450 UNION STREET SITE

NYSDEC BCP SITE NO. C224219

450 UNION STREET, BROOKLYN, NEW YORK

REMEDIAL SITE OPTIMIZATION WORK PLAN

SEPTEMBER 2024

Prepared For

New York State Department of Environmental Conservation
Division of Environmental Remediation
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CERTIFICATION

I, Ariel Czemerinski, certify that I am currently a NYS registered professional engineer and that this Remedial Site Optimization Work Plan was prepared in accordance with all applicable statutes and regulations and is substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

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

076508	9/16/24	
NYS Professional Engineer	Date	Signature

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

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1.0 INTRODUCTION

This Remedial Site Optimization Work Plan (RSOWP) was prepared on behalf of 2201 Union LLC (the Applicant) for the property located at 450 Union Street in the Gowanus section of Kings County, New York (the Site). The Site is enrolled in the New York State (NYS) Brownfield Cleanup Program (BCP) Site No. C224219, which is administered by the New York State Department of Environmental Conservation (NYSDEC). 450 Union LLC c/o Pilot Real Estate Group (the Volunteer) executed a Brownfield Cleanup Agreement (BCA) on September 1, 2015, with the NYSDEC to investigate and remediate the Site. 450 Union Developer LLC was added to the BCA as an additional Volunteer on March 13, 2020, and 2201 Union LLC was added to the BCA upon purchase of the property. A notice of transfer of Certificate of Completion (COC) and Change of Use Notification for the new entity was submitted to the NYSDEC on October 24, 2022.

1.1 Purpose and Objectives

A remedial site optimization (RSO) / grossly contaminated material (GCM) investigation was conducted at the Site between June and August 2023. Evidence of coal tar-like impacts was observed within several borings varying in depths. However, horizontally, the GCM impacts do not go beyond 75 feet west of the Gowanus Canal. Contaminants of concern include constituents of petroleum-related contamination (BTEX), PAHs, and metals at various depths within GCM-impacted areas and petroleum-related contamination (BTEX), PAHs, and metals contamination in groundwater. Consequently, the NYSDEC determined that the encountered GCM is an ongoing source of contamination and must be treated to solidify and stabilize the mobile GCM. A bench-scale test was performed using bulk sample volume in February 2024 to assess the efficacy of in-situ stabilization/solidification (ISS) and in-situ geochemical stabilization (ISGS) as potential remedial technologies to address the contaminants of concern at the Site. Although both technologies were determined to feasibly treat and/or stabilize the GCM, ISS is the preferred treatment method by the NYSDEC in areas where there are no obstructions that would prevent its application. Since the NYSDEC approved treatment area is outside the existing bulkhead and the high-relieving platform, no major obstructions that make the ISS infeasible are believed to be present. Therefore, this document presents the implementation plan for ISS to address GCM delineated during the prior investigations at the Site.

2.0 SITE BACKGROUND

2.1 Site Location and Description

The Site is located on the southeast corner of Union Street and Bond Street intersection to the west of Gowanus Canal within the Gowanus section of Kings County, New York. The legal description of the Site is Tax Block 438 and Lot 7. A Site location map is provided in Figure 1.

The Site consists of an irregular-shaped vacant lot that is approximately 28,500 square feet. Access to the site is controlled by a New York City Department of Buildings (NYCDOB) approved construction fence. Most recently, the Site was improved with a 9,880-square-foot one-story commercial building and adjacent ancillary structures utilized as storage, outdoor kitchen, and event space. The former buildings were demolished by June 2023. The concrete slab of the former building was partially cracked during the demolition activities, as required by the NYCDOB. The eastern portion of the Site remains asphalt-paved in areas not disturbed by the pilot testing work.

The Site is located within a primarily mixed residential, commercial, and industrial area of Kings County. The Site was rezoned on October 24, 2022, as a result of the Gowanus Neighborhood Rezoning and Related Actions under the City Environmental Quality Review (CEQR) #19DCP157K, and the new zoning (M1-4/R7-2) allows for residential uses with mandatory inclusionary housing (MIH), community facilities, commercial and manufacturing uses.

2.2 Surrounding Property Land Use

North	Union Street followed by a four-story mixed residential and commercial use building (305 Bond Street, 487-493 Union Street), a one-story commercial/office building (497-499 Union Street), and a lot undergoing residential development at 503 Union/510 Sackett Street.
Northwest	A four-story residential building across Bond Street and Union Street intersection (485 Union Street).
South	Multiple lots undergoing residential development work within BCP Site No. C224221.
West	Bond Street followed by two four-story residential buildings (316 Bond Street and 318 Bond Street), a three-story residential building (320 Bond Street), and a five-story residential building (322 Bond Street).
East	Gowanus Canal

The properties adjacent to the north of the Site across Union Street consist of a four-story mixed residential and commercial use building, a one-story commercial/office building, and a lot undergoing residential development at 503 Union/510 Sackett Street; the adjacent property to the northwest consists of a four-story residential building; adjacent to the east is the Gowanus Canal; the property adjacent to the south consists of multiple lots undergoing residential development work within BCP Site No. C224221; and the properties adjacent to the west across Bond Street consist of two four-story residential buildings, a three-story residential building, and a five-story residential building. A Site plan showing surrounding land use is provided in Figure 2.

The nearest ecological receptor is the Gowanus Canal which borders the eastern perimeter of the Site. Other sensitive receptors, as defined in DER-10, within 1,000-feet of the Site include:

- P.S. 032 Samuel Mills Sprole School at 420 Union Street
- St. Lydia's at 304 Bond Street

2.3 Site Topography, Geology, and Hydrogeology

According to a survey performed by Montrose Survey Co. LLC. on July 17, 2023, the Site is located at approximately el. 12 (NAVD88).

Groundwater flow direction may be impacted by several factors, including surface topography, hydrology, hydrogeology, characteristics of soil, and nearby wells. According to groundwater elevation data obtained during the recent investigations and using survey data gathered during the surveying event on July 17, 2023, the inferred groundwater flow direction in the vicinity of the Site is east towards the Gowanus Canal, located immediately east adjacent to the Site. The groundwater depth ranges from approximately el. 1 to el. 3 (NAVD88) (or 9 to 11 feet below grade surface (bgs)).

According to the United States Geological Survey (USGS), the Site is located within the Atlantic Coastal Plain physiographic province, which represents the end or terminal moraines of a glacier and the associated outwash aprons beyond the moraine.

During recent investigations, historic fill was encountered between the ground surface and a maximum depth of 12 feet bgs, underlain by brown, fine- to coarse-grained sand and silt with varying amounts of silt and gravel with intermittent clay lenses. Organic material was encountered at depths varying from 19 to 25 feet bgs, underlain by brown, fine- to coarse-grained sand and silt with varying amounts of silt and gravel with intermittent clay lenses. Bedrock was not encountered in borings advanced to approximately 80 feet below site grade at the Site during the environmental investigations.

2.4 Site History

The Site was historically occupied by a lumber yard in 1886, a coal and wood yard between 1886 and 1928, a granite works in 1915, a die casting/electroplating facility in 1922, a fuel company, and auto repair in 1931, and a foundry between 1930 and 2007.

Tenants on the Site included a coal and wood yard between 1886 and 1928; a granite works in 1915; a die casting/electroplating facility in 1922; a garage between 1918 and 1930; a fuel company, auto repair, and office in 1931; Thos Paulson & Son Inc Brass Foundry between 1940 and 1973; Bronco Bronze Corp between 1940 and 1949; Ernest Aron Metls between 1960 and 1973; private tenants in 1973 and 1994; Regency Service Carts Incorporated in 1999; Chimu Bistro between 2009 and 2014, the Green Building and 450 Union LLC in 2014.

The Site is currently vacant, and all structures are demolished.

2.5 Redevelopment Plans

Current plans include a 20-story mixed residential and commercial use building. The building will be used for parking, utilities, mechanical, bicycle storage, commercial retail spaces, and residential lobby uses on the first floor, parking, mechanical, storage, and building workshop uses on the mezzanine level, parking and commercial office and event spaces on the floor 2, residential units on floors 3-18, storage, mechanical and residential amenity spaces on floor 19, and mechanical uses on the roof/bulkhead areas. Other residential amenity spaces are on floors 3 and 7.

2.6 Grossly Contaminated Material Investigations

Vektor conducted a remedial site optimization (RSO) / grossly contaminated material (GCM) investigation at the Site between June and August 2023 in accordance with an NYSDEC and NYSDOH-approved Remedial Site Optimization (RSO) Work Plan dated April 2023. The purpose of this investigation was to delineate the extent of on-site GCM at depth.

The scope of the RSO included the installation and sampling of thirteen soil borings (DB-1 through DB-13) and eighteen monitoring wells at various depths. Visual and/or olfactory evidence of GCM attributed to the adjacent Gowanus Canal, known GCM impacted Federal Superfund site, was observed within nine of the thirteen borings and within seven of the eighteen wells during the investigation. Based on the 13 borings installed approximately 90 feet inland of the Canal, GCM impacts do not go beyond 75 feet west of the Canal. Evidence of coal tar-like impact was observed within borings DB-1 through DB-9, varying in depths with the shallowest observation of staining at el. -9 in DB-4 and the deepest observation of staining at el. -57 in DB-1. Blebs and sheen associated with coal tar impacts were observed as shallow as el. -17 in DB-5 and the deepest observation at el.-27 in DB-6. GCM was observed as shallow as el. -12 in DB-4 and as deep as el. -42 in DB-1. Borings DB-10 through DB-13 did not show any evidence of GCM/NAPL impacts. Visual and olfactory evidence of impacts was most prevalent in the groundwater wells in the most

northern and southern well clusters during the investigation. Figure 3 shows the locations of borings and cluster wells installed during this investigation.

Contaminants of concern for the Site include constituents of petroleum-related contamination (BTEX), PAHs, and metals at various depths within GCM-impacted areas and petroleum-related contamination (BTEX), PAHs, and metals contamination in groundwater. The results of the investigation were provided to the NYSDEC and NYSDOH in a draft RSO/GCM report dated September 2023. Figure 3 shows the extent of GCM impacts at the Site.

Based on their review of the draft RSO/GCM report, the NYSDEC determined that the encountered GCM is an ongoing source of contamination and must be treated to solidify and stabilize the mobile GCM.

2.6.1 Treatability Study

Based on the results of the RSO/GCM investigation, a subsequent bench-scale test was performed in February 2024 by Vektor to assess the efficacy of in-situ stabilization (ISS) and in-situ geochemical stabilization (ISGS) as potential remedial technologies to address the contaminants of concern at the Site. Sampling locations were biased towards areas of documented GCM contamination. The study consisted of the installation of four soil borings to 45 feet bgs (el. -33), and collection of two soil samples for the ISS study, and the installation of two soil borings and collection of one soil sample for the ISGS study. The existing monitoring well network within the proposed treatment area (DB1-MW-1, DB3-MW-3, and DB4-MW-4) was utilized to collect nine sample volumes for the analysis of one groundwater sample and one NAPL sample for the ISGS study.

Groundwater samples were analyzed for pH, oxygen reduction potential (ORP), and VOCs via EPA Method 8260D and SVOCs via EPA Method 8270D in addition to the field parameters, including pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, temperature, and turbidity. Soil samples were analyzed for VOCs via EPA Method 8260D and polyaromatic hydrocarbons (PAHs, a class of SVOCs) via EPA Method 8270 SIM.

The treatability study concluded that both ISS and ISGS are feasibly applicable remedial methods for the Site. The findings for each of the bench-scale studies are discussed below:

ISS

Based on testing conducted on the 16 test mixes in the geotechnical laboratory for hydraulic conductivity and unconfined compressive strength (UCS), the following was determined:

- The mixes containing slag cement generally outperformed the equivalent mixes with only Portland cement in both UCS and hydraulic conductivity.
- Ten of the 16 mixes achieved both the UCS and hydraulic conductivity bench scale targets.

- For the mixes containing slag, a 9% total cementitious addition rate was sufficient to meet the target mix design parameters for UCS and hydraulic conductivity for both soil composites.
- A 6% total cementitious addition rate mix containing slag was noted to be close to achieving to achieving the target mix design parameters for UCS and hydraulic conductivity for both soil composites.
- For Portland cement-only mixes, a 12% addition rate was required to meet the target mix design parameters for the second composite soil sample and a 15% addition rate was required to meet the target parameters for the first composite soil sample.

The following conclusions were made from the ISS bench scale study:

- Commercially available reagents were successful in achieving standard UCS and hydraulic conductivity for ISS mixes, via soil mixing and jet-grouting, with site soils.
- Based on the results of this study, a 9% total cement addition to a slab to Portland cement ratio of 2:1, by weight of soil, can achieve the UCS and hydraulic conductivity objectives with a typical factor of safety for both soil composites, and was likely to be the most cost-effective mix to achieve the parameters.

ISGS

Based on testing conducted on the soil and water samples from the Site, the following was determined:

- The mass of benzene, toluene, ethylbenzene and xylenes (BTEX) discharged from the 4.5% ISGS columns were higher than the control while the 10% ISGS columns showed a decrease. The mass of polyaromatic hydrocarbons (PAHs), a class of semi-volatile organic compounds (SVOCs), discharged from the 4.5% ISGS columns were higher than the control while the 10% ISGS columns showed a large decrease.
- For permeability, the 4.5% ISGS columns had a slightly higher hydraulic conductivity than the control. The 10% ISGS columns hydraulic conductivity was significantly less than the control.
- During the microscopy, manganese oxide crusts were observed in all ISGS-amended columns. When compared to the control, the 4.5% ISGS columns and 10% ISGS columns provided evidence that the most complete ISGS impact was seen in the 10% column section.

The following conclusion was made from the ISS bench scale study:

- The addition of ISGS to the NAPL greatly increased the migration time of the NAPL indicating the increase in viscosity, with 10% ISGS columns showing near total immobility.

Although both technologies were determined to feasibly treat and/or stabilize the GCM, ISS is the preferred treatment method by the NYSDEC in areas where there are no obstructions that would prevent its application. Since the NYSDEC approved treatment area is outside the existing bulkhead and the high-relieving platform, no major obstructions that make the ISS infeasible are believed to be present. Therefore, upon review of the ISS bench-scale results, NYSDEC determined on May 31, 2024, that a field pilot-test was required for the ISS technology to ensure the laboratory tested reagents were successful in achieving standard unconfined compressive strength (UCS) and hydraulic conductivity for ISS mixes via mixing with site soils.

2.6.2 Field Pilot-Study

Based on the ISS bench-scale results, a preliminary mix design of 9% total cement addition to a slag to Portland cement ratio of 2:1, by weight of soil, can achieve the UCS and hydraulic conductivity objectives with a typical factor of safety for both soil composites and is likely to be the most effective mix to achieve the parameters.

The NYSDEC objective is to meet the following standard ISS testing criteria:

- Strength: Target a minimum unconfined compressive strength of 50 pounds per square inch (PSI)
- Permeability: Achieve a maximum permeability of 1x 10^{-6} centimeters per second (cm/sec)

Vektor conducted a field pilot-study at the Site in August 2024 in accordance with an NYSDEC and NYSDOH-approved ISS Pilot Work Plan dated June 2024 and a NYSDEC-approved letter addendum to the work plan dated August 2024.

During the pilot test, Geo-Solutions, Inc. (GSI) of New Kensington, PA, introduced two reagent mix designs, as follows via auger mixing:

- 9% total cement addition using slag to Portland ratio of 2:1 by weight of soil (Installed 8/23/2024)
- 12% total cement addition using slag to Portland ratio of 2:1 by weight of soil (Installed 8/19/2024)

The 6% total cement addition using slag to Portland ratio of 2:1 by weight of soil, originally proposed in the work plan, was omitted from the scope based on a determination by NYSDEC in the field on August 19th, 2024.

The work consisted of the following:

- Auger mixing was performed utilizing a Delmag RH38 hydraulic drill rig fitted with mixing augers. The two different mixes were advanced in two different locations on the Site. A minimum of two strokes (i.e., passes) per column were advanced between the

intervals of el. -10 and el. -28 within the GCM-impacted area. Each mix had a minimum of two overlapping columns.

- Reagent addition control at the batch plant that was built at the Site was generally controlled by weight. After the batch plant accurately produces the reagent slurry with a known amount of reagent weight per volume of slurry, the volume of slurry for each column was calculated.
- During the application, the rig's onboard data monitoring device recorded the mixing time per depth/interval, grout distribution (reagent addition per interval), injection pressure, injection rate, speed of rotation in real-time, and advance rate. These real-time data recordings were then utilized to create daily reports. Data recordings were reported to NYSDEC in the daily field reports and was used to establish production performance parameters for review and approval by NYSDEC for the Remedial System Optimization Work Plan.

Wet grab samples were collected for laboratory testing during the mixing to assess the homogeneity of different mix designs. Wet samples were collected from the depths where non-aqueous phase liquid (NAPL) was observed within the respective application/sampling area. One sample per 500 cy was analyzed for UCS and permeability from each application area. Individual soil-cement test specimens were created by casting the soil-cement mixture in plastic cylinders.

The cast cylinders were placed in an insulated cooler with standing water to cure, undisturbed, prior to testing. GSI then allowed sample cylinders to cure a minimum of 3 days before shipping to a third-party laboratory for UCS and permeability. Geotechnics of East Pittsburgh was used for laboratory testing. Sample cylinders were tested at the following curing frequency:

- UCS – 7, 14, and 28 days of curing
- Permeability – 7, 14, and 28 days of curing

Results were shared with the NYSDEC as received after the 7- and 14-day results (to date) and will be shared with NYSDEC as after the 28 day results are received.

On September 3rd, 2024, (at least one week after the application of both the 9% and 12% columns), Coastal Environmental Solutions advanced three borings to retrieve core samples using a 1.5-inch diameter, 5-foot-long core sampler with disposable acetate liners for visual inspection, as follows:

- One confirmation core was collected from the overlapped areas between the two 9% mix columns;
- One confirmation core was collected from the middle of a 9% column (the mix with the least cement addition); and
- One confirmation core was collected from the overlapped areas between the two 12% mix columns.

Visual inspections were conducted for the retrieved core sample from ISS-2C down to 40 feet below grade surface (bgs) and from ISS-2S between 25' to 40' bgs. ISS-3C was only drilled down to 35' bgs due to refusal. A visual inspection was conducted for the retrieved core sample from ISS-3C down to 35' bgs. Free product was observed within sand in the 30–35-foot interval from ISS-3C. It was determined that the test columns for the 12% mix failed to satisfy the QA/QC requirements for use on-site. However, further coring of the 12% mix was not required.

Upon observation of the core samples and 7-day analytical results of the wet samples, the following was determined in collaboration with NYSDEC based on letter issued on September 6th 2024:

- The 9% mixture has acceptable compression strength and the core show sufficient mixing with the preliminary permeability data meeting project requirements. The 9% mixture is acceptable for the implementation. If final permeability changes, NYSDEC may need to reevaluate the mixture. Upon receipt of the final 7-day permeability data for the 9% mix, it was determined that the 9% mixture still meets project requirements.

3.0 SCOPE OF WORK

3.1 ISS Process

ISS is conducted by the mixing of fluid cement grout into a column or cell of soil without the removal of soil. ISS mixing typically involves mechanical equipment, such as a mixing auger or hydraulic excavator bucket, in the soil while additives are pumped into the soil. Obstructions are typically either removed prior to mixing or determined to be encapsulated into the monolith. In the case of contamination under 450 Union Street, the primary objective of the ISS is to permanently immobilize the GCM into a soil-cement monolithic matrix. The purpose of this work plan is to implement the full-scale remedy design to treat the GCM delineated at the Site.

3.1.1 Implementation

During the bench scale test and field pilot test, it was determined that reagents were successful in achieving standard unconfined compressive strength (UCS) and hydraulic conductivity for ISS mixes via soil mixing.

