 contained in the Health and Safety Plan

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Remove and open acetate liner (cont'd)	24. Skin contact with contaminated soil	4. Wear proper PPE (nitrile gloves)
18. 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 8. Use proper lifting techniques / Do not lift heavy loads without assistance 9. 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 10. Be alert / Follow good housekeeping procedures
19. 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	21. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance 22. Wear proper PPE (cut-resistant or leather gloves)  23. Wear proper PPE (cut-resistant or leather gloves)  24. Wear proper PPE (nitrile gloves underneath work gloves)  25. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions 26. 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 repellent / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where 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

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. All activities (cont'd)	10. Eye Injuries	10. Wear safety glasses
Additional items.		
Additional Items identified while in the field.  (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><u>Prepared by:</u></b>		
<b><u>Reviewed by:</u></b>		

**JSA Title:** Groundwater Sampling

**JSA Number:** JSA008-01

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):**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input checked="" type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Tyvek sleeves, Dermal Protection, PID				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
20. Transport equipment to work area	<ol style="list-style-type: none"> <li>1. Back Strain</li> <li>2. Slips/ Trips/ Falls</li> <li>3. Traffic</li> <li>4. Cuts/abrasions from equipment</li> <li>5. Contusions from dropped equipment</li> </ol>	<ol style="list-style-type: none"> <li>1. Use proper lifting techniques / Use wheeled transport</li> <li>2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures</li> <li>3. Wear proper PPE (high visibility vest or clothing)</li> <li>4. Wear proper PPE (leather gloves, long sleeves)</li> <li>5. Wear proper PPE (safety shoes)</li> </ol>
21. Remove well cover	<ol style="list-style-type: none"> <li>5. Scrape knuckles/hand</li> <li>6. Strain wrist/bruise palm</li> <li>7. Pinch fingers or hand</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (leather gloves)</li> <li>2. Using a hammer, tap the end of the wrench to loosen grip of bolts</li> <li>3. Wear proper PPE (leather gloves)</li> </ol>
22. Remove well cap and lock	<ol style="list-style-type: none"> <li>5. Well can pops from pressure</li> <li>6. Exposure to hazardous substances through inhalation or dermal exposure</li> <li>7. Scrape knuckles/hand</li> <li>8. Strain write/bruise palm</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses)</li> <li>2. Use direct air monitoring/reading instrument (i.e. PID) / Be familiar with and follow actions prescribed in the CHASP / Wear proper PPE (nitrile gloves)</li> <li>3. Wear proper PPE (leather gloves)</li> <li>4. Using hammer, tap the end of the wrench to loosen grip</li> </ol>
23. Measure head-space vapor levels	<ol style="list-style-type: none"> <li>1. Exposure to hazardous substances through inhalation</li> </ol>	<ol style="list-style-type: none"> <li>1. Do not place face over well when collecting measurement</li> </ol>
24. Remove dedicated tubing (if necessary)	<ol style="list-style-type: none"> <li>1. Exposure to hazardous substances through inhalation or dermal exposure</li> <li>2. Tubing swings around after removal</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (nitrile gloves, Tyvek sleeves)</li> <li>2. Wear proper PPE (safety glasses)</li> </ol>
25. Set-up plastic sheeting for work site around the well	<ol style="list-style-type: none"> <li>1. Lacerations when cutting plastic sheeting</li> </ol>	<ol style="list-style-type: none"> <li>1. Use scissors to cut plastic sheeting / Cut motions should always be away from body and body parts</li> </ol>
26. Measure depth to water	<ol style="list-style-type: none"> <li>1. Exposure to hazardous substances through inhalation or dermal exposure</li> <li>2. Pinch fingers or hand in water level instrument</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (nitrile gloves)</li> <li>2. Wear proper PPE (leather gloves)</li> </ol>



JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
27. Calibrate monitoring equipment	<ol style="list-style-type: none"> <li>1. Skin or eye contact with calibration chemicals</li> <li>2. Pinch fingers or hand in monitoring equipment</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (safety glasses, nitrile gloves)</li> <li>2. Wear proper PPE (leather gloves) / Avoid pinch points</li> </ol>
28. Install sampling pump in well	<ol style="list-style-type: none"> <li>1. Hand injuries during installation of pump</li> <li>2. Lacerations when cutting tubing</li> <li>3. Back strain during installation of pump</li> <li>4. Physical hazards associated with manual lifting of heavy equipment</li> <li>5. Back strain from starting generator</li> <li>6. Burns from hot exhaust from generator</li> <li>7. Electrical shock from improper use of generator and pump</li> <li>8. Contaminated water spray from loose connections</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (leather gloves, nitrile gloves)</li> <li>2. Use safety tubing cutter</li> <li>3. Use proper lifting techniques</li> <li>4. Use proper lifting techniques / Use wheeled transport for heavy equipment</li> <li>5. Use arm when starting generator / Do not over-strain if generator does not start</li> <li>6. Do not touch generator near exhaust / Use proper handle to carry / Allow generator to cool down before moving</li> <li>7. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord</li> <li>8. Check all tubing connections to ensure they are tight and secure</li> </ol>
10. Purge water	<ol style="list-style-type: none"> <li>1. Contact with potentially contaminated groundwater</li> <li>2. Back strain from lifting buckets of water</li> <li>3. Tripping potential on sample discharge lines and pump electric line</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (safety glasses, nitrile gloves)</li> <li>2. Use proper lifting techniques / Use wheeled transport</li> <li>3. Organize discharge of electric line to keep out of way as much as possible / Mark potential tripping hazards with caution tape or safety cones</li> </ol>
11. Sample water collection	<ol style="list-style-type: none"> <li>1. Contact with potentially contaminated groundwater through dermal exposure</li> <li>2. Contact with and burns from acid used for sample preservation</li> <li>3. Tripping potential on sample discharge lines and pump electric line</li> <li>4. Lacerations from broken sample bottles</li> <li>5. Back strain when transporting coolers full of collected samples</li> <li>6. Slips/ Trips/ Falls</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (safety glasses, nitrile gloves)</li> <li>2. Wear proper PPE (safety glasses, nitrile gloves) / Ensure sample bottle lids are secure before use and after sample collection</li> <li>3. Organize line to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones</li> <li>4. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible</li> <li>5. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle</li> <li>6. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift</li> </ol>
12. Remove pump and pack up equipment	<ol style="list-style-type: none"> <li>1. Back strain when removing pump or lifting heavy equipment</li> </ol>	<ol style="list-style-type: none"> <li>1. Use proper lifting technique / Use wheeled transport for heavy equipment</li> </ol>
13. Replace well cap and lock	<ol style="list-style-type: none"> <li>1. Scrape fingers/hand</li> <li>2. Strain wrist/bruise palm</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (leather gloves)</li> <li>2. Using hammer, tap the end of the well cap to tighten grip</li> </ol>
14. Replace well cover	<ol style="list-style-type: none"> <li>1. Scrape knuckles/hand</li> <li>2. Strain wrist/bruise palm</li> <li>3. Pinch fingers or hand</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (leather gloves)</li> <li>2. Using hammer, tap the end of the wrench to tighten the grip of the bolts</li> <li>3. Wear proper PPE (leather gloves)</li> </ol>
15. Transport drums to disposal staging location	<ol style="list-style-type: none"> <li>1. Back, arm or shoulder strain from moving drums</li> <li>2. Pinch hazard</li> <li>3. Contact with potentially contaminated groundwater when moving improperly sealed drums</li> <li>4. Slips/ Trips/ Falls when moving drum</li> <li>5. Drop drum on feet/toes</li> </ol>	<ol style="list-style-type: none"> <li>1. Use drum cart for moving drums / Use proper lifting techniques / Obtain assistance, if needed</li> <li>2. Wear proper PPE (leather gloves)</li> <li>3. Wear proper PPE (nitrile gloves under leather gloves) / Properly seal drum to prevent leak</li> <li>4. Ensure route to move drum to storage space is dry and free from obstructions</li> <li>5. Wear proper PPE (safety shoes)</li> </ol>