The objective is to meet the following standard ISS testing criteria:

- Strength: Target a minimum unconfined compressive strength of 50 pounds per square inch (PSI)
- Permeability: Achieve a maximum permeability of 1x 10^{-6} centimeters per second (cm/sec)

Based on the bench-scale results, a preliminary mix design of 9% total cement addition to a slag-to-Portland cement ratio of 2:1, by weight of soil, can achieve the UCS and hydraulic conductivity objectives with a typical factor of safety for both soil composites and is likely to be the most effective mix to achieve the parameters.

As determined during the pilot-study with NYSDEC, Geo-Solutions, Inc. (GSI) of New Kensington, PA, will introduce the following reagent mix design via auger mixing:

- 9% total cement addition using slag to Portland ratio of 2:1 by weight of soil.

3.1.1.1 Site Preparation

As per the letter Addendum to the Pilot Test Work Plan for In-Situ Stabilization/Solidification dated August 23rd, 2024, large obstructions were encountered at depths that required deeper than anticipated excavation upon commencement of the pilot test program at the Site on August 15th, 2024. Therefore, the ISS column locations needed to be pre-cleared using specialized equipment to remove the debris (i.e., concrete and steel) at or below 10 feet below grade. The Addendum also proposed to pre-clear obstructions within the full-scale ISS treatment area after completion of the pilot testing. Pre-clearing activities were approved by NYSDEC during the pilot testing and will be completed prior to the approval and implementation of the RSO Work Plan. Prior to conducting full scale production, the entirety of asphalt-paved areas over the treatment zone will be removed

to prepare the Site for excavation and ISS. The procedures for the proposed scope of work (including the continued pre-clearing work) were described in an updated Soil/Materials Management Plan (SMMP) within the Addendum.

The ISS treatment area requires a minimum 4-foot-thick cap at grade surface atop the completed monolith post-treatment. To ensure an accessible work area, soil/fill in the treatment zone will be excavated to 2 feet below grade, with proper sloping, to facilitate the full-scale ISS implementation, potential for swell, as well as to mitigate potential run-off off-site. Shallow utilities and existing infrastructure, including but not limited to catch basins, outfalls, Site lighting, and associated utility conduits, will be safely uncovered and removed prior to auguring work. Excavations to uncover and remove these utilities may entail excavation below 2 feet; however, will remain localized. Utilities and existing Site infrastructure will be re-installed during the Site-wide redevelopment. Further excavation down to 4 feet below grade within the treatment work area outside of the building footprint will be conducted after the ISS work is complete. The 2-foot excavation will remain beneath the building footprint for the installation of foundation elements. The extent of excavation and location of obstructions to be removed to facilitate the ISS work are found in Figure 4.

Equipment and materials will be staged and stored within the secured Site. However, due to the nature of the work involved under this work plan, equipment and materials may need to be relocated within the secured Site as work progresses.

Groundwater Monitoring and Recovery Wells Decommissioning

The existing groundwater monitoring and recovery wells at the Site will be properly decommissioned in accordance with NYSDEC Commissioners Policy CP-43 prior to full production. At this time, as per the approved letter Addendum, well decommissioning work started in August 2024 and all remaining wells are anticipated to be decommissioned via grouting. Nineteen of the twenty (20) wells at the Site, within and near the treatment area, are constructed of 2” diameter PVC riser, and their casings will be removed during grouting, if able. It may be infeasible for RW-02, one of the recovery wells, consisting of a 6” diameter steel riser, to be pulled after grouting and may be an obstruction during auguring work. Over-drilling and pulling of the well casing will be attempted to remove the well if it cannot be removed via grouting/pulling.

Vektor submitted a formal written request to NYSDEC on August 20, 2024, to prepare the Site wells for decommissioning. Upon approval of the request, the NYSDEC was notified prior to the decommissioning of the wells during the site preparation phase of the work with monitoring well field inspection forms and the written request for decommissioning. Well-decommissioning work is currently underway, and decommissioning records will be prepared for the nine groundwater monitoring wells and two DNAPL recovery wells. Records of the decommissioning, along with the original well documentation, will be sent to the NYSDEC but will also be appended to the Remedial Site Optimization Report (RSOR) for the ISS work.

The primary objective of the ISS is to address the DNAPL within the treatment area at the Site. However, DNAPL recovery well extending below the treatment zone may be required based on site conditions after the ISS is completed. The groundwater monitoring wells and DNAPL recovery well locations to be decommissioned are shown in Figure 5.

3.1.1.2 Auguring and Grout Work (ISS Full Implementation)

Auger mixing will be performed utilizing a Delmag RH38 hydraulic drill rig fitted with mixing augers. The mix will be advanced throughout the treatment area on the Site. A 10-foot diameter auger is proposed with the ability to change out tooling to smaller (6-foot diameter or 8-foot diameter, as needed) augurs to most effectively ensure coverage throughout the entirety of the proposed treatment area. A smaller augur will be utilized around the existing manhole and surrounding structures in the southeast portion of the proposed treatment area. A minimum of two strokes (i.e., passes) per column will be advanced between the intervals of el. 10 and el. -28 within the GCM-impacted area. Each column will be overlapped to ensure a continuous soil-cement monolithic matrix. Approximately 4,400 cubic yards of soil are anticipated to be mixed as mixing will be performed from 2 feet below grade down to the bottom of the column elevation.

Reagent addition control at the batch plant that will be built at the Site is generally controlled by weight. After the batch plant accurately produces the reagent slurry with a known amount of reagent weight per volume of slurry, the volume of slurry for each column will be calculated.

During the application, the rig's onboard data monitoring device will record the mixing time per depth/interval, grout distribution (reagent addition per interval), injection pressure, injection rate, speed of rotation in real-time, and advance rate. These real-time data recordings will then be utilized to create daily reports. Any column that does not pass Quality Assurance (QC)/Quality Control (QC) will be reinstalled, repaired, remixed and/or other applicable methods will be evaluated and implemented. These will be reported to NYSDEC in the daily field reports and will be used to establish production performance parameters for review and approval by NYSDEC in the Remedial System Optimization Work Plan. No adjustments to the mix mechanicals are permitted without prior NYSDEC approval.

The total proposed number of ISS columns was determined to be 41 columns with a total treatment area of approximately 3,200 square feet. The proposed column locations are shown in Figure 6. The cross-sections of the proposed ISS columns and proposed Site cover are shown in Figure 7.

Approximately 1,000 cubic yards of spoils are anticipated to be removed from the treatment area during auguring. Soil spoils from the auguring work will be properly staged atop polyethylene sheeting, covered and secured by the end of each workday and monitored for odor controls prior to off-site shipment. Further details on the management of spoils are described in Section 4.0.

3.1.1.3 Post-Treatment

Post-treatment work after the monolith's completion includes further excavation outside of the building footprint to meet NYSDEC's 4-foot Site cap requirement outside of the building footprint and backfilling atop of the ISS with soil/fill backfill from off-site sources.

Excavation

Further excavation to 4 feet below grade outside the building footprint will continue and be completed after the ISS work is completed from 2 feet below grade and the monolith is installed, as required by NYSDEC.

The excavation will consist of the removal of the top 2 feet of the ISS installed in order to meet the minimum 4-foot clean fill Site cap requirement by NYSDEC for areas outside of the building footprint.

Backfill from Off-Site Sources

The excavated treatment zone will be backfilled upon completion of the ISS. Recycled Concrete Aggregate (RCA) derived from recognizable and uncontaminated concrete and supplied by facilities are permitted by, and in full compliance with Part 360-16 and DSNY regulations, are an acceptable form of backfill material. The RE is responsible for ensuring that the facility proposed is compliant with the registration and permitting requirements of 6 NYCRR Part 360 and DSNY regulations at the time the RCA is required. RCA imported from compliant facilities does not require additional testing unless required by NYSDEC and DSNY under its terms of operations for the facility. Documentation of Part 36-16 and DSNY compliance must be provided to the RE before the RCA is transported to the Site. RCA or the import of clean fill from off-site source(s) will be needed for all areas between the proposed building footprint and the bulkhead/relieving platform. An Import/Reuse Soil or Fill form will be submitted to NYSDEC for review and approval prior to placement on-site and is found in Appendix D. The proposed backfill locations plan is shown in Figure 8 and the extent of the proposed cover systems following the RSO work are shown in Figure 9.

As landscape and hardscape work is anticipated to occur in the area of the ISS site cap at a later date, oversight and management of this work would be conducted under an Excavation Work Plan. Oversight and management includes notification to NYSDEC prior to disturbance of the cap, with anticipated timeline and informing NYSDEC of the measures to be taken to ensure the cap is replaced / restored in kind.

3.1.2 Best Management Practices

To improve the sustainability of the remedy, best management practices (BMPs) will be implemented regarding all equipment used on-site. All vehicles, including equipment, will be turned off when not in use, reducing idling emissions. The choice to use auger mixing is a sustainable BMP because augers cause less disturbance to the surrounding environment than other drilling methods. A BMP associated with auger mixing is to use an appropriate auger bit for the

task and material type to ensure the auger bit is not damaged and needs replacement. The ability to change out tooling for the proper application (diameter sizes) ultimately reduces waste. These practices are sustainable as less waste is produced.

The column layout was specifically designed to sufficiently overlap all columns to ensure a continuous soil-cement monolithic matrix while minimizing resource waste by avoiding mixing into areas that do not require ISS.

The batch plant to be built at the Site is a sustainable BMP as it reduces the amount of transportation of supplies required to complete the remedy. Materials required to produce the slurry for the full-scale ISS implementation are anticipated to be sourced locally and only on an as-needed basis to reduce fuel usage, thus reducing emissions.

Excavation activities are anticipated to be conducted immediately after confirmation that the pilot test results satisfy the requirements of NYSDEC to proceed with a full-scale implementation and further excavation to be conducted after the monolith is installed. Excavation activities will be conducted in a manner that minimizes double-handling of material, which includes the live-loading of soil disposal trucks to avoid staging of material on-site. As a waste characterization study was previously conducted at the Site in April 2023, properly permitted waste disposal facilities will be selected for off-site disposal. The proposed disposal facilities' information, including their location, will be reported to the NYSDEC project manager prior to commencing the disposal activities.

The excavator used for the remedy will be appropriately maintained to ensure there are no fluid leaks. Soil disturbance activities may release dust particles, affecting air quality. Dust particles will be monitored as part of a Community Air Monitoring Plan, and dust mitigation practices, including the use of fresh water to suppress dust and prevent fugitive dust, will be employed when necessary.

Emissions evaluation criteria, specific to this scope, includes sustainability metrics such as total energy consumption, greenhouse gases, and other air emissions, as well as water consumption, waste generation and disposal. The footprint analysis was conducted by utilizing the EPA's Spreadsheets for Environmental Footprint Evaluation (SEFA). The emissions associated with the equipment and the overall remedy will be analyzed through SEFA to track metrics throughout RSO implementation. To complete the analysis, the metrics will be tracked by coordinating with the contractor, utilizing surveys, and using meters as necessary.

3.1.2.1 Green and Sustainable Remediation and Climate Resiliency

The Pilot Test performed prior to this full-scale ISS program did not consist of evaluations of greener cleanup activities. The evaluations of each phase / component of work for this RSO, including Site Preparation, Full ISS Implementation and Post-Treatment consisted of human and environmental health considerations, which will be the basis of this Green and Sustainable Remediation and Climate

Resiliency.

Each aspect of the RSO (Site Preparation, Full ISS Implementation, and Post-Treatment) generates waste and produces emissions. To reduce the environmental impact of the RSO, the following Best Management Practices, in addition to the practices noted in the previous section, can be implemented:

1. To protect the local ecosystem and ecosystem services, minimally invasive technologies will be employed. Real-time data collecting technologies are minimally invasive, protecting the local ecosystem and ecosystem services. The BMPs implemented under this principle include:
    i. The Site's Community Air Monitoring Plan (CAMP). The Site will have portable Photo Ionization Detectors (PIDs) and portable dust monitors that protect the workers on-site and the surrounding community, while remaining minimally invasive on-site.
2. Reducing the amount of time and distance for transporting materials to and from the Site will reduce the fuel consumed and associated air emissions. The BMPs implemented under this principle include:
    i. Ensuring any heavy diesel trucks transporting materials have a Clean Idle Certification Label;
    ii. Ensuring proper scheduling so that trucks do not need to idle longer than necessary to load or unload the material;
    iii. Requiring trucks to turn off their engines when leaving the engine on is not necessary;
    iv. When applicable, the reuse of clean, recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction since these materials can be locally-derived, thus reducing transportation and processing emissions;
    v. Participating in OER's low-energy project management program. Under this program, whenever possible, meetings were held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.
3. Reducing the amount of unnecessary material used both on-site or off-site will reduce both material consumption and waste generation, and will reduce the emissions associated with extraction, processing/production, use, and disposal. The BMPs implemented under this principle include:
    i. Reducing paper usage by using electronic copies of plans and drawings;
    ii. When applicable, the reuse of clean, recyclable materials reduces consumption of non-renewable virgin resources.
4. Requesting the Contractor tracks material use, material disposal, equipment use and associated emissions, water use, and transportation emissions of both material and personnel. The tracking data will be used in collaboration with the EPA's Spreadsheets for

Environmental Footprint Analysis ("SEFA") to determine the footprint of activities on Site. Summaries of the activities are included in Table 1.

Based on DER-31, the RSO will result in a green cleanup, benefiting the people and ecosystems around the Site. Components of the cleanup achieve the following:

1. Achieves a complete cleanup:
    i. The RSO plans to permanently immobilize the GCM at the Site into a soil-cement monolithic matrix beneath the Site.
2. Permanently and significantly reduces the toxicity, mobility, or volume of contamination:
    i. The RSO will include excavation and off-site disposal of approximately 450 cubic yards of soil/fill within the top 4 feet of the treatment zone outside of the building footprint and 2 feet of the treatment zone within the building footprint and permanently immobilize the GCM into a soil-cement monolithic matrix beneath the Site immediately west of the bulkhead and Gowanus Canal. The volume of contamination will significantly be reduced after excavation, and residual GCM contamination will be immobilized. Clean fill (i.e.: soil meeting UUSCOs, virgin stone, native crushed stone) and RCA will backfill excavated areas atop of the ISS, ensuring no additional contamination of soil/fill will occur after excavation.
3. Fewer long-term ancillary impacts to the environment:
    i. To facilitate the RSO and meet the required minimum cover system cap for the landscaped area, excavation will be conducted within the landscaped area (within the treatment area). Approximately 450 cubic yards of soil/fill are planned to be removed from the shallow soils in the area between the proposed building and the existing bulkhead. This excavation work removes contaminated soils at an earlier stage in the development, removing contamination at an earlier timeline than originally anticipated (landscape work anticipated for 2025). The excavation also benefits the RSO work as the work level of the augur will be at a lower elevation, resulting in less overburden to advance through and the time needed to complete each column; therefore, generating less carbon emissions during the RSO work. Approximately 1,000 cubic yards of augur spoils will be staged and removed off-site during this work. The ISS grout mixture will displace contaminated soils, benefitting conditions beneath the Site long term.

Of the three phases of the RSO work, the ISS Full Implementation phase generates the largest footprint over Site Preparation and Post-Treatment work. Overall, approximately 690,000 pounds of greenhouse gas emissions (GHG) emissions (carbon dioxide equivalents of global warming potential), 3,700 pounds of NOx emissions, 391 pounds of SOx emissions, 1,100 pounds of particulate matter (PM) emissions, and 38 pounds of hazardous air pollutants (HAPs) are anticipated to be produced during the entirety of the RSO.

The RSO will entail the removal of contaminated soils and permanently immobilizing the GCM into a soil-cement monolithic matrix beneath the Site immediately west of the bulkhead and Gowanus Canal, resulting in the site having fewer contaminants and mobile GCM contamination immobilized, benefiting the people and ecosystems around the site. The long-term effects of the removed and immobilized contamination will benefit the health of the environment due to lower risk of exposure. The tracking during the RSO work will be used in collaboration with the EPA's SEFA spreadsheets to determine the approximate footprint of activities on Site.

3.1.3 Field Sampling, Laboratory Test, and Column Evaluation

Wet grab samples will be collected for laboratory testing during the mixing to assess the homogeneity of the 9% mix design. Wet samples will be collected from the depths where non-aqueous phase liquid (NAPL) is observed within the respective application/sampling area. One sample per 500 cy will be analyzed for UCS and permeability from each application area. Individual soil-cement test specimens will be created by casting the soil-cement mixture in plastic cylinders. Based on the anticipated volume of mixing, 9 samples will be collected.

The cast cylinders will be placed in an insulated cooler with standing water to cure, undisturbed, prior to testing. GSI will then allow sample cylinders to cure a minimum of 3 days before shipping to a third-party laboratory for UCS and permeability. Geotechnics of East Pittsburgh will be used for laboratory testing. Sample cylinders will be tested at the following curing frequency:

- UCS – 7, 14, and 28 days of curing
- Permeability – 7, 14, and 28 days of curing

Results will be shared with the NYSDEC as received after 7, 14, and 28 days.

To ensure quality assurance and quality control, three core samples representing column overlap areas between working grade and 40 feet below grade will be retrieved using a 1.5-inch diameter, 5-foot-long core sampler with disposable acetate liners for visual inspection in a chosen location one week after application. The visual inspection will be conducted to ensure the entirety of the cored column was mixed uniformly and no free product is observed. The confirmation cores will be collected from the overlapped areas between three separate pairs of columns.

It was determined that the test columns for the 12% mix failed to satisfy the QA/QC requirements for use on-site. These masses will be replaced by the 9% mix design.

If recovery during verification coring is not achieved at the bottom of the ISS column, an offset location will be selected. The coring rig can either core from top to bottom of the offset location, or drill to the isolated coring location for retrieval and recovery. Should the offset or adjacent location not achieve recovery, close communication with the DEC and its' representatives will determine the path forward according to section *2.1 Coring Drilling Method* of the NYSDEC In-

Situ Solidification QA/QC document. As identified in *Section 2.1*, the lack of recovery is not intended to justify an inadequate sampling program.

Confirmation coring will be conducted as per NYSDEC's In-Situ Solidification QA/QC protocols outlined in Appendix C.

Failure to meet NYSDEC's Quality Assurance (QA)/Quality Control (QC) requirements will be the responsibility of the Applicant and professional engineer of record for the site to remove and replace deficient sections. If NYSDEC deems the In-site Stabilization (ISS) installation unsatisfactory based on review of the QA/QC data, the deficient section(s) of mass must be removed and replaced. The replaced sections are also subject to the QA/QC requirements and NYSDEC approval.

4.0 SOIL/MATERIALS MANAGEMENT PLAN

Soil/Materials Management Plan

Excavated soil during the Site preparation and post-treatment phases of work are anticipated to be live loaded directly into trucks for disposal off-site and only staged at the Site, atop polyethylene sheeting, covered and secured by the end of each workday until disposal off-site, as needed. As a waste characterization study was previously conducted at the Site in April 2023, properly permitted waste disposal facilities will be selected for off-site disposal during the removal of excavated soils during the Site preparation phase. The proposed disposal facilities' information, including their location, will be reported to the NYSDEC project manager prior to commencing the disposal activities.

Soil spoils from the auguring work will be staged within the treatment area excavation upon removal from the mixing columns. As material is anticipated to be removed from below the groundwater table, soils will remain staged within the excavation area until they solidify for handling outside of the excavation. Washout activities of the grouting equipment and lines will be conducted within the treatment area excavation, and washout fluids are to be mixed with the ISS spoils. Once the ISS spoils and washout fluids mix solidify, they will be managed as soil outside of the treatment area excavation and will be properly staged atop polyethylene sheeting, covered and secured by the end of each workday until disposal off-site. Additional waste characterization samples will be collected, as needed, based on the volume of spoils generated during the ISS work and removal of the ISS monolith to 4 feet below grade to meet NYSDEC's Site cap requirement outside of the building footprint.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. The tarps will be reused until the RE determines they need to be replaced. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional or experienced field geologist under the direction of the Remedial Engineer during all remedial and development excavations into known or potentially contaminated material. Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during the remedy.

Water will be available on-site at suitable supply and pressure for use in dust control, when necessary. To reduce the suspension of dust, vehicle speeds within the Site will be limited with the spraying of water in vulnerable areas prior to performance of work in which suspension of dust is likely to occur.

4.1 Fluid Management

During the RSO implementation, liquids will not be recharged back to the land surface or subsurface of the Site, or into the New York City sewer system. As most of the water introduced

during this work will be utilized within the batch plant for grout production, dewatering is not anticipated. Other uses for water during this work include dust control, as needed, as well as washing out equipment/hoses during grout operations. Washout activities will be conducted within the treatment area excavation, and washout fluids are to be mixed with ISS spoils. Once the ISS spoils and washout fluids mix solidify, they will be managed as soil outside of the treatment area excavation and staged appropriately for off-site disposal, as shown on Figure 4.

4.2 Stormwater Pollution Prevention Plan

Barriers and hay bale checks will be installed, as needed, and inspected on a daily basis. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed, as required, to keep the barrier and hay bale check functional. Silt fencing, if needed, shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the work plan shall be observed to ensure that they are operating correctly. Nothing will be discharged off-site during the implementation phase. Silt fencing or hay bales will be installed, as needed, around stockpiles and the Site perimeters near the treatment area.

4.3 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. Specific odor control methods to be used on a routine basis will include application of foam suppressants or tarps over the odorous materials. If nuisance odors are identified, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Remedial Engineer.

All necessary means will be employed to prevent on- and off-Site nuisances. Since the soil removal to 4 feet below grade likely does not require odor control, odor exposure would be limited to spoils generation while auguring. At a minimum, procedures will include 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.

4.4 Dust Control Plan

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

- Water will be available on-site at suitable supply and pressure for use in dust control. Dust suppression will be achieved though spraying water directly onto off-road areas including excavations and stockpiles.
- On-Site roads will be limited in total area to minimize the area required for water spraying.
- Vehicle speeds within the Site will be limited to prevent dust suspension.

4.5 Other Nuisances

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

4.6 Community Air Monitoring Plan

Community air monitoring will be performed during the RSO implementation as required by the DER-10. Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels will be performed during intrusive activities. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. The comprehensive CAMP plan is found in Appendix A.

Volatile organic compounds (VOCs) must be monitored at the downwind and upwind perimeters of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified utilizing two RAE Systems MiniRAE 3000 Photoionization Detectors (PID) units or equivalent. Concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to

the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations utilizing two TSI DustTrak™ DRX Aerosol Monitors (DustTrak) or equivalent. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped, and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

CAMP stations will be placed strategically every day based on wind direction.

Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities. CAMP exceedances will immediately be reported to the NYSDEC and NYSDOH Project Managers at the time of exceedance via email in addition to inclusion in the daily status reports. The NYSDEC Project Manager and NYSDOH Project Manager for the Site is:

Meghan Medwid, EIT
Project Manager
NYSDEC Division of Remediation, Bureau B, Section D
meghan.medwid@dec.ny.gov

Angela Martin
Project Manager
NYSDOH
angela.martin@health.ny.gov

A Special Requirements CAMP (SR-CAMP) will need to be implemented when remedial activities are occurring within 20 feet of the exposed populations:

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

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

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring will occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions will be pre-determined). Background readings in the occupied spaces will be taken prior to commencement of the planned work. Any unusual background readings will be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3, work activities will be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions will be pre-determined, as necessary.

5.0 REPORTING

Daily Field Reports will be prepared and submitted to the NYSDEC and NYSDOH Project Managers by noon the following business day of any fieldwork. This field report will include the following:

- Work Summary
- Photos
- Community Air Monitoring Program (CAMP) data
- Site Figure showing work locations and staged materials
- Performance parameters from the rig's onboard data monitoring device (discussed in Section 3.1.1.2)
- Plans for the future

Daily reports are not intended to be the primary mode of communication for notifying the NYSDEC of emergencies (accidents, spills, etc.), requests for changes to this Work Plan, or other sensitive or time-critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the Work Plan will be communicated directly to the NYSDEC and NYSDOH project managers via telephone call or email.

The results of confirmation testing will be submitted to the NYSDEC and NYSDOH as they are received.

Upon completion of the full-scale ISS implementation, a Remedial Site Optimization Report (RSOR) for the ISS work will be prepared and submitted to NYSDEC.

The RSOR provides documentation that the remedial work outlined in this RSOWP for the ISS has been completed and has been performed in compliance with this plan. The RSOWP will provide a comprehensive account of the locations and characteristics of all material removed from the Site, including the surveyed map(s) of all sources. The RSOR will include as-built drawings for all constructed elements, certifications, manifests, and bills of lading. The RSOR will provide a description of the changes in the implementation from the elements provided in this RSOWP and associated design documents. The RSOR will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the implementation. The RSOR will provide analytical results demonstrating that all mitigation and remedial systems are functioning properly. The RSOR will be prepared in conformance with DER-10.

The Remedial Site Optimization Report will include written and photographic documentation of all remedial work performed under this remedy. The RSOR will include an itemized tabular description of actual costs incurred during all aspects of the ISS implementation.

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

Before approval of the RSOR, all project reports must be submitted in digital form on electronic media (PDF).

6.0 HEALTH AND SAFETY PLAN (HASP)

A site-specific Health and Safety Plan (HASP) has been prepared for this project. All field personnel involved in investigation activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers' training records. The Site Safety Coordinator will be Peter Rathsack. An emergency contact sheet is included in the site-specific HASP.

All investigative work performed under this work plan will comply with all applicable health and safety laws and regulations, including OSHA worker safety requirements and HAZWOPER requirements. Field personnel will receive site-specific training. Depending on the tasks performed, additional safety training may be added. Subcontractors may choose to utilize their own site-specific HASP or adopt this HASP.

A copy of the site-specific Health and Safety Plan is provided in Appendix B.

7.0 SCHEDULE

The full-scale ISS remedy will be implemented upon approval of this work plan by the NYSDEC.

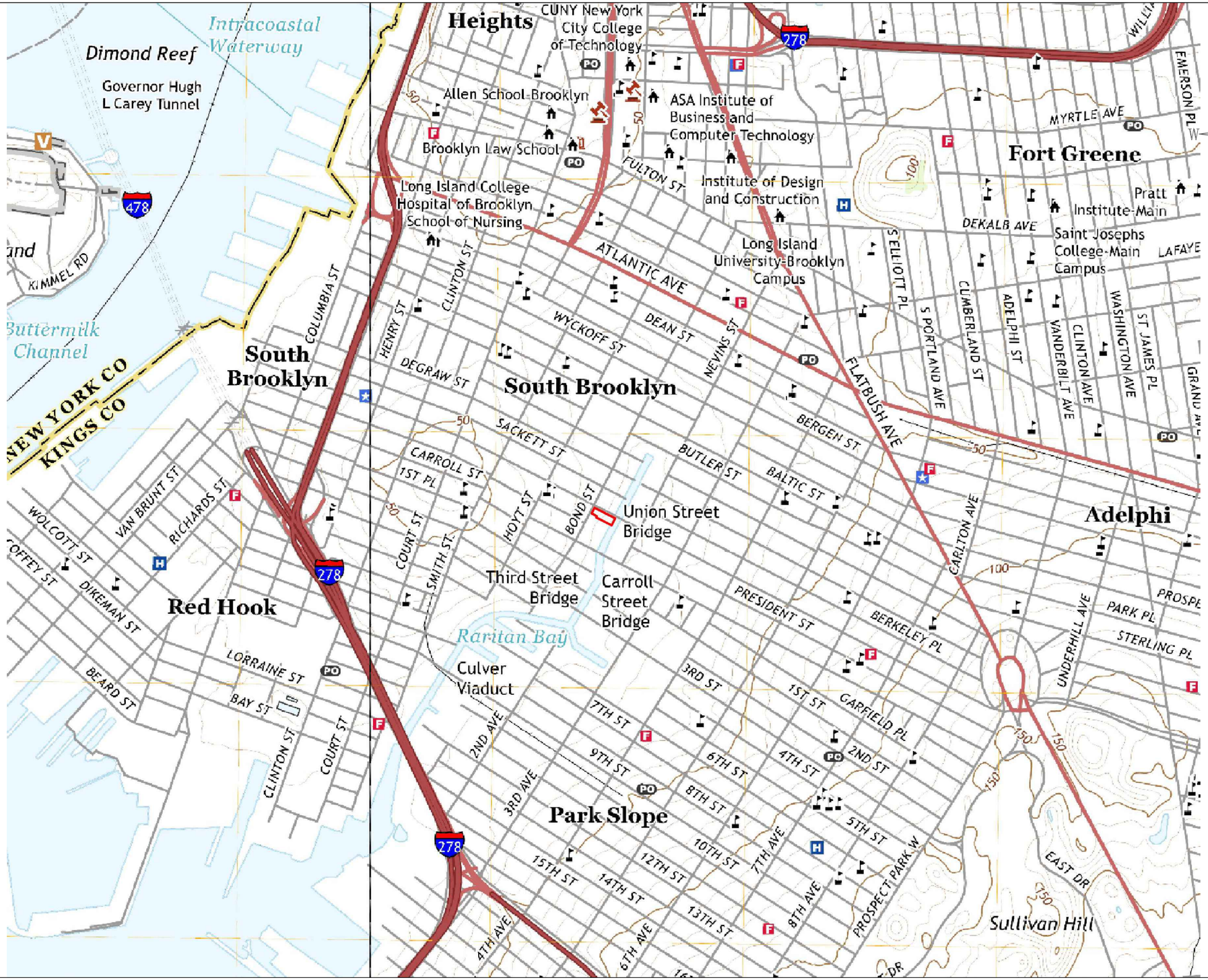
Notification

The NYSDEC will be notified at least one week prior to the start of the full-scale implementation. Soil mixing is anticipated to take 3 weeks based on site logistics and techniques observed during the pilot testing. The NYSDEC will be provided a two-week look ahead of Site activities every Monday by close of business. The table below shows the anticipated schedule for completing the scope of work:

Task	Weeks							
	1	2	3	4	5	6	7	8
Mobilization and Start of Implementation								
Implementation (Soil Mixing)								
Confirmation Core								
Laboratory Testing of Wet Samples (7, 14, 28 days)								
Receipt of Laboratory Deliverables and Submission to NYSDEC								
RSOR to NYSDEC								

The anticipated schedule is also found in Appendix E.

FIGURES



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Legend:

- Approximate BCP Site Boundary

Notes:

1. All feature locations are approximate
2. Base Map - 2019 Topography

Scale:

0 625 1250 1875 2500

Figure No.	1
Figure Name:	Site Location Plan
Report:	RSO Work Plan
Date:	7/1/2024
Drawn By:	TG
Site Address:	450 Union Street Brooklyn, New York BCP# C224219

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Legend:

- Approximate BCP Site Boundary

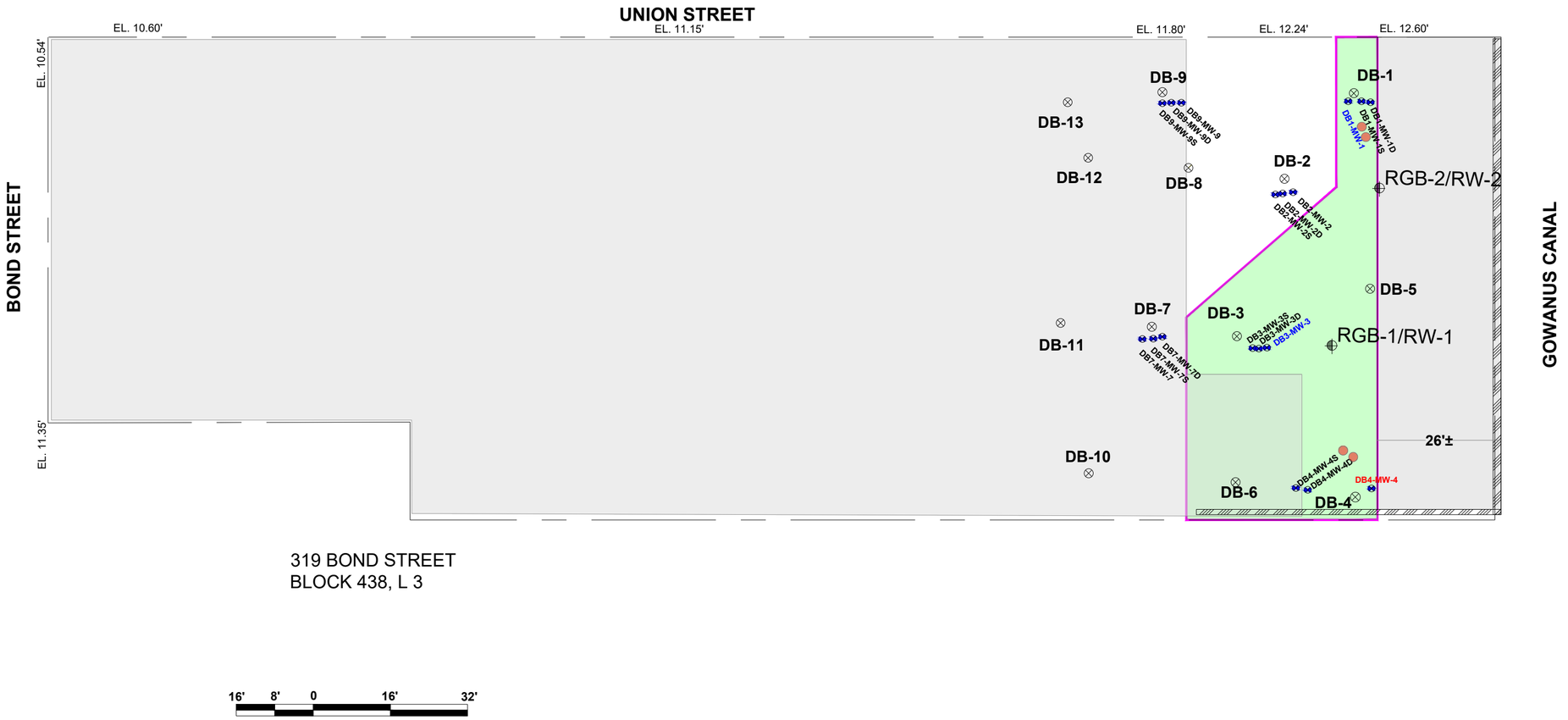
Notes:

1. All feature locations are approximate
2. Base Map is provided by Google

Scale:

0 25 50 75 100

Figure No.	2
Figure Name:	Site Plan
Report:	RSO Work Plan
Date:	7/1/2024
Drawn By:	TG
Site Address:	450 Union Street Brooklyn, New York BCP# C224219



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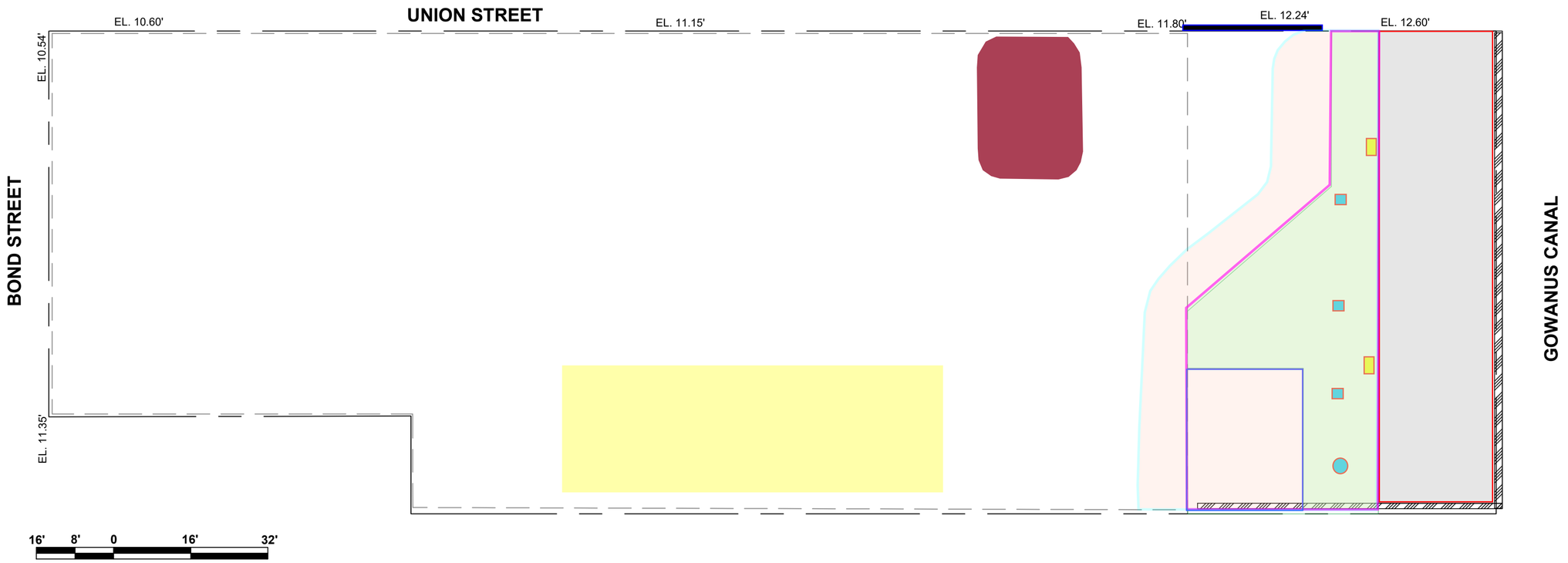
Legend:

- DBX — Delineation Boring Location and ID
- DBX-MW-XD — Monitoring Well Location and ID
- RGB/RW-X — Recovery Well Location and ID
- Extent of GCM Impacts and Proposed ISS Area
- Approximate location of borings for collection of soil between el. -10 and -28 for ISS and ISGS studies
- DBX-MW-XD — Groundwater well locations for collection of groundwater between el. -10 and -28 for ISGS study
- DBX-MW-XD — Groundwater well location for collection of groundwater and NAPL sample between el. -10 and -28 for ISGS study

Notes:

1. All feature locations are approximate
2. Base Plan is provided by Mueser Rutledge Engineers PLLC
3. DB-X: Delineation Boring and ID
4. DBX-MW-XD: Deep Monitoring Well screened below GCM and ID
5. DBX-MW-XS: Shallow Monitoring Well screened at groundwater interface and ID
6. DBX-MW-X: NAPL Mobility Well screened over GCM interval

Scale:	AS SHOWN
Figure No.	3
Figure Name:	GCM Investigation and Extent of GCM Impacts
Report:	RSO Work Plan
Date:	7/1/2024
Drawn By:	KB
Site Address:	450 Union Street Brooklyn, New York



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Legend:

- Proposed ISS Treatment Area
- Proposed Building Footprint Within Treatment Area
- High-Level Relieving Platform
- Proposed Excavation to 2 Feet Below Grade - Sloped (Site Preparation)
- Proposed Excavation to 4 Feet Below Grade (Post-Treatment Outside of Building Footprint)
- Proposed Soil/Spoils Staging Area
- Proposed Contractor Equipment and Materials Staging Area
- Private Site Storm-Sewer Infrastructure Locations (To Be Removed)
- Site Access