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
16. Place used PPE in designated disposal drum	<ol style="list-style-type: none"> <li>1. Pressure build-up inside drum</li> <li>2. Pinch hazard</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove cap from bung hole in drum to relieve pressure</li> <li>2. Wear proper PPE (leather gloves)</li> </ol>
17. Decontaminate equipment	<ol style="list-style-type: none"> <li>1. Splashing water/soap from decontamination</li> <li>2. Contact with potentially contaminated groundwater through dermal exposure</li> <li>3. Electrical shock from broken electric cords</li> </ol>	<ol style="list-style-type: none"> <li>1. Wear proper PPE (safety glasses)</li> <li>2. Wear proper PPE (safety glasses, dermal protection)</li> <li>3. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord</li> </ol>
18. All activities	<ol style="list-style-type: none"> <li>25. Slips/ Trips/ Falls</li> <li>26. Hand injuries, cuts or lacerations during manual handling of materials</li> <li>27. Foot injuries</li> <li>28. Back injuries</li> <li>29. Traffic</li> <li>30. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)</li> <li>31. High Noise levels</li> <li>32. Overhead hazards</li> <li>33. Heat Stress/ Cold Stress</li> <li>34. Eye Injuries</li> </ol>	<ol style="list-style-type: none"> <li>27. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards</li> <li>28. 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</li> <li>29. Wear Langan approved safety shoes</li> <li>30. 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</li> <li>31. Wear high visibility clothing &amp; vest / Use cones or signs to designate work area</li> <li>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</li> <li>33. Wear hearing protection</li> <li>34. Wear hard hat / Avoid areas where overhead hazards exist.</li> <li>35. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Take breaks as necessary to avoid heat/cold stress</li> <li>36. Wear safety glasses</li> </ol>
Additional items.		
Additional Items identified while in the field.  (Delete row if not needed.)		





## 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):**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input checked="" type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

Other: \_\_\_\_\_

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
29. Unpack/Transport equipment to work area.	15. Back Strains 16. Slip/Trips/Falls 17. Cuts/Abrasions from equipment 18. Contusions from dropped equipment	15. Use proper lifting techniques/Use wheeled transport 16. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 17. Wear proper PPE (leather gloves, long sleeves). 18. Wear proper PPE (Langan approved safety shoes).
30. Initial Site Arrival-Site Assessment	8. Traffic	5. Situational awareness (be alert of your surroundings). Secure area from through traffic.
31. Surface Water Sampling	9. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	5. Wear appropriate PPE (Safety glasses, appropriate gloves). Review (M)SDS for all chemicals being.
32. Sampling from bridges	8. Struck by vehicles	11. Wear appropriate PPE (Safety Vest). Use buddy system and orange safety cones.
33. Icing of Samples/ Transporting coolers/equipment from work area.	35. Back Strains 36. Slips/Trips/Falls 37. Cuts/Abrasions from equipment 38. Pinch/Crushing Hazards.	37. Drain coolers of water. Use proper lifting techniques. Use wheeled transport. 38. Have unobstructed path from work area. Aware of surroundings. 39. Wear proper PPE (Leather gloves, long sleeves) 40. Wear proper PPE (Leather gloves, long sleeves)
34. 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.
35. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 39. Traffic 40. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.)	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

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	41. High Noise levels 42. Overhead hazards 43. Heat Stress/ Cold Stress 44. Eye Injuries	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 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/ Do not approach stray dogs / Carry/use dog/animal repellent / Use bug spray when needed 43. Wear hearing protection 44. Wear hard hat / Avoid areas where 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.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><u>Prepared by:</u></b>		
<b><u>Reviewed by:</u></b>		