Scale: AS SHOWN

Figure No. 4

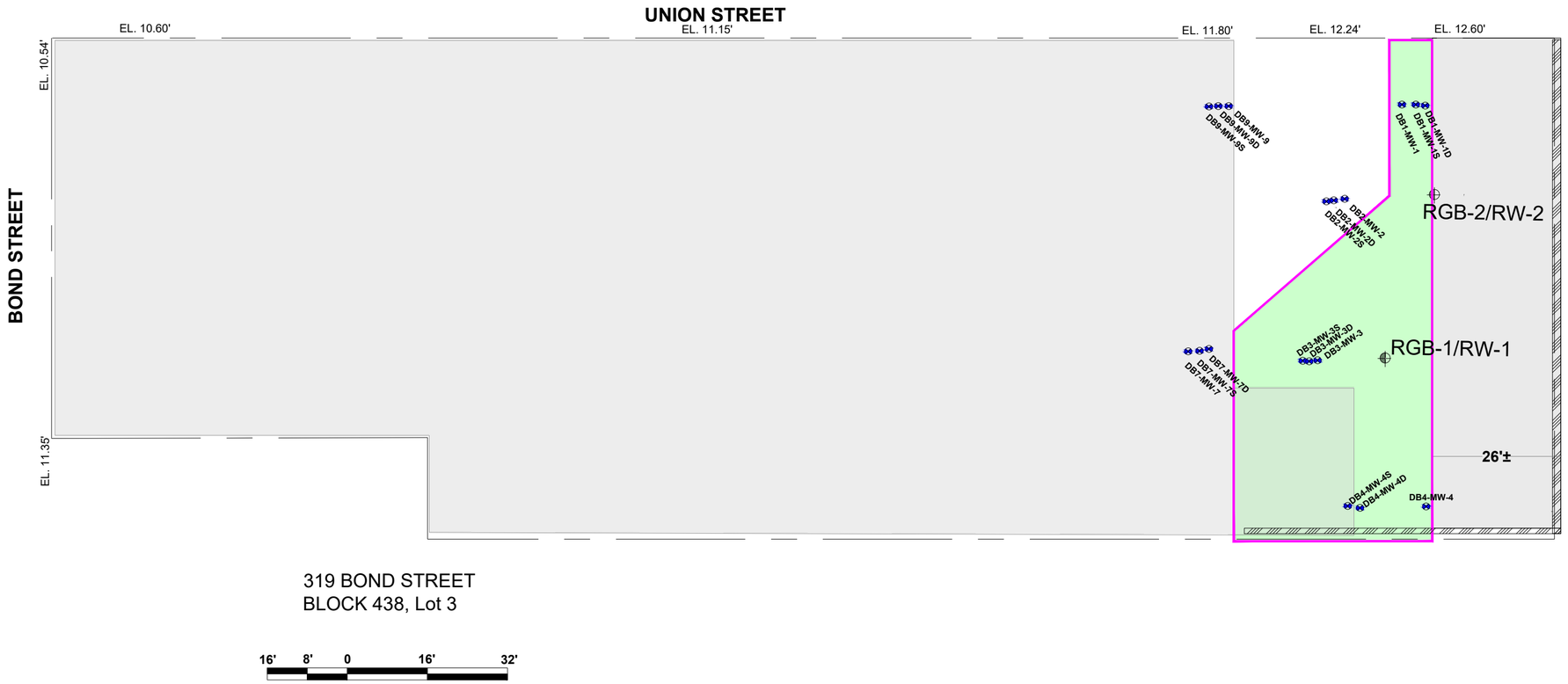
Figure Name: Excavation Plan

Report: RSO Work Plan

Date: 9/6/2024

Drawn By: TG

Site Address: 450 Union Street
Brooklyn, New York



319 BOND STREET
BLOCK 438, Lot 3

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Legend:

- Monitoring Well Location and ID to be decommissioned
- Recovery Well Location and ID to be decommissioned
- ISS Treatability Work Area

Notes:

1. All feature locations are approximate
2. Base Plan is provided by Mueser Rutledge Engineers PLLC
3. DBX-MW-XD: Deep Monitoring Well screened below GCM and ID DBX-
4. MW-XS: Shallow Monitoring Well screened at groundwater interface and ID
5. DBX-MW-X: NAPL Mobility Well screened over GCM interval
6. All wells to be removed via grouting in place (NYSDEC CP-43) and casings pulled, if able.

Scale: AS SHOWN

Figure No. 5

Figure Name: Groundwater Monitoring & Recovery Well Locations

Report: RSO Work Plan

Date: 9/6/2024

Drawn By: KB

Site Address: 450 Union Street
Brooklyn, New York

Geo-Solutions

SHEET 1 OF 1	Drawing Name: ISS LAYOUT

10' DIAMETER COLUMN LAYOUT

Note: 8' Diameter Columns to be installed in area of existing manhole and surrounding structures

PRODUCTION KEY

- Previously completed Columns
- Columns completed today
- Sampled Columns
- Obstructed Columns

FIGURE 6 - ISS COLUMN LOCATIONS

RSO WORK PLAN
9/12/2024

BENCHMARK SET ON POLE EL.=17.00

E11 E10 E9 E8 D8 B7 C7 D7 E7 A5 B6 C6 D6 E6 A4 B5 C5 D5 E5 A3 B4 C4 D4 E4 A2 B3 C3 D3 E3 A1 B2 C2 D2 E2 B1 C1 D1

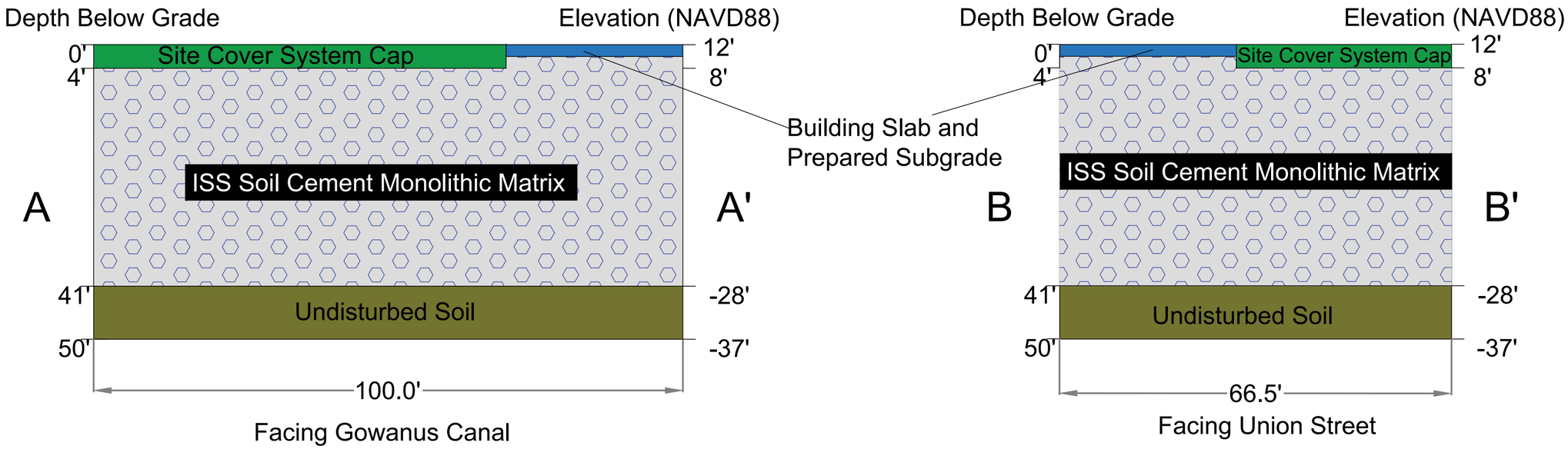
15 inch pipe

Manhole

GOWANUS CANAL

GOWANUS CANAL

REV	DESCRIPTION		CHECKED
ⓐ	Initial:	Appr.:	APPROVED
ⓑ	Initial: REV	Appr.:	
ⓒ	Initial: Revised:	Appr.: Initial:	Appr.:



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Legend:

- Proposed ISS/Treatment Area
- Proposed ISS/Treatment Area within Building Footprint

Notes:

1. Figure 9 provides typical detail drawings of the Site Cover System Cap

Scale: AS SHOWN

Figure No. 7

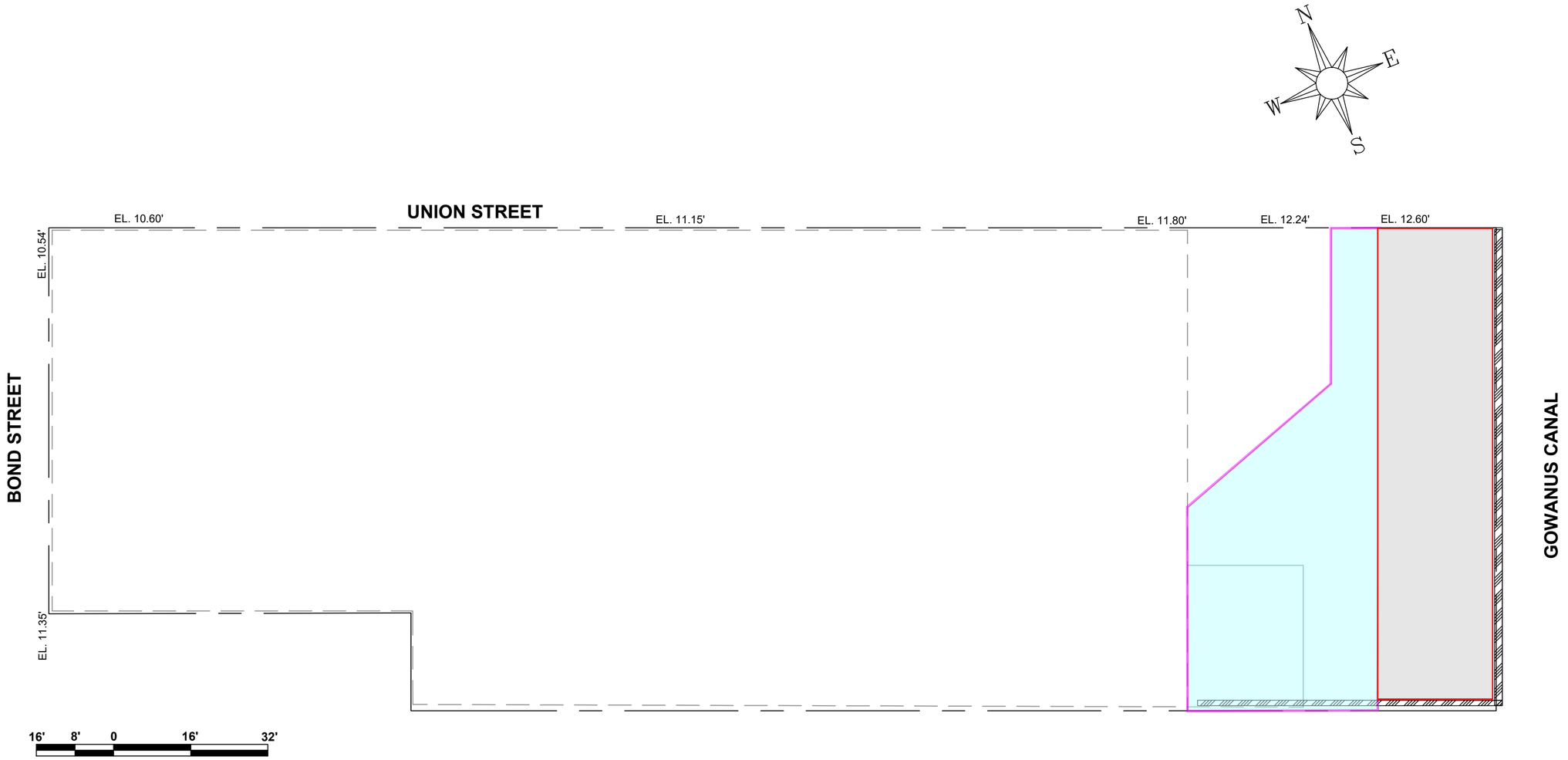
Figure Name: ISS Cross Sections

Report: RSO Work Plan

Date: 7/12/2024

Drawn By: PR

Site Address: 450 Union Street
Brooklyn, New York



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Legend:

- Proposed ISS Treatment Area
- Proposed Building Footprint Within Treatment Area
- High-Level Relieving Platform
- Location of Imported Recycled Concrete Aggregate or Clean Soil/Fill

Scale: AS SHOWN

Figure No. 8

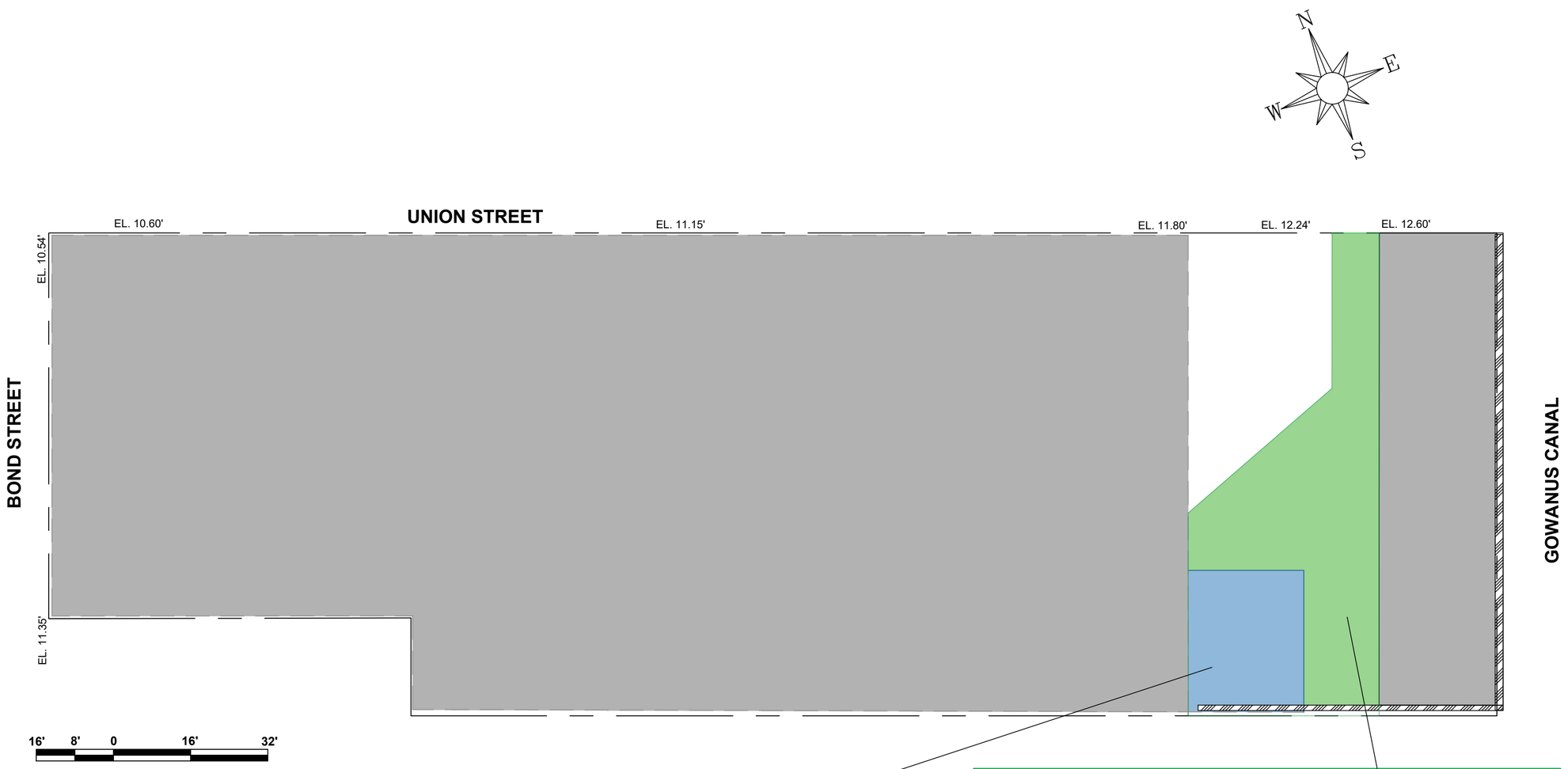
Figure Name: Proposed Backfill Locations Plan

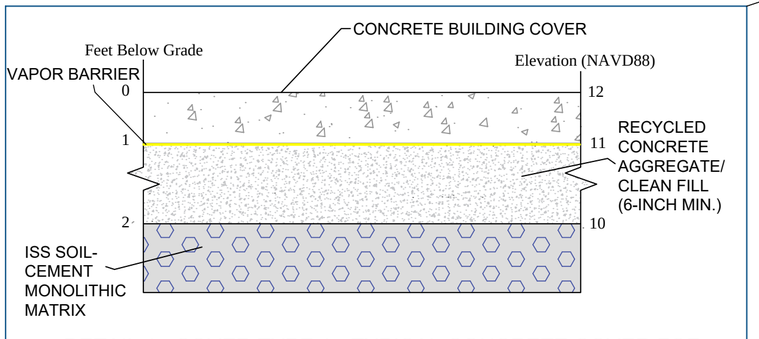
Report: RSO Work Plan

Date: 7/1/2024

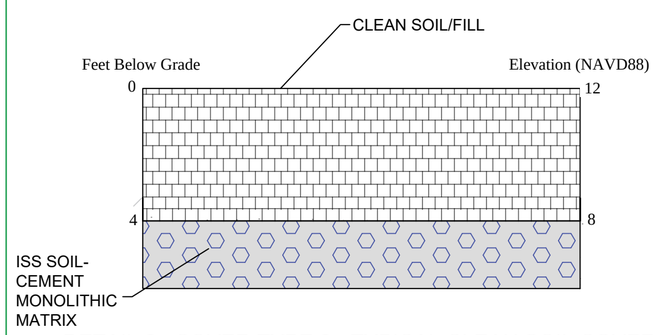
Drawn By: TG

Site Address: 450 Union Street Brooklyn, New York





DETAIL 1: COVER TYPE 1 - TYPICAL CONCRETE COVER FOR BUILDING AND FOOTINGS
(NOT TO SCALE)



DETAIL 2: COVER TYPE 2 - TYPICAL CLEAN SOIL COVER
(NOT TO SCALE)

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Legend:

- Proposed ISS/Treatment Area
- Proposed ISS/Treatment Area within Building Footprint

Notes:

1. All feature locations are approximate
2. Base Plan is provided by Mueser Rutledge Engineers PLLC

Scale: AS SHOWN

Figure No. 9

Figure Name: Proposed Cover System In Treatment Area

Report: RSO Work Plan

Date: 7/1/2024

Drawn By: TG

Site Address: 450 Union Street Brooklyn, New York

TABLES

Table 1
GSR Summary
NYSDEC BCP SITE NO. C224219
450 Union Street, Brooklyn, NY

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
450 Union Street, Brooklyn, NY - ISS

Environmental Footprint Summary

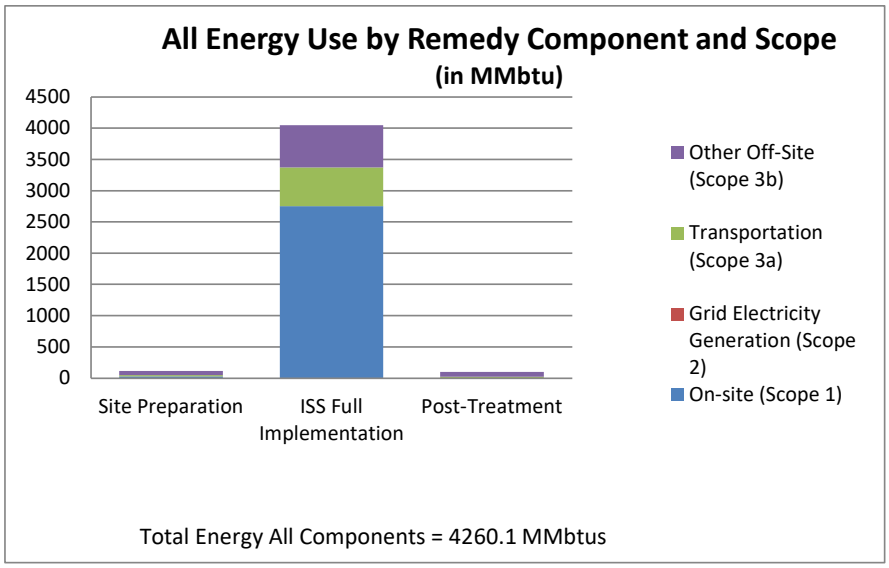
Core Element	Metric		Unit of Measure	Footprint			
				Site Preparation	ISS Full Implementation	Post-Treatment	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.0	25.0	0.0	25.0
	M&W-2	% of refined materials from recycled or reused material	%		0.0%		0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	25.000	0.000	25.0
	M&W-4	% of unrefined materials from recycled or reused material	%		0.0%		0.0%
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	375.0	1,500.0	375.0	2,250.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%	0.0%	0.0%	0.0%	0.0%
Water (used on-site)	W-1	Public water use	MG	0.0	0.2	0.0	0.2
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	112.8	4,047.3	100.0	4,260.1
	E-2	Energy voluntarily derived from renewable resources					
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.000	0.000	0.000	0.0
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	21.8	2,710.1	0.0	2,731.9
	A-2	On-site HAP emissions	Pounds	0.0	0.5	0.0	0.5
	A-3	Total NOx, SOx, and PM emissions	Pounds	281.6	4,632.8	274.1	5,188.5
	A-3A	Total NOx emissions	Pounds	97.8	3,511.7	88.4	3,697.9
	A-3B	Total SOx emissions	Pounds	31.0	326.7	33.0	390.7
	A-3C	Total PM emissions	Pounds	152.8	794.4	152.7	1,099.9
	A-4	Total HAP emissions	Pounds	0.9	36.0	1.0	38.0
	A-5	Total greenhouse gas emissions	Tons CO2e*	9.0	327.3	7.3	343.6
Land & Ecosystems		Qualitative Description					