**Job Safety Analysis (JSA)  
Health and Safety**

**JSA Title:** Geophysical Investigation

**JSA Number:** JSA023-01

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):**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input checked="" type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input type="checkbox"/> Other: _____				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
36. Transport equipment to work area	19. Back/strain 20. Slip/Trip/Falls 21. Traffic 22. Cuts/abrasions/contusions from equipment	19. Use proper lifting techniques/Use wheeled transport 20. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 21. Wear proper PPE (high visibility vest or clothing) 22. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes)
37. Supervision of subcontractor and all other activities	9. Slip/Trips/Falls 10. Hand injuries 11. Foot injuries 12. Back injuries/Strains 13. Traffic 14. Wildlife a. Wildlife b. Mice/rats c. Vectors (i.e. mosquitoes, bees, etc.)  7. Heat/Cold Stress	6. Be aware of potential trip hazards/follow good housekeeping procedures/mark significant below-grade hazards (i.e. holes, trenches, wires, ropes) with safety cones or spray paint. 7. Wear proper PPE (leather gloves)/watch wear you place your hands/inspect material or equipment for jagged, rough or slippery surfaces/ watch for pinch points/ wipe off slippery, wet, or dirty items prior to handling. 8. Wear proper PPE (Langan approved safety shoes)/ Be aware of uneven terrain) 9. Use proper lifting techniques/ Buddy system when lifting/ use wheeled transport. 10. Wear proper PPE (high-visibility shirts and vests)/ use cones if appropriate/ notify equipment operators of work area. 11. Be aware of surroundings at all times for the presence of wildlife. a. Do not approach stray animals b. Carry animal repellent/ use if situation arises. c. Use bug spray when needed. 7. Wear proper attire for weather conditions (sunscreen, protective clothing in sunlight or layer clothing in cold weather)/ drink plenty of fluids/ take regular breaks.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
38. All activities	45. Slips/ Trips/ Falls 46. Hand injuries, cuts or lacerations during manual handling of materials 47. Foot injuries 48. Back injuries 49. Traffic 50. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 51. High Noise levels 52. Overhead hazards 53. Heat Stress/ Cold Stress 54. Eye Injuries	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 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 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 proper 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.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><u>Prepared by:</u></b>		
<b><u>Reviewed by:</u></b>		



**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):**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	

Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
39. Transport equipment to work area	23. Back Strain 24. Slips/ Trips/ Falls 25. Traffic 26. Cuts/abrasions from equipment 27. 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)
40. Moving equipment to its planned location	15. Pinch Hazard 16. 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
41. Equipment Set-up	10. Pinch Hazard 11. Cuts/abrasions to knuckles/hands 12. Back Strain	5. Wear proper PPE (leather gloves) 6. Wear proper PPE (leather gloves) 7. Use proper lifting techniques / Use wheeled transport
42. All activities	55. Slips/ Trips/ Falls 56. Hand injuries, cuts or lacerations during manual handling of materials 57. Foot injuries 58. Back injuries 59. Traffic 60. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 61. High Noise levels 62. Overhead hazards 63. Heat Stress/ Cold Stress 64. 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



JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
8. All activities (cont'd)		62. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellent / Use bug spray when needed 63. Wear hearing protection 64. Wear hard hat / Avoid areas where 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.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><u>Prepared by:</u></b>		
<b><u>Reviewed by:</u></b>		

**JSA Title:** Hand Auger Soil Sampling

**JSA Number:** JSA003-01

**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:**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input checked="" type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input checked="" type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input checked="" type="checkbox"/> Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
43. Unpack equipment	28. Slips/ Trips/ Falls  29. Physical hazards including strains and hand injury	1. Be aware of hazards in area/ Place safety cones in areas of potential slips/trips/falls 2. Use proper lifting techniques / Do not lift heavy loads without assistance / Avoid putting hands near pinch points / Wear proper PPE (leather gloves)
44. Calibration of monitoring equipment	17. Skin or eye contact with calibration chemicals 18. Pinch fingers in monitoring equipment	12. Wear proper PPE (safety glasses/ goggles) 13. Wear proper PPE (leather gloves)
45. Advancing and removing hand auger	13. Physical hazards including back strain and hand injury	6. Twist auger using arms and shoulders/ Do not over exert / Keep back in neutral position, bend at the knees / Request assistance when needed / Remove auger from ground keeping back in neutral position and lift using legs
46. Sample collections a) Monitor parameters b) Prepare sample containers and labels c) Collect soil sample d) Securely cap containers, label and store in sample cooler until shipping e) Deliver cooler to lab or courier to lab	9. Contact with potentially contaminated soil 10. Lacerations from broken sample bottles 11. Back strain with transporting coolers 12. Internal exposure to contaminants through inhalation of dust  13. Slips/ Trips/ Falls	12. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 13. Do not over-tighten bottles caps / Handle bottles safely to prevent breakage 14. Use proper lifting techniques / Do not lift heavy loads without assistance 15. Avoid creating dust / If necessary, wear a half-face respirator with applicable dust cartridges / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location 16. Be alert / Follow good housekeeping procedures
47. Decontamination of equipment	65. Splashing water/soap from decontamination 66. Contact with potentially contaminated soil	67. Wear proper PPE (safety glasses, gloves) 68. Wear proper PPE (safety glasses, gloves)
48. All activities	1. Slips/ Trips/ Falls	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
6. All activities (cont'd)	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  10. Eye Injuries	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 repellent / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where 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 / Take 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.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><u>Prepared by:</u></b>		
<b><u>Reviewed by:</u></b>		