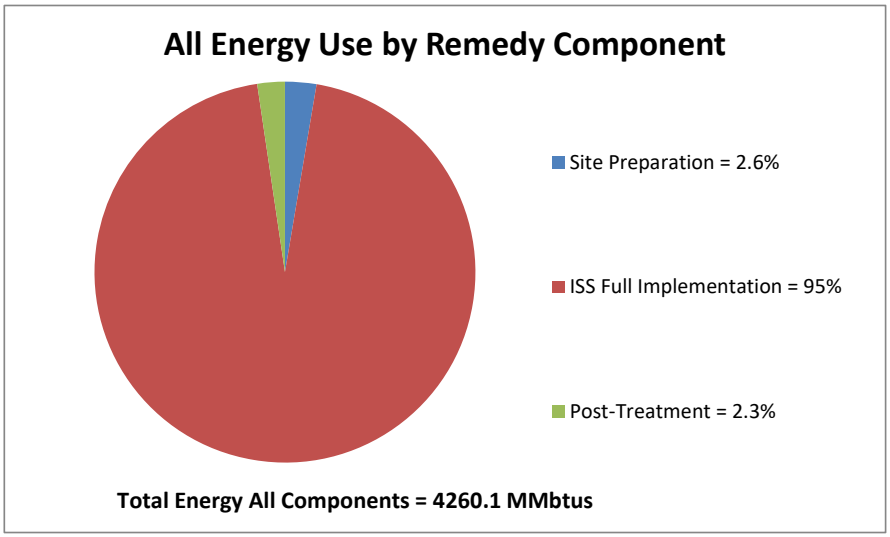
** Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.*

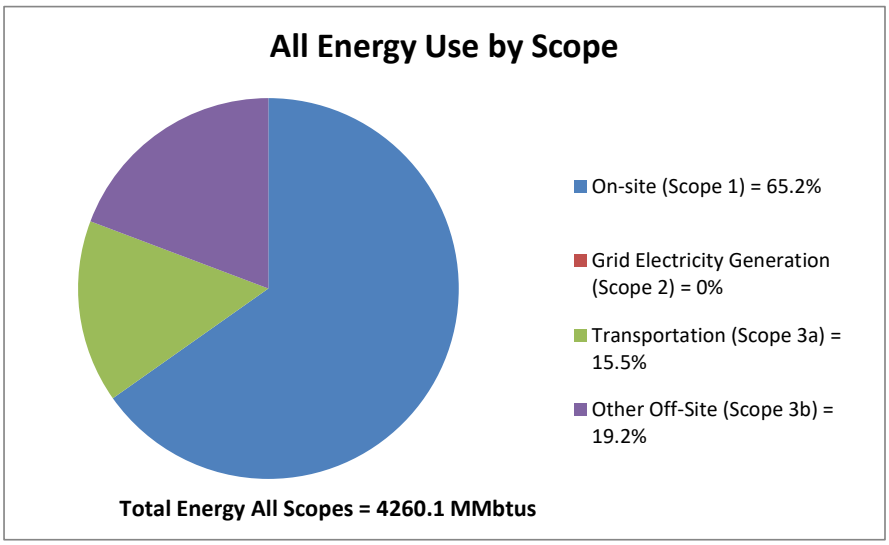
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)

The above metrics are consistent with EPA's Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

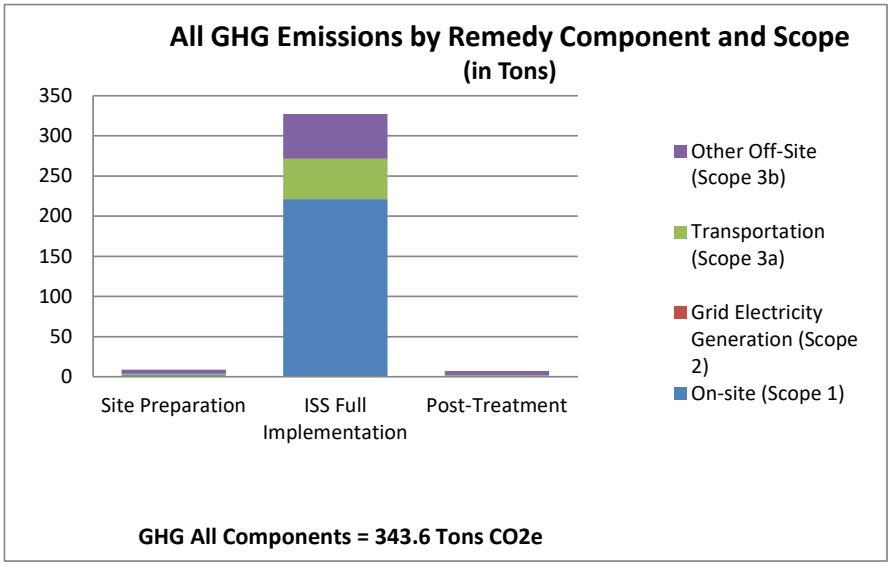
Notes:

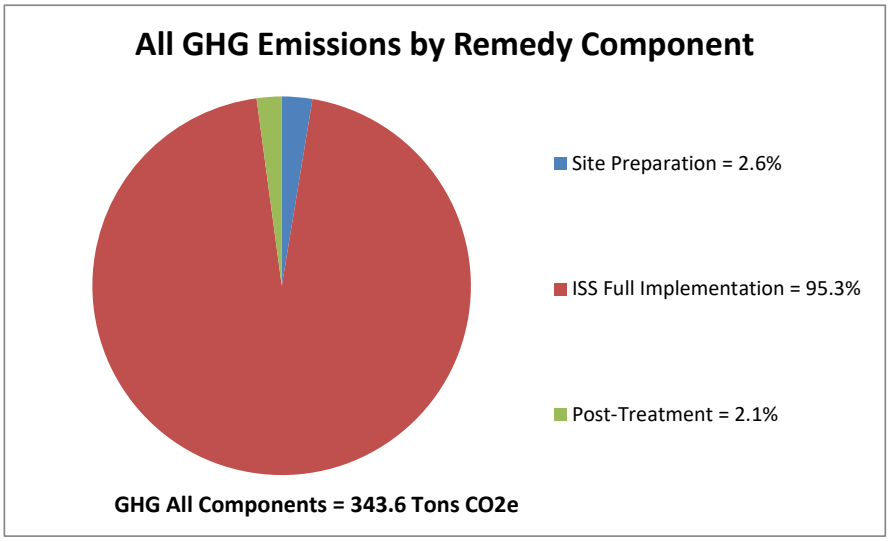

All Energy Use by Remedy Component and Scope
(in MMbtu)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Site Preparation
ISS Full Implementation
Post-Treatment
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
Total Energy All Components = 4260.1 MMbtus

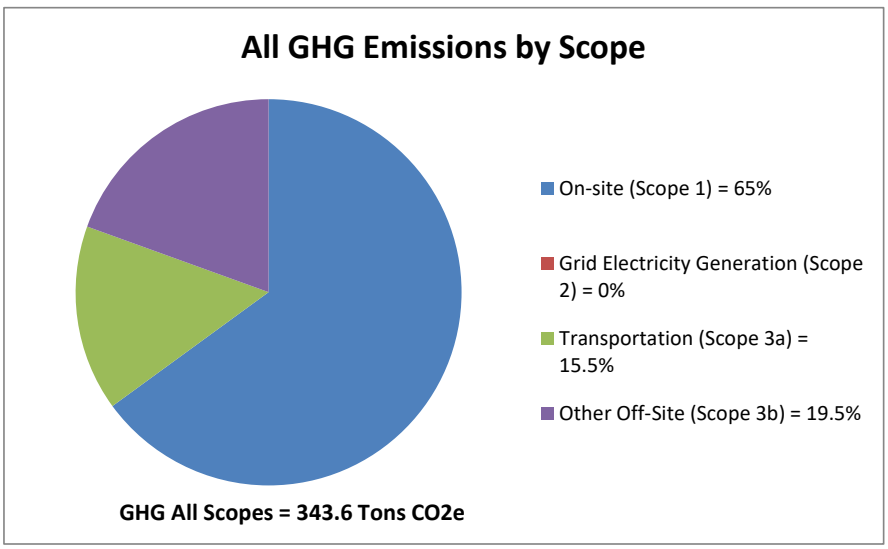

All Energy Use by Remedy Component
Site Preparation = 2.6%
ISS Full Implementation = 95%
Post-Treatment = 2.3%
Total Energy All Components = 4260.1 MMbtus

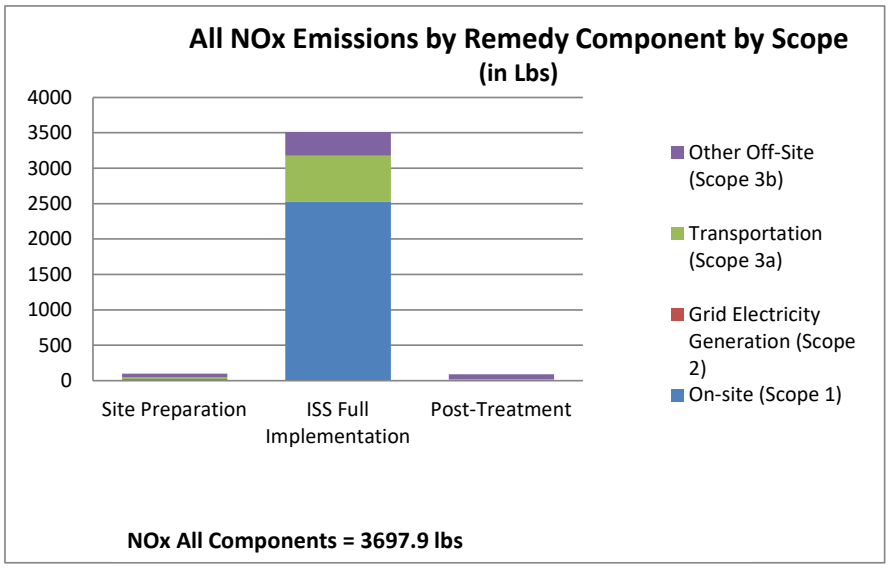

All Energy Use by Scope
On-site (Scope 1) = 65.2%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 15.5%
Other Off-Site (Scope 3b) = 19.2%
Total Energy All Scopes = 4260.1 MMbtus

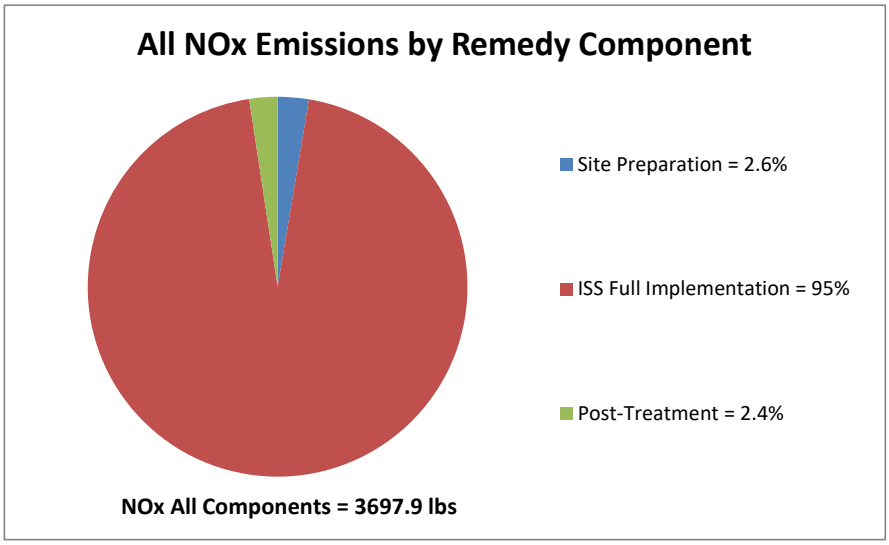
Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
450 Union Street, Brooklyn, NY - ISS

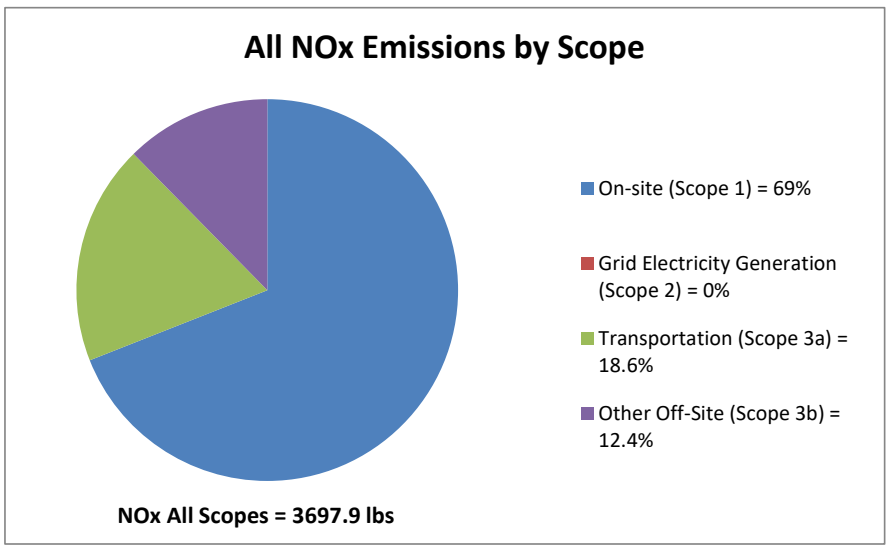


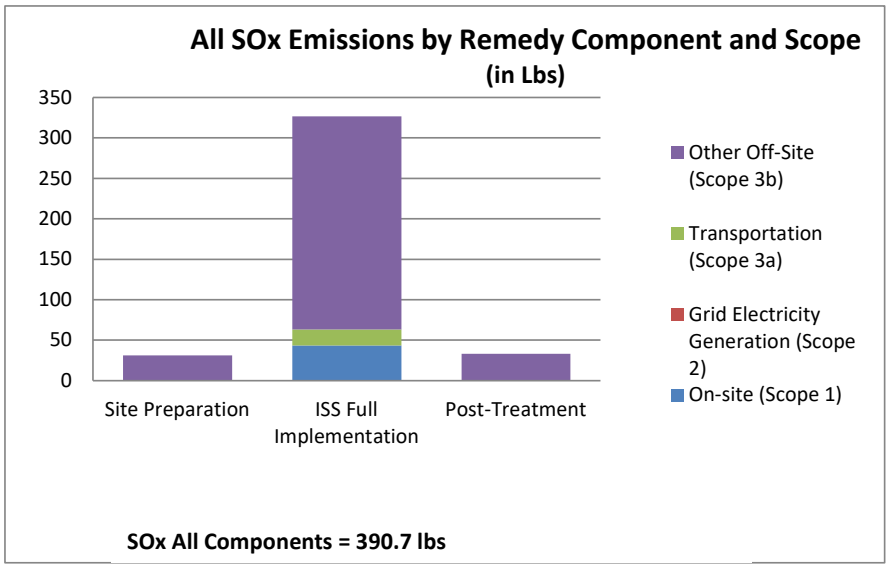


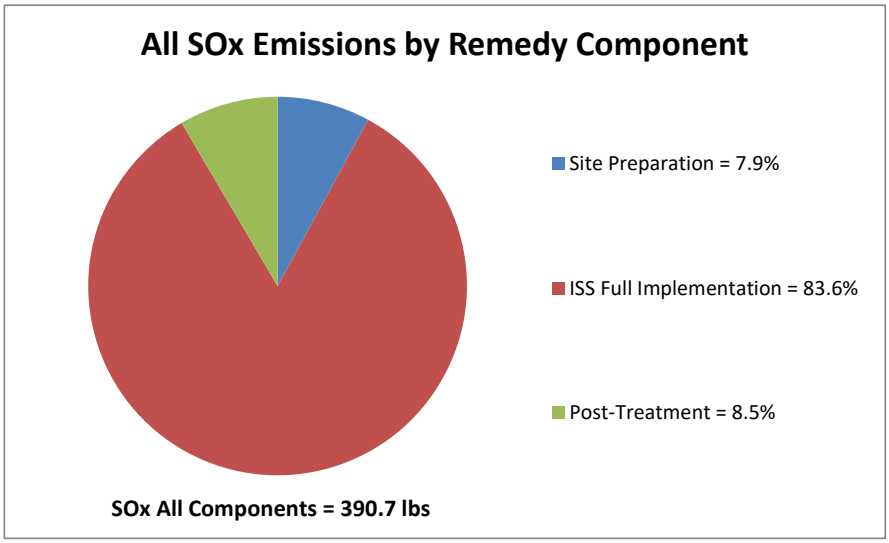


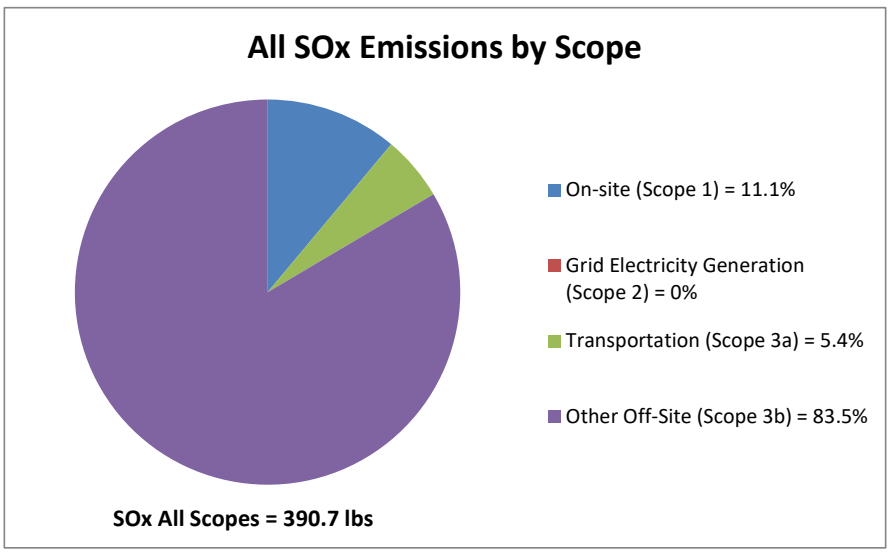

All NOx Emissions by Remedy Component by Scope
(in Lbs)
4000
3500
3000
2500
2000
1500
1000
500
0
Site Preparation
ISS Full Implementation
Post-Treatment
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
NOx All Components = 3697.9 lbs

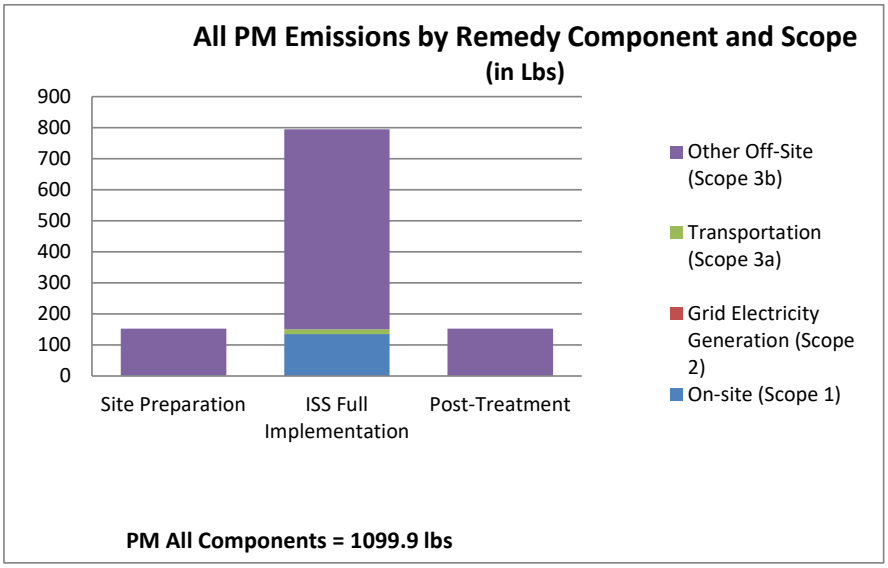

All NOx Emissions by Remedy Component
Site Preparation = 2.6%
ISS Full Implementation = 95%
Post-Treatment = 2.4%
NOx All Components = 3697.9 lbs

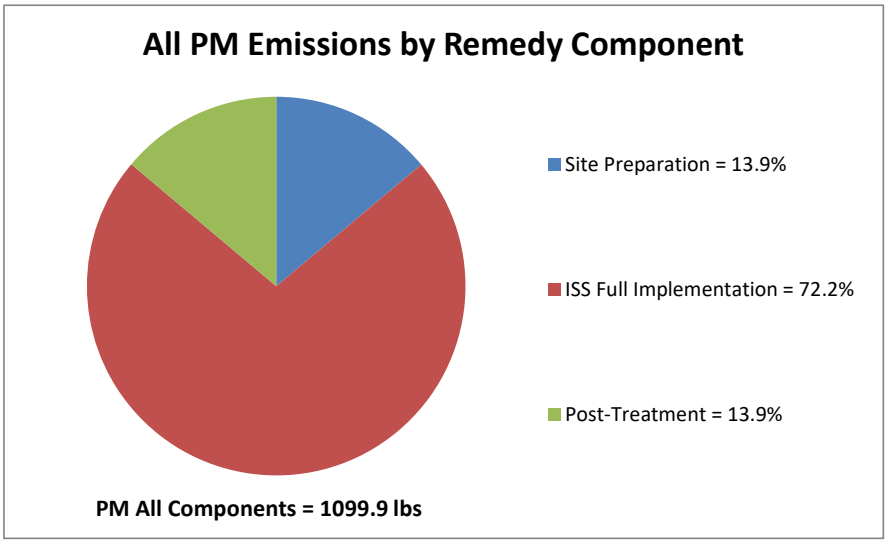

All NOx Emissions by Scope
On-site (Scope 1) = 69%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 18.6%
Other Off-Site (Scope 3b) = 12.4%
NOx All Scopes = 3697.9 lbs

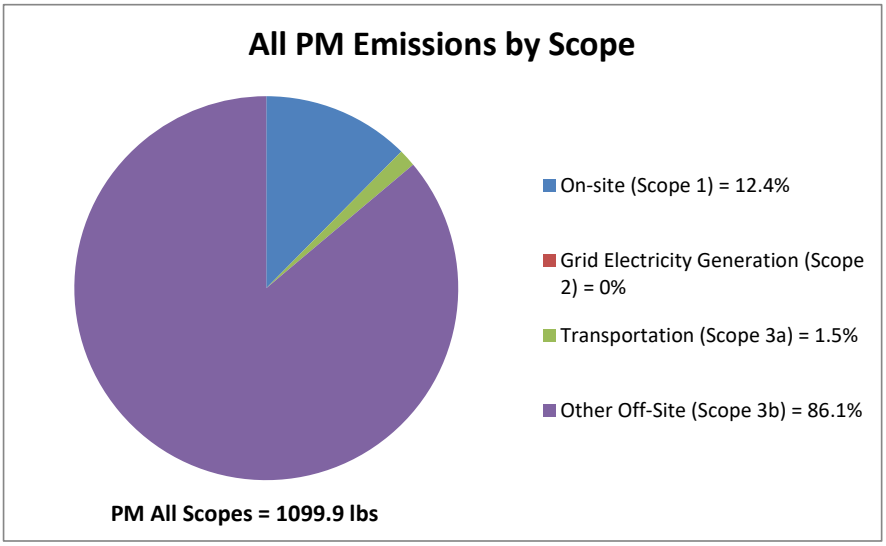

All SOx Emissions by Remedy Component and Scope
(in Lbs)
350
300
250
200
150
100
50
0
Site Preparation
ISS Full Implementation
Post-Treatment
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
SOx All Components = 390.7 lbs

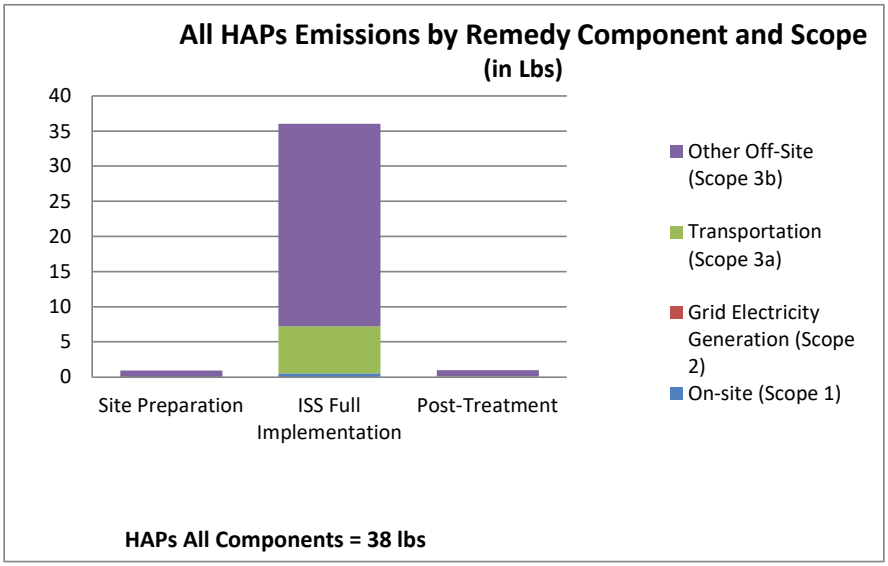

All SOx Emissions by Remedy Component
Site Preparation = 7.9%
ISS Full Implementation = 83.6%
Post-Treatment = 8.5%
SOx All Components = 390.7 lbs

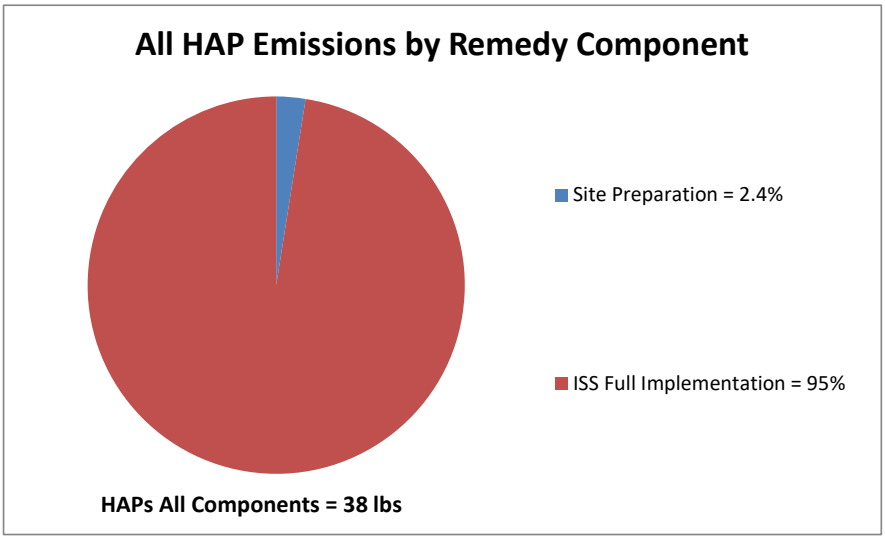

All SOx Emissions by Scope
On-site (Scope 1) = 11.1%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 5.4%
Other Off-Site (Scope 3b) = 83.5%
SOx All Scopes = 390.7 lbs


All PM Emissions by Remedy Component and Scope
(in Lbs)
900
800
700
600
500
400
300
200
100
0
Site Preparation
ISS Full Implementation
Post-Treatment
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
PM All Components = 1099.9 lbs


All PM Emissions by Remedy Component
Site Preparation = 13.9%
ISS Full Implementation = 72.2%
Post-Treatment = 13.9%
PM All Components = 1099.9 lbs


All PM Emissions by Scope
On-site (Scope 1) = 12.4%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 1.5%
Other Off-Site (Scope 3b) = 86.1%
PM All Scopes = 1099.9 lbs


All HAPs Emissions by Remedy Component and Scope
(in Lbs)
40
35
30
25
20
15
10
5
0
Site Preparation
ISS Full Implementation
Post-Treatment
Other Off-Site (Scope 3b)
Transportation (Scope 3a)
Grid Electricity Generation (Scope 2)
On-site (Scope 1)
HAPs All Components = 38 lbs


All HAP Emissions by Remedy Component
Site Preparation = 2.4%
ISS Full Implementation = 95%
HAPs All Components = 38 lbs

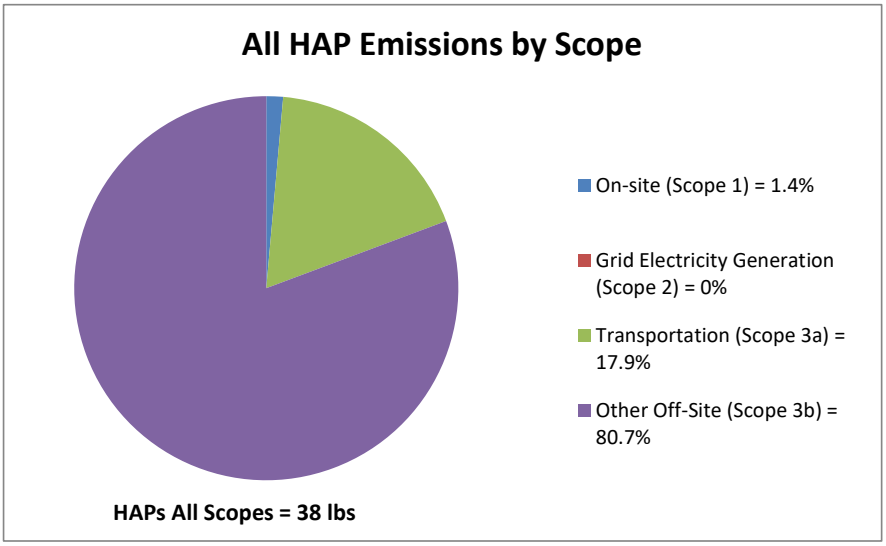

All HAP Emissions by Scope
On-site (Scope 1) = 1.4%
Grid Electricity Generation (Scope 2) = 0%
Transportation (Scope 3a) = 17.9%
Other Off-Site (Scope 3b) = 80.7%
HAPs All Scopes = 38 lbs

Table 1
GSR Summary
NYSDEC BCP SITE NO. C224219
450 Union Street, Brooklyn, NY

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
450 Union Street, Brooklyn, NY - ISS

Site Preparation - Energy & Air Compiled Results

Category	Total Energy	GHG	NOx	SOx	PM	NOx + SOx + PM	HAPs
	MMbtus	lbs CO2e	lbs	lbs	lbs	lbs	lbs
On-site (Scope 1)	27	4,399	20	0	2	22	0
Grid Electricity Generation (Scope 2)	0.000	0	0	0	0	0	0
Transportation (Scope 3a)	19	3,151	24	1	0	25	0
Other Off-Site (Scope 3b)	66	10,401	54	30	151	235	1
Remedy Totals	113	17,951	98	31	153	282	1

Values that are forwarded to the "Summary" tab are indicated in orange.

Voluntary Renewable Energy Use	Unit	Quantity	
On-site renewable energy generation or use	MMBtu	0	
On-site biodiesel use	MMBtu	0	
Biodiesel and other renewable resource use for transportation	MMBtu	0	
On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0	*(This value is the sum of the three rows above)*
Voluntary purchase of renewable electricity	MWh	0	
Voluntary purchase of RECs	MWh	0	

This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx

Table 1
GSR Summary
NYSDEC BCP SITE NO. C224219
450 Union Street, Brooklyn, NY

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
450 Union Street, Brooklyn, NY - ISS

ISS Full Implementation - Energy & Air Compiled Results

Category	Total Energy	GHG	NOx	SOx	PM	NOx + SOx + PM	HAPs
	MMbtus	lbs CO2e	lbs	lbs	lbs	lbs	lbs
On-site (Scope 1)	**2,751**	**442,210**	**2,532**	**43**	**135**	**2,710**	**1**
Grid Electricity Generation (Scope 2)	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Transportation (Scope 3a)	**623**	**100,555**	**644**	**20**	**15**	**679**	**7**
Other Off-Site (Scope 3b)	**673**	**111,922**	**336**	**264**	**644**	**1,244**	**29**
Remedy Totals	**4,047**	**654,686**	**3,512**	**327**	**794**	**4,633**	**36**

Values that are forwarded to the "Summary" tab are indicated in orange.

Voluntary Renewable Energy Use	Unit	Quantity	
On-site renewable energy generation or use	MMBtu	**0**	
On-site biodiesel use	MMBtu	**0**	
Biodiesel and other renewable resource use for transportation	MMBtu	**0**	
On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	**0**	*(This value is the sum of the three rows above)*
Voluntary purchase of renewable electricity	MWh	**0**	
Voluntary purchase of RECs	MWh	**0**	

This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx

Table 1
GSR Summary
NYSDEC BCP SITE NO. C224219
450 Union Street, Brooklyn, NY

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
450 Union Street, Brooklyn, NY - ISS

Post-Treatment - Energy & Air Compiled Results

Category	Total Energy	GHG	NOx	SOx	PM	NOx + SOx + PM	HAPs
	MMbtus	lbs CO2e	lbs	lbs	lbs	lbs	lbs
On-site (Scope 1)	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Grid Electricity Generation (Scope 2)	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Transportation (Scope 3a)	**19**	**3,054**	**22**	**1**	**0**	**23**	**0**
Other Off-Site (Scope 3b)	**81**	**11,592**	**67**	**32**	**152**	**251**	**1**
Remedy Totals	**100**	**14,646**	**88**	**33**	**153**	**274**	**1**

Values that are forwarded to the "Summary" tab are indicated in orange.

Voluntary Renewable Energy Use	Unit	Quantity	
On-site renewable energy generation or use	MMBtu	**0**	
On-site biodiesel use	MMBtu	**0**	
Biodiesel and other renewable resource use for transportation	MMBtu	**0**	
On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	**0**	*(This value is the sum of the three rows above)*
Voluntary purchase of renewable electricity	MWh	**0**	
Voluntary purchase of RECs	MWh	**0**	

This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx

Table 1
GSR Summary
NYSDEC BCP SITE NO. C224219
450 Union Street, Brooklyn, NY

Spreadsheets for Environmental Footprint Analysis (SEFA) Version 3.0, November 2019
450 Union Street, Brooklyn, NY - ISS

All - Energy & Air Compiled Results

Category	Total Energy	GHG	NOx	SOx	PM	NOx + SOx + PM	HAPs
	MMbtus	lbs CO2e	lbs	lbs	lbs	lbs	lbs
On-site (Scope 1)	**2,779**	**446,609**	**2,552**	**43**	**137**	**2,732**	**1**
Grid Electricity Generation (Scope 2)	**0.000**	**0**	**0**	**0**	**0**	**0**	**0**
Transportation (Scope 3a)	**661**	**106,760**	**689**	**21**	**16**	**726**	**7**
Other Off-Site (Scope 3b)	**820**	**133,914**	**457**	**326**	**947**	**1,730**	**31**
Remedy Totals	**4,260**	**687,283**	**3,698**	**391**	**1,100**	**5,189**	**38**

Values that are forwarded to the "Summary" tab are indicated in orange.

Voluntary Renewable Energy Use	Unit	Quantity	
On-site renewable energy generation or use	MMBtu	**0**	
On-site biodiesel use	MMBtu	**0**	
Biodiesel and other renewable resource use for transportation	MMBtu	**0**	
On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	**0**	*(This value is the sum of the three rows above)*
Voluntary purchase of renewable electricity	MWh	**0**	
Voluntary purchase of RECs	MWh	**0**	

This worksheet is not intended for user input. Values on this worksheet are obtained from the following file: SEFA_calculations_(121718).xlsx

APPENDICES

APPENDIX A

COMMUNITY AIR MONITORING PLAN

vEKtor consultants

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COMMUNITY AIR MONITORING PLAN

Prepared For: 2201 Union LLC

Project Name: 450 Union Street

BCP Site No: C224219

Project Location: 450 Union Street, Brooklyn, NY 11231

Date: September 2024

37 West 37th Street, 6th Floor, New York, NY 10018

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Appendix A: Action Limit Report

1.0 INTRODUCTION

This site-specific Community Air Monitoring Plan (CAMP) has been prepared on behalf of 2201 Union LLC for the implementation of a Remedial Site Optimization Work Plan for in-situ stabilization/solidification (ISS) by Vektor Consultants (Vektor), AMC Engineering, PLLC (AMC), and their subcontractors at the property located at 450 Union Street in Brooklyn, New York (the Site). The Site is identified by the City of New York as Borough of Brooklyn, Tax Block 438, and Lot 7.

This CAMP was developed in accordance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan included within DER-10 Technical Guidance for Site Investigation and Remediation (May 2010). All instruments will be operated and calibrated as per the manufacturer's specifications.

A CAMP requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind and upwind perimeters of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

2.0 COMMUNITY AIR MONITORING PLAN

A remedial investigation and associated interim remedial activities were conducted by Langan between February 20 and May 3, 2017 and February 22 and November 25, 2020 and the findings of their assessments were provided in a Final Engineering Report by Langan dated December 18, 2020. Prior to interim remedial measures in 2017, a soil vapor intrusion evaluation was conducted. As a result, the recommended actions ranged from 'no further action' to 'take reasonable and practical actions to identify source(s) and reduce exposures'. The petroleum-related volatile organic compounds (VOCs) identified in soil vapor were attributed to the former underground storage tank (UST) and associated impacted soil, which were removed from the Site during the 2017 Interim Remedial Measure (IRM). The chlorinated VOCs detected in soil vapor were attributed to off-site sources, as those VOCs were not detected above applicable regulatory standards in soil or groundwater samples.

Based on the endpoint soil sample results collected upon completion of 2017 and 2020 IRM, semi-volatile organic compounds (SVOCs) and metals are the constituents of concern at the Site.

In 2023, Vektor prepared the draft RSO/GCM (Remedial Site Optimization / Grossly Contaminated Material) report to report the findings of their June through August 2023 delineation of on-site GCM within soil and groundwater at depth. Visual and/or olfactory evidence of GCM attributed to the adjacent Gowanus Canal, known as the GCM-contaminated Federal Superfund site, was observed within nine of the thirteen borings and within seven of the eighteen wells during the investigation. Based on the 13 borings installed approximately 90 feet inland of the Canal, GCM impacts do not go beyond 75 feet west of the Canal. Evidence of coal tar-like contamination was observed within borings DB-1 through DB-9, varying in depths with the shallowest observation of staining at el. -9 in DB-4 and the deepest observation of staining at el. -57 in DB-1. Blebs and sheen associated with coal tar contamination were observed as shallow as el. -17 in DB-5 and the deepest observation at el.-27 in DB-6. Coated soils with coal tar were observed as shallow as el. -12 in DB-4 and as deep as el. -42 in DB-1. Soils fully saturated with coal tar were observed in DB-4 between approximately el. -27 and el. -31. Borings DB-10 through DB-13 did not show any evidence of GCM/NAPL impacts. Olfactory evidence of GCM in groundwater was observed throughout the investigation, with visual and olfactory evidence most prevalent within most eastern and western well clusters.