**Job Safety Analysis (JSA)  
Health and Safety**

**JSA Title:** Test Pits  
**JSA Number:** JSA016-01

**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):**

<input checked="" type="checkbox"/> Safety Shoes	<input checked="" type="checkbox"/> Long Sleeves	<input checked="" type="checkbox"/> Safety Vest (Class 2)	<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Hearing Protection
<input checked="" type="checkbox"/> Safety Glasses	<input type="checkbox"/> Safety Goggles	<input type="checkbox"/> Face Shield	<input type="checkbox"/> Nitrile Gloves	<input type="checkbox"/> PVC Gloves
<input checked="" type="checkbox"/> Leather Gloves	<input type="checkbox"/> Cut Resist. Gloves	<input type="checkbox"/> Fall Protection	<input type="checkbox"/> Fire Resistant Clothing	<input type="checkbox"/> Rubber Boots
<input type="checkbox"/> Insect/Animal Repellent	<input type="checkbox"/> Ivy Blocker/Cleaner	<input type="checkbox"/> Traffic Cones/Signs	<input type="checkbox"/> Life Vest/Jacket	
<input type="checkbox"/> Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
49. Transport equipment to work area	30. Back Strain 31. Slips/ Trips/ Falls 32. Traffic 33. Cuts/abrasions from equipment 34. 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)
50. Digging Test Pit	19. Back Strain 20. Unstable walls of excavation	6. Observe proper digging technique. 7. Excavate test pit in a stepped manor.
51. All activities	67. Slips/ Trips/ Falls 68. Hand injuries, cuts or lacerations during manual handling of materials 69. Foot injuries 70. Back injuries 71. Traffic 72. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 73. High Noise levels 74. Overhead hazards 75. Heat Stress/ Cold Stress 76. Eye Injuries	69. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 70. 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 71. Wear Langan approved safety shoes 72. 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 73. Wear high visibility clothing & vest / Use cones or signs to designate work area 74. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellent / Use bug spray when needed 75. Wear hearing protection 76. Wear hard hat / Avoid areas where overhead hazards exist. 77. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Take breaks as necessary to avoid heat/cold stress

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
3. All activities (cont'd)		78. Wear safety glasses
Additional items.		
Additional Items identified while in the field.  (Delete row if not needed.)		

<u>Print Name</u>	<u>Sign Name</u>	<u>Date</u>
<b><i>Prepared by:</i></b>		
<b><i>Reviewed by:</i></b>		

# **ATTACHMENT H**

## **TAILGATE SAFETY BRIEFING FORM**



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**APPENDIX B**

**PROPOSED CONSTRUCTION SCHEDULE**

**Appendix B  
Excavation Work Plan  
Proposed Construction Schedule**

**691 Lenox Avenue - Phase 1  
New York, NY  
NYSDEC BCP Site No.: C231145  
Langan Project No.: 170635401**

Item	Action	2022																			
		January				February				March				April				May			
		Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
1	COU, EWP, SMMP - Preparation and Submittal																				
2	COU, EWP, SMMP - NYSDEC Review, Revisions, and Approval																				
3	Contractor - Bid and Award																				
4	Contractor - Site Mobilization																				
5	EWP - Implementation/Construction																				
6	CCR - Preparation and Submittal																				
7	CCR - NYSDEC Review, Revisions, and Approval																				

- Notes:**
- 1. BCP = Brownfield Cleanup Program
  - 2. CCR = Construction Completion Report
  - 3. COU = Change of Use
  - 4. EWP = Excavation Work Plan
  - 5. NYSDEC = New York State Department of Environmental Conservation
  - 6. SMMP = Soil/Materials Management Plan