Contaminants of concern for the Site include constituents of petroleum-related contamination (BTEX), PAHs, and metals at various depths within GCM-impacted areas, and petroleum-related contamination (BTEX), PAHs, and metals contamination in groundwater.

Therefore, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary.

Continuous monitoring will be required for all ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings, soil vapor points, or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

Meteorological monitoring including temperature, wind direction and speed will be conducted by the field personnel and the data will be logged in the field book on a daily basis. CAMP station(s) will be relocated based on the direction of the wind.

3.0 VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

Volatile organic compounds (VOCs) must be monitored at the downwind and upwind perimeters of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
- All 15-minute readings must be recorded and be available for the NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

4.0 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations (i.e.: DustTrak). The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped, and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.
- All readings must be recorded and be available for the NYSDEC and NYSDOH personnel to review.

Dust suppression will be achieved by applying water as needed.

CAMP exceedances will immediately be reported to the NYSDEC and NYSDOH Project Managers at the time of exceedance via email, in addition to inclusion in the daily status reports. The NYSDEC Project Manager and NYSDOH Project Manager for the Site are:

Meghan Medwid, EIT
Project Manager
NYSDEC Division of Remediation,
Bureau B, Section D
meghan.medwid@dec.ny.gov

Angela Martin
Project Manager
NYSDOH
angela.martin@health.ny.gov

APPENDIX A

ACTION LIMIT REPORT

CAMP
ACTION LIMIT REPORT

Project Location: 450 Union Street, Brooklyn, NY

Date: _____ Time: _____

Name: _____

Contaminant: _____ PM-10: _____ VOC: _____

Wind Speed: _____ Wind Direction: _____

Temperature: _____ Barometric Pressure: _____

DOWNWIND DATA

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

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

UPWIND DATA

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

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

BACKGROUND CORRECTED LEVELS

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

ACTIONS TAKEN

_____
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_____

APPENDIX B

HEALTH AND SAFETY PLAN

vEKtor consultants

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HEALTH AND SAFETY PLAN

Prepared For: 2201 Union LLC

Project Name: 450 Union Street

BCP Site No: C224219

Project Location: 450 Union Street, Brooklyn, NY 11231

Date: September 2024

37 West 37th Street, 6th Floor, New York, NY 10018

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Emergency Contacts			
Position	**Name**	**Organization**	**Phone**
Remedial Engineer	Ariel Czemerinski	AMC Engineering PLLC	(718) 545-0474
Project Director	Ezgi Karayel	Vektor Consultants	(347) 871-0750
Project Manager	Thomas Giordano	Vektor Consultants	(347) 871-0750
Field Representative	Antonio Cardenas	Vektor Consultants	(347) 871-0750
Site Health and Safety Supervisor	Peter Rathsack	Vektor Consultants	(347) 871-0750
Client Contact	Robert Doster	2201 Union LLC	(718) 222-1028
DEC Project Manager	Meghan Medwid	NYSDEC	(518) 402-8610
DOH Project Manager	Angela Martin	NYSDOH	
Emergency Response		FDNY	911
Spill Hotline		NYSDEC	(800) 457-7362

Emergency Medical Facility	
Primary	***Alternate***
The Brooklyn Hospital Center 121 DeKalb Ave, Brooklyn, NY 11201 Tel: (718) 250-8000 Open 24 Hours	New York-Presbyterian Brooklyn Methodist Hospital 506 6th St, Brooklyn, NY 11215 Tel: (718) 780-3000 Open 24 Hours
Route to emergency medical facility map attached to back of this health & safety plan	

Sign-in Sheet

Name	Signature	Company	Date

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared on behalf of 2201 Union LLC for the implementation of a Remedial Site Optimization (RSO) Work Plan for In-situ Stabilization/Solidification (ISS) by Vektor Consultants (Vektor), AMC Engineering, PLLC (AMC), and their subcontractors at the property located at 450 Union Street in Brooklyn, New York (the Site). The Site is identified by the City of New York as Borough of Brooklyn, Tax Block 438 and Lot 7.

This HASP describes lines of authority, responsibility, and communication as they pertain to health and safety functions at this site in compliance with *29 CFR 1910.120(b)(2) and 29 CFR 1926.65(b)(2)*. This plan also details key personnel who are responsible for the development and implementation of the HASP. Vektor and AMC field personnel will implement this HASP during the implementation of the Remedial Site Optimization Work Plan for ISS.

1.1 Site Location and Description

The Site is located on the southeast corner of Union Street and Bond Street intersection to the west of Gowanus Canal within the Gowanus section of Kings County, New York. The Site consists of an irregular-shaped vacant lot that is approximately 28,500 square feet. The Site access is controlled by a New York City Department of Buildings (NYCDOB) approved construction fence. Most recently, the Site was improved with a 9,880 square feet one-story commercial building and adjacent ancillary structures utilized as storage, outdoor kitchen, and event space. The concrete slab of the former building has been partially cracked during the demolition activities as required by the NYCDOB. The eastern portion of the Site remains asphalt paved.

The legal description of the subject is Block 438 and Lot 7. A site location map is provided as Figure 1.

1.2 Summary of Previous Investigations

The following Grossly Contaminated Material (GCM) investigation related reports were reviewed during the preparation of this HASP in order to determine potential hazards:

Remedial Site Optimization Work Plan by Vektor dated April 2023

- Vektor prepared the Remedial Site Optimization Work Plan (RWSO) on behalf of 2201 Union LLC to delineate the extent of on-site grossly contaminated material (GCM) at depth. The work plan was prepared in accordance with the regulations and guidance applicable to the BCP and DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010.

- The scope of the RWSO included installation of a minimum of five soil borings installed to 80 feet bgs. In the event that evidence of GCM/NAPL is encountered, additional borings and groundwater wells to be installed.
- If NAPL is identified in a soil boring by the presence of saturated material or free phase product, NAPL mobility to be assessed. To assess NAPL mobility, 2" PVC wells to be installed and screened over the impacted interval.
- The NYSDEC, in consultation with the NYSDOH, approved the RWSO on April 6, 2023.

Draft Remedial Site Optimization / Grossly Contamination Material Report by Vektor dated September 2023

- Vektor prepared the draft RSO/GCM report to report the findings of their June through August 2023 delineation of on-site GCM within soil and groundwater at depth.
- Visual and/or olfactory evidence of GCM attributed to the adjacent Gowanus Canal, known GCM contaminated Federal Superfund site, were observed within nine of the thirteen borings and within seven of the eighteen wells during the investigation. Based on the 13 borings installed to approximately 90 feet inland of the Canal, GCM impacts do not go beyond 75 feet west of the Canal. Evidence of coal tar-like contamination was observed within borings DB-1 through DB-9, varying in depths with the shallowest observation of staining at el. -9 in DB-4 and the deepest observation of staining at el. -57 in DB-1. Blebs and sheen associated with coal tar contamination were observed as shallow as el. -17 in DB-5 and the deepest observation at el.-27 in DB-6. Coated soils with coal tar were observed as shallow as el. -12 in DB-4 and as deep as el. -42 in DB-1. Soils fully saturated with coal tar were observed in DB-4 between approximately el. -27 and el. -31. Borings DB-10 through DB-13 did not show any evidence of GCM/NAPL impacts. Olfactory evidence of GCM in groundwater was observed throughout the extent of the investigation with visual and olfactory evidence most prevalent within the most eastern and western well clusters during the investigation.
- Contaminants of concern for the Site include constituents of petroleum-related contamination (BTEX), PAHs and metals at various depths within GCM-impacted areas; and petroleum-related contamination (BTEX), PAHs and metals contamination in groundwater.

The NYSDEC and NYSDOH currently have copies of these prior reports.

2.0 ORGANIZATIONAL STRUCTURE

Vektor and AMC will provide a copy of this HASP to each contractor and subcontractor in accordance with 29 CFR 1910.120(b)(1)(iv) and 29 CFR 1926.65(b)(1)(iv) to inform them of site hazards and emergency procedures. All contractors and subcontractors are solely responsible for the safe and healthful performance of all work by each of its employees and/or support personnel who may enter the Site. Each contractor and subcontractor shall provide its own HASP as required by 29 CFR 1910.120 and 29 CFR 1926.65. However, they need to submit a copy of their HASP to Vektor and AMC or they can adopt this HASP during the RSO Work Plan activities.

2.1 Site Supervisor

As required by *29 CFR 1910.120(b)(2)(i)(A) and 29 CFR 1926.65(b)(2)(i)(A)*, a Site Supervisor will be assigned to the project prior to implementation of this Work Plan. The Site Supervisor is responsible for directing all hazardous waste operations. All other site personnel report directly to the Site Supervisor unless otherwise noted. The Site Supervisor is directly responsible for:

- Ensuring the pre-entry briefing and/or tailgate-safety meetings are held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of site hazards
- Ensuring that all work activities conducted are consistent with this HASP and making any modifications as necessary
- Verifying all Job Hazard Analyses and ensuring that ongoing Hazard Analysis is conducted at this Site
- Overseeing the training program and ensuring that employees are trained for all tasks or operations they are asked to perform
- Providing a copy of this HASP to each contractor and subcontractor
- Updating the Site Control Program as needed
- Granting site workers site and zone access approval
- Registering all site visitors
- Establishing and maintaining security measures for this Site
- Directing how each work zone is adjusted
- Notified if emergency assistance is needed
- Supervising PPE use on this Site
- Approving any changes in PPE used on this Site
- Notified when any hazardous-substance spill occurs
- Evaluating the quality and safety of response activities after every emergency incident or evacuation of this Site

- Providing site workers with notifications and training on changes to the emergency response plan
- Evaluating confined spaces and responsible for the confined space permit program
- Performing initial monitoring to identify and evaluate any hazardous atmospheres during confined space operations
- Implementing the thermal stress program
- Authorizing the hot-work plan and cutting and welding operations
- Inspecting the hot-work permit area before work is authorized
- Monitoring site activities as they pertain to health and safety at this site
- Stopping any unsafe acts that pose an immediate or imminent health and safety hazard to anyone at this site
- Ensuring that all elements of this HASP are followed and correctly implemented
- Updating the Site Health and Safety Supervisor and other applicable personnel as to changes or work progress reports that may pertain to health and safety functions at this site
- Setting up decontamination lines and the solutions appropriate for the type of chemical contamination on Site
- Controlling the decontamination of all equipment, personnel and samples from the contaminated areas
- Ensuring that all required decontamination equipment is available and in working order
- Providing for collection, storage and disposal of decontamination waste (e.g., rinse water, contaminated sediment, etc.)

2.2 Site Health and Safety Supervisor

As required by *29 CFR 1910.120(b)(2)(i)(B) and 29 CFR 1926.65(b)(2)(i)(B)*, Peter Rathsack (or designated alternate) is the Site Health and Safety Supervisor who has the responsibility and authority for all functions that may pertain to health and safety at this site. This is the individual located on a hazardous waste site that is responsible to the Site Supervisor and has the authority and knowledge necessary to implement the HASP and verify compliance with applicable safety and health requirements. The Site Health and Safety Supervisor is directly responsible for:

- Providing a copy of this HASP to each contractor and subcontractor
- Updating the Site Control Program as needed
- Notified if emergency assistance is needed
- Supervising PPE use on this Site
- Approving any changes in PPE used on this Site
- Notified when any hazardous-substance spill occurs
- Providing site workers with notifications and training on changes to the emergency response plan

- Performing initial monitoring to identify and evaluate any hazardous atmospheres during confined space operations
- Developing and implementing the HASP
- Monitoring site activities as they pertain to health and safety at this Site
- Stopping any unsafe acts that pose an immediate or imminent health and safety hazard to anyone at this Site
- Ensuring that all elements of this HASP are followed and correctly implemented
- Verifying compliance of subcontractors with respect to this HASP and reporting deviations to the Site Supervisor
- Evaluating site incidents including spills, releases of hazardous substances
- Determining the appropriate response including site evacuations
- Implementing the Emergency Response Plan
- Coordinating emergency response activities on this Site

2.3 Contractors and Subcontractors

Each contractor and subcontractor shall designate a Contractor Site Representative. The Contractor Site Representative will interface directly with the Site Supervisor, and Vektor Consultants, AMC Engineering, the Site Health and Safety Supervisor, with regards to all areas that relate to this HASP and safe and healthful performance of work conducted by the contractor and/or subcontractor workforce. Contractor/Subcontractor Site Representatives for this site are listed in the Contact Summary Table at the end of this section.

2.4 Local/State/Federal Agency Representative

Local, state, and/or federal agencies are responsible for ensuring the Site is in compliance with appropriate regulatory requirements, permits, and/or legal ruling(s). Local/State/Federal Agency Representatives for this Site are listed in the Contact Summary Table at the end of this section.

The organizational structure shall be reviewed and updated as necessary to reflect the current status of site operations.

Contact Summary Table

Position	Name	Organization	Phone/Email
Remedial Engineer	Ariel Czemerinski	AMC Engineering	(718) 545-0474
Project Director	Ezgi Karayel	Vektor Consultants	(347) 871-0750
Project Manager	Thomas Giordano	Vektor Consultants	(347) 871-0750
Field Representative	Antonio Cardenas	Vektor Consultants	(347) 871-0750
Site Health and Safety Supervisor	Peter Rathsack	Vektor Consultants	(347) 871-0750
Client Contact	Robert Doster	2201 Union LLC	(718) 222-1028
Project Manager	Meghan Medwid	NYSDEC	(518) 402-8610
Project Manager	Angela Martin	NYSDOH	
Emergency Response		FDNY	911
Spill Hotline		NYSDEC	(800) 457-7362

3.0 HAZARD ANALYSIS

This section describes the safety and health hazards associated with site work and the control measures selected to protect workers in compliance with *29 CFR 1910.120(b)(4)(ii)(A) and 29 CFR 1926.65(b)(4)(ii)(A)*. This is accomplished by creating a specific Job Hazard Analysis for each task and operation to be conducted at the Site.

The purpose of the Job Hazard Analysis is to identify and, to the extent practicable, quantify the health and safety hazards associated with each site task and operation, and to evaluate the risks of each hazard to workers. With this information, appropriate control methods are selected to eliminate the identified risks if possible, or to effectively control them. The control methods are documented in each task-specific Job Hazard Analysis.

Job Hazard Analyses contained in this HASP have been developed by Vektor Consultants and AMC Engineering, the Site Health and Safety Supervisor. The Site Supervisor is the individual responsible for reviewing and "verifying" that all Job Hazard Analyses are complete and to ensure that ongoing hazard analyses are conducted at this site.

3.1 Hazard Notification Process

The information in the Job Hazard Analysis Worksheets, Hazardous Substance Profiles, and Safety Data Sheets (SDS) is made available to all employees who could be affected in the scope of their work at the Site. This shall be done prior to beginning work activities.

New, or modifications to existing, Job Hazard Analysis Worksheets, Hazardous Substance Profiles, or SDS are communicated during routine briefings. Consistent with *29 CFR 1910.120(i) and 29 CFR 1926.65(i)*, this information will also be made available to contractors and subcontractors.

The Site Supervisor is the person responsible for providing Site information, this HASP, and any modifications to this HASP to contractors and/or subcontractors working on this Site.

3.2 Phases, Site Tasks and Hazard Analysis

This HASP applies to the Soil Vapor Investigation phase at the Site. This HASP will apply to the following Tasks and/or Operations that will be accomplished during the full-scale ISS work under the Remedial Site Optimization Work Plan:

- Excavation and staging of soil;
- Export of soils;
- Auguring and soil mixing;
- Drilling (installation of soil borings);
- Test pits, if necessary;
- Decontamination;
- Inspection;

- Sampling (grout - by others); and
- Community Air Monitoring

3.3 Chemical Hazards

Exposure to chemical hazards should always be avoided. When working around chemical hazards it is important to be protected by administrative and/or engineered controls or, if administrative and/or engineered controls are not practicable or fully protective, by use of proper personal protective equipment (PPE). A direct reading instrument must be used, as necessary, to establish potential worker exposure.

No chemical hazards were identified at the time this HASP was prepared.

OSHA PEL. OSHA sets permissible exposure limits (PELs) to protect workers against the health effects of exposure to hazardous substances. PELs are regulatory limits on the amount or concentration of a substance in the air. They may also contain a skin designation. PELs are enforceable. OSHA PELs are based on an 8-hour time weighted average (TWA) exposure.

IDLH. Immediately dangerous to life or health (IDLH) is a regulatory value defined as the maximum exposure concentration in the workplace from which one could escape within 30 minutes without any escape-impairing symptoms or any irreversible health effects. This value should be referred to in respirator selection.

More specific chemical information is available in the Hazardous Substance Profiles included in Attachment 1 of this HASP. The Hazardous Substance Profiles are designed to assist with "chemical guidelines" in which further information may be needed, including but not limited to an SDS. This information is not intended to replace an SDS, rather to augment one.

3.4 Physical Hazards

Below is a list of physical hazards that may be encountered during treatability study field work activities at this Site. Personal awareness, strict adherence to all safety requirements, and the use of proper PPE when applicable will help keep this work site safe.

- Hand Tool Use
- Heavy Manual Lifting/Moving
- Material Handling
- Noise (Sound Pressure Level), dBA
- Sharp Objects
- Slips/Trips/Falls
- Traffic - On or Near Site
- Utilities (electrical, gas, water, etc.) – Overhead
- Utilities (electrical, gas, water, etc.) – Underground

3.5 Biological Hazards

Job hazard analysis indicates that workers are not expected to encounter biological hazards during the implementation of RSO Work Plan at this Site. Personal awareness, strict adherence to all safety requirements, and the use of proper PPE when applicable will help keep this work site safe.

3.6 Radiological Hazards

Job hazard analysis indicates that workers are not expected to encounter radiological hazards at this Site for the phases, tasks and/or operations and work locations covered by this HASP.

3.7 Job Hazard Analysis Worksheets

The site-specific Job Hazard Analysis Worksheet is included in Attachment 2. A single Job Hazard Analysis Worksheet may be used for multiple locations provided that the task or operation, and hazards and control measures, are the same in each location.

The Job Hazard Analysis Worksheet lists the following information:

- Phase description
- Specific task or operation
- Specific location for task or operation
- Hazard analysis date(s) of task or operation
- Task or operation date(s)
- Person responsible for developing Job Hazard Analysis
- Person responsible for reviewing the Job Hazard Analysis
- Chemical, physical, biological and radiological hazards for each task or operation
- Specific control measures for each task or operation
- Required permit(s), if any

The Job Hazard Analysis Worksheet should be kept updated as information changes and previous copies should be retained.

4.0 TRAINING PROGRAM

The Site Safety and Health Training Program is designed to provide workers with the training necessary to work safely on this Site in compliance with *29 CFR 1910.120(b)(4)(ii)(B) and 29 CFR 1926.65(b)(4)(ii)(B)*. Training requirements for this site are based on the Job Hazard Analysis, contained in Attachment 2 of this HASP, and relevant OSHA requirements. Employees who have not been trained to a level required by their job function and responsibility are not permitted to participate in or supervise field activities.

4.1 Initial HazWoper Training

Initial training requirements for field personnel are based on the personnel's potential for exposure and compliance with the requirements of *29 CFR 1910.120(e)(3) and 29 CFR 1926.65(e)(3)*.

General Site Workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities that expose, or potentially expose, them to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off site, and a minimum of three days of actual field experience under direct supervision of a trained, experienced supervisor as per *29 CFR 1910.120(e)(3)(i) and 29 CFR 1926.65(e)(3)(i)*.

Specific Limited Task Workers on site only occasionally for a specific limited task (such as, but not limited to, field sampling, land surveying, geophysical surveying, or drilling) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off site, and a minimum of one day of actual field experience under direct supervision of a trained, experienced supervisor as per *29 CFR 1910.120(e)(3)(ii) and 29 CFR 1926.65(e)(3)(ii)*.

4.2 Site-Specific Training

In addition to the initial HAZWOPER training requirements outlined above, site personnel shall be trained on the following site-specific elements:

- Names of personnel and alternates responsible for site safety and health
- Health, safety, and other hazards present
- Use of specific personal protective equipment (PPE) detailed in this HASP
- Standard work practices by which the personnel can minimize risks from the hazards detailed in this HASP
- Safe use of administrative and/or engineering controls and equipment detailed in this HASP
- Medical surveillance requirements detailed in this HASP
- Decontamination procedures detailed in this HASP
- The emergency response plan detailed in this HASP

- Heat and cold stress prevention
- Working safely around heavy equipment

4.3 Site Briefings

A site-specific briefing shall be provided to visitors who enter this Site beyond the designated entry point. For visitors, the site-specific briefing shall include information about site hazards, the site layout including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements, as appropriate.

5.0 MEDICAL SURVEILLANCE PROGRAM

The Medical Surveillance Program is designed to medically monitor worker health to ensure that personnel are not adversely affected by site hazards in compliance with *29 CFR 1910.120(b)(4)(ii)(D) and 29 CFR 1926.65(b)(4)(ii)(D)*.

Medical surveillance is not required at this site due to:

- There is NO potential for worker exposure to hazardous substances at levels above OSHA permissible exposure limits or other published limits for 30 days or more per year, without regard to use of respiratory protection.
- Personnel DO NOT wear a respirator for 30 days or more a year or as required by *29 CFR 1910.134 and 29 CFR 1926.103*.

Any worker who is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substances or health hazards on this Site shall receive a medical examination as soon as possible after the occurrence, with follow-up examinations provided as required by the attending physician. Physical Exams shall be consistent with *29 CFR 1910.120(f) and 29 CFR 1926.65(f)*.

6.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be used at this Site to protect employees from biological, chemical, and physical hazards in compliance with *29 CFR 1910.120(b)(4)(ii)(C) and 29 CFR 1926.65(b)(4)(ii)(C)*. This includes hazards associated with, but not limited to, RSO Work Plan activities.

With employee safety being the number one priority, site health hazards will be eliminated or reduced to the greatest extent possible through administrative and/or engineering controls and safe work practices. Where hazards are still present, a combination of administrative and/or engineering controls, work practices, and PPE will be used to protect employees.

The Site Supervisor and/or Health and Safety Supervisor are responsible for PPE use on this Site.

6.1 PPE Selection Criteria

PPE shall be selected and used to protect site workers from the hazards and potential hazards they are likely to encounter, as identified during the site characterization and Job Hazard Analysis (see Attachment 2). A PPE ensemble shall be assigned to each work task or operation.

PPE selection shall be based upon many factors. Materials providing the greatest duration of protection shall be used. Tear and seam strength of the PPE shall also be considered to ensure ensemble durability while work is performed.

When necessary, multiple layers of protection shall be used to accommodate the range of hazards that may be encountered. All PPE shall be properly fitted.

PPE selection criteria shall also include:

- Level of PPE required (Level A, B, C, or D)
- PPE components
- Chemical suit and glove compatibility

All PPE ensembles shall be consistent with Appendix B of *29 CFR 1910.120 and 29 CFR 1926.65* and used in accordance with manufacturers' recommendations.

The following criteria were used to select PPE levels at this Site:

<u>Level D Protection was selected due to the following:</u>

- The atmosphere contains no known or suspected hazardous substances at concentrations that meet or exceed the published exposure limits

- Contact with hazardous levels of any chemicals through splashes, immersion, or by other means will not occur
- There is no potential for unexpected inhalation or contact with hazardous levels of any chemical

Training In Use of PPE

Employees receive general training regarding proper selection, use and inspection of PPE during initial HAZWOPER training and subsequent refresher training. Site-specific PPE requirements, including task-specific PPE, ensemble components, cartridge and canister service times, and inspection and maintenance procedures, as applicable, shall be communicated as identified in the Training Program.

Because chemical exposure levels present do not create a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape, positive pressure self-contained breathing apparatus or positive-pressure air-line respirators equipped with an escape air supply are not required.

7.0 ENVIRONMENTAL MONITORING

This section of the HASP describes how site worker exposures to hazardous substances will be monitored in compliance with *29 CFR 1910.120(b)(4)(ii)(E) and 29 CFR 1926.65(b)(4)(ii)(E)*.

7.1 Air Monitoring Procedures

Exposures to airborne hazardous substances shall be fully characterized throughout site operations to ensure that exposure controls are effectively selected and modified as needed. Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards to determine the appropriate level of site worker protection needed on site. Air monitoring procedures shall be consistent with OSHA requirements in *29 CFR 1910.120(c)(6) and 29 CFR 1926.65(c)(6)*.

Air monitoring shall be conducted using direct-reading instruments. Air monitoring includes:

- Initial monitoring prior to the beginning of RSO Work Plan activities to identify conditions that may cause death or serious harm and to permit preliminary selection of site controls
- Periodic monitoring throughout implementation of the RSO Work Plan

7.2 Initial Monitoring Procedures

Upon initial entry, representative air monitoring shall be conducted to identify any IDLH condition, exposure over permissible exposure limits or published exposure levels, exposure over a radioactive material's dose limits, or other dangerous condition such as the presence of flammable atmospheres or oxygen-deficient environments.

7.3 Periodic Monitoring

Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed, or when there is indication that exposure may have risen over permissible exposure limits or published exposure levels since previous monitoring was conducted. Situations where it shall be considered that the possibility exposures have risen are as follows:

- When work begins on a portion of the Site that has not been previously monitored
- When contaminants other than those previously identified are being handled
- When a change in environmental conditions exist
- When site workers handle leaking drums or containers, or work in areas with obvious liquid contamination

- When site workers report or exhibit signs of exposure

7.4 Direct-Reading Instrument Monitoring Procedures

Direct-reading instrument monitoring will be used on this site as follows:

- VOCs by photoionization detector (PID)
- Dust particulates by dust monitor

Monitoring equipment calibration and maintenance procedures on this site are:

- Every morning

8.0 DECONTAMINATION

This HASP element describes procedures for decontaminating site workers and equipment when exiting the Exclusion Zone in compliance with *29 CFR 1910.120(b)(4)(ii)(G) and 29 CFR 1926.65(b)(4)(ii)(G)*. This section also describes disposal of waste from decontamination processes. Site decontamination procedures are designed to achieve a safe, logical removal or neutralization of contaminants that may accumulate on site workers and/or equipment. The Site Supervisor is responsible for decontamination procedures at this site.

These procedures are intended to minimize site worker contact with contaminants and protect against the transfer of contamination to clean areas of the site and away from the site. They may also extend the useful life of personal protective equipment (PPE) by reducing the amount of time that contaminants contact and permeate or otherwise affect the surfaces of PPE.

Decontamination procedures shall be communicated to site workers and implemented before any site workers or equipment are permitted to enter areas on site where potential for exposure to hazardous substances exists.

Emergency decontamination procedures are detailed in Section 8, the Emergency Response Plan of this HASP.

The decontamination procedures described below are designed to meet the requirements of *29 CFR 1910.120(k) and 29 CFR 1926.65(k)* and include site-specific information about:

- General and Specific Decontamination Procedures for Personnel and PPE
- General and Specific Decontamination Procedures for Equipment
- Location and Type of Site Decontamination Procedures
- Disposal of Residual Waste from Decontamination
- Monitoring the Effectiveness of Decontamination Procedures

8.1 General and Specific Decontamination Procedures for Site Workers and PPE

All site workers and PPE leaving a contaminated area shall be appropriately decontaminated. General decontamination guidelines for site workers and PPE include:

- Decontamination is required for all site workers exiting a contaminated area. Site workers may only re-enter uncontaminated areas after undergoing the decontamination procedures described in the next section.
- Protective clothing is decontaminated, cleaned, laundered, maintained and/or replaced as needed to ensure its effectiveness.
- PPE used at this site is decontaminated or prepared for proper disposal.

- The site requires and trains site workers that if their permeable clothing is splashed or becomes wetted with a hazardous substance, they will immediately exit the work zone, perform applicable decontamination procedures, shower, and change into uncontaminated clothing.

8.2 General and Specific Decontamination Procedures for Equipment

All contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated. General decontamination guidelines for equipment include:

- Decontamination is required for all equipment exiting a contaminated area. Equipment may only re-enter uncontaminated areas after undergoing specific decontamination as described in the Job Hazard Analysis Worksheets.
- Particular attention is given to decontaminating tires, scoops, and other parts of heavy equipment that are directly exposed to contaminants and contaminated soil.

8.3 Location and Type of Site Decontamination Procedures

Decontamination shall be performed in areas that will minimize the exposure of uncontaminated site workers or equipment to contaminated site workers or equipment. Decontamination on this site shall be conducted in the Contamination Reduction Zone. The Contamination Reduction Zone acts as a buffer between the Exclusion Zone and Support Zone. The location and design of decontamination stations minimize the spread of contamination beyond these stations.

8.4 Disposal of Waste from Decontamination

Procedures for disposal of decontamination waste shall meet applicable local, State, and Federal regulations.

8.5 Monitoring the Effectiveness of Decontamination Procedures

Decontamination procedures shall be monitored by a representative of Vektor Consultants or AMC Engineering, the Site Health and Safety Supervisor, to determine effectiveness. If procedures are found to be deficient, appropriate steps shall be taken to correct any deficiencies.

9.0 EMERGENCY RESPONSE PLAN

This section describes the site-specific Emergency Response Plan in compliance with *29 CFR 1910.120(b)(4)(ii)(H) and 29 CFR 1926.65(b)(4)(ii)(H)*. Specifically, the Emergency Response Plan addresses potential emergencies at this site, procedures for responding to these emergencies, roles and responsibilities during emergency response, and training. This element also describes the provisions this site has made to coordinate its emergency response planning with other contractors on site and with off-site emergency response organizations.

This Emergency Response Plan shall be available for inspection and copying by site workers, their representatives, OSHA personnel, and other governmental agencies with relevant responsibilities as required by *29 CFR 1910.120(l)(1)(i) and 29 CFR 1926.65(l)(1)(i)*.

In accordance with *29 CFR 1910.120(l)(3)(ii) and 29 CFR 1926.65(l)(3)(ii)*, this Emergency Response Plan is a separate section of the HASP.

9.1 Pre-Emergency Planning

This Emergency Response Plan is compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

This Site has been evaluated for potential emergency occurrences based on site hazards, the tasks within the work plan, the site topography, and prevailing weather conditions.

9.2 Personnel Roles, Lines of Authority, and Communication

Anyone may activate the Emergency Response Plan; however, Saranda Alka (or designated alternate), Site Health and Safety Supervisor, is responsible for implementing the Emergency Response Plan and coordinating emergency response activities on this Site. Saranda Alka (or designated alternate) also provides specific direction for emergency action based upon information available regarding the incident and response capabilities, initiates emergency procedures including protection of the public, and ensures appropriate authorities are notified.

In accordance with *29 CFR 1910.38(a) and 29 CFR 1926.35*, in the event of an emergency, site workers are evacuated and do not participate in emergency response activities.

This Site relies upon the off-site emergency response organizations listed in the Emergency Response Contact Information list to respond to site emergencies. These organizations are appropriately trained, staffed, and equipped to provide emergency response to this site.

These organizations are contacted at least annually to verify the accuracy of phone numbers and contact names.

Communication on this site will be conducted by the following methods:

- Face to face
- Cell phone
- Hand signals

9.3 Site Security and Control

In case of an on-site emergency, site security and control for this site shall be provided by:

- Warning Signs
- Barrier Tape
- Locked Doors and Gates

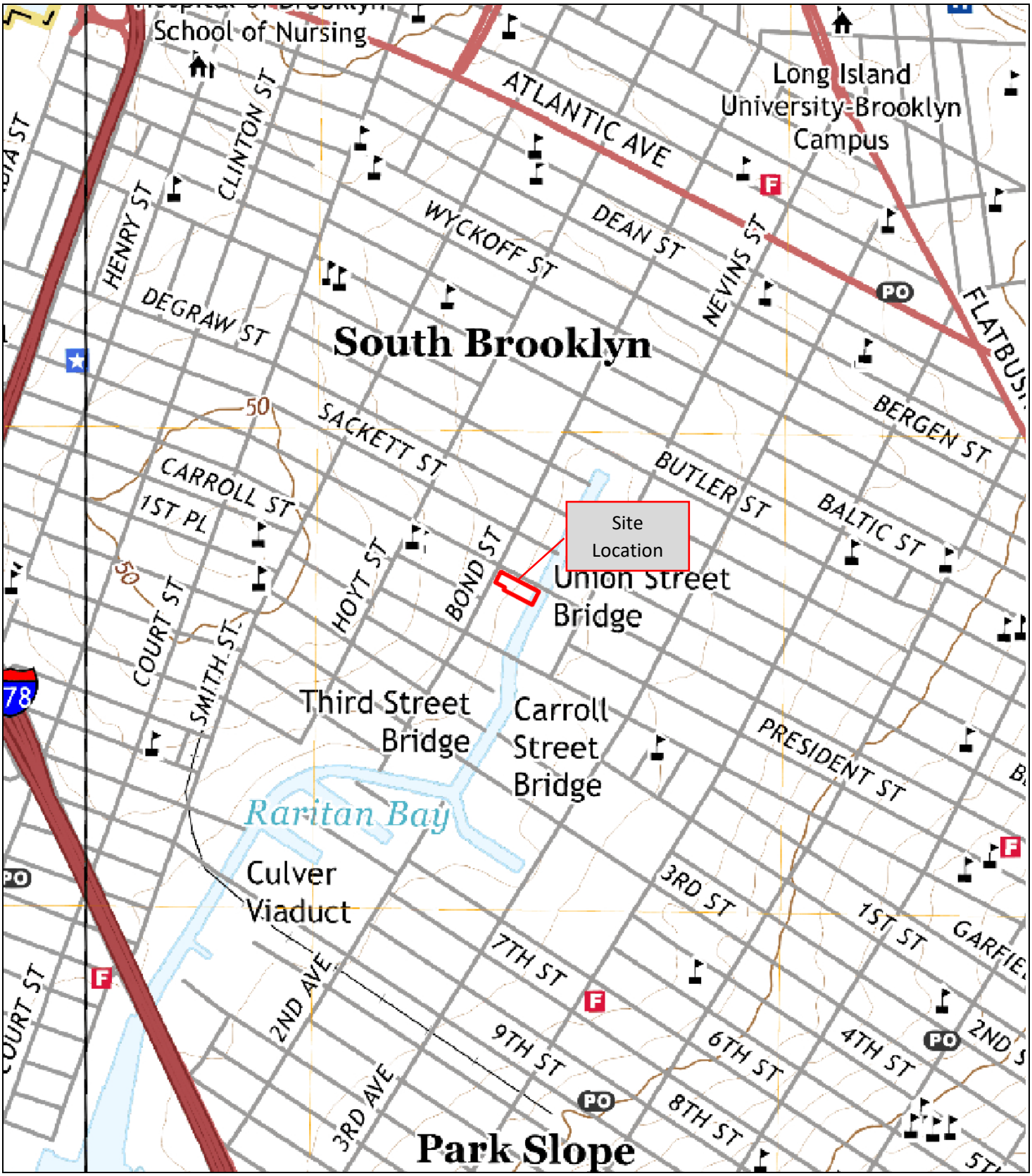
9.4 Emergency Medical Treatment and First Aid

Any site worker who requires medical care and/or is transferred to a medical facility shall be accompanied by Hazardous Substance Profiles included in Attachment 1 of this HASP and other applicable information to apprise caregivers of the chemicals and hazards to which the victim has potentially been exposed. The emergency medical care facility for this site is:

The Brooklyn Hospital Center
121 DeKalb Ave, Brooklyn, NY 11201
Tel: (718) 250-8000
Open 24 Hours

The route to the facility is shown in on the map included in Attachment 3 of this HASP.

Figure 1: Site Location
450 Union Street, Brooklyn, NY



Attachment 1

Hazardous Substance Profiles and/or SDS

Material Safety Data Sheet
PAH Contaminated Soil

ACC# 17974

Section 1 - Chemical Product and Company Identification

MSDS Name: PAH Contaminated Soil
Catalog Numbers: SRS103100
Synonyms: API separator sludge
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	Soil	78-99	unlisted
120-12-7	Anthracene	0-2	204-371-1
129-00-0	Pyrene	0-2	204-927-3
132-64-9	Dibenzofuran	0-2	205-071-3
205-99-2	Benzo(b)fluoranthene	0-2	205-911-9
206-44-0	Fluoranthene	0-2	205-912-4
208-96-8	Acenaphthylene	0-2	205-917-1
218-01-9	1,2-benzphenanthrene	0-2	205-923-4
50-32-8	Benzo(a)pyrene	0-2	200-028-5
56-55-3	1,2-Benzanthracene	0-2	200-280-6
83-32-9	Acenaphthene	0-2	201-469-6
85-01-8	Phenanthrene	0-2	201-581-5
86-73-7	Fluorene	0-2	201-695-5
87-86-5	Pentachlorophenol	0-2	201-778-6
91-20-3	Naphthalene	0-2	202-049-5
91-57-6	2-methylnaphthalene	0-2	202-078-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: not available solid.
Warning! May cause allergic skin reaction. Causes eye and skin irritation. May cause cancer based on animal studies.

Target Organs: Eyes, skin.

Potential Health Effects

Eye: May cause eye irritation.
Skin: May cause skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Naphthalene can cause cataracts, optical neuritis, and cornea injuries. Ingestion of large quantities may cause severe hemolytic anemia and
Inhalation: Causes respiratory tract irritation. May cause effects similar to those described for ingestion.
Chronic: May cause cancer according to animal studies. Prolonged exposure to respirable crystalline quartz may cause delayed lung injury/fibrosis (silicosis).

Section 4 - First Aid Measures

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

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

Section 7 - Handling and Storage

Handling: Avoid generating dusty conditions. Use with adequate ventilation. Avoid contact with skin and

eyes. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a cool, dry place.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Soil	none listed	none listed	none listed
Anthracene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).
Pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).
Dibenzofuran	none listed	none listed	none listed
Benzo(b)fluoranthene	none listed	none listed	none listed
Fluoranthene	none listed	none listed	none listed
Acenaphthylene	none listed	none listed	none listed
1,2-benzphenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).
Benzo(a)pyrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).
1,2-Benzanthracene	none listed	none listed	none listed
Acenaphthene	none listed	none listed	none listed
Phenanthrene	0.2 mg/m3 TWA (as benzene soluble aerosol) (listed under Coal tar pitches).	0.1 mg/m3 TWA (cyclohexane-extractable fraction) (listed under Coal tar pitches).80 mg/m3 IDLH (listed under Coal tar pitches).	0.2 mg/m3 TWA (benzene soluble fraction) (listed under Coal tar pitches).
Fluorene	none listed	none listed	none listed
Pentachlorophenol	0.5 mg/m3 TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	0.5 mg/m3 TWA 2.5 mg/m3 IDLH	0.5 mg/m3 TWA
	10 ppm TWA; 15 ppm STEL; Skin - potential	10 ppm TWA; 50 mg/m3	10 ppm TWA; 50 mg/m3

Naphthalene	significant contribution to overall exposure by the cutaneous r oute	TWA 250 ppm IDLH	TWA
2-methylnaphthalene	0.5 ppm TWA; Skin - potential significant contribution to overall exposure by the cutaneous r oute	none listed	none listed

OSHA Vacated PELs: Soil: No OSHA Vacated PELs are listed for this chemical. Anthracene: No OSHA Vacated PELs are listed for this chemical. Pyrene: No OSHA Vacated PELs are listed for this chemical. Dibenzofuran: No OSHA Vacated PELs are listed for this chemical. Benzo(b)fluoranthene: No OSHA Vacated PELs are listed for this chemical. Fluoranthene: No OSHA Vacated PELs are listed for this chemical. Acenaphthylene: No OSHA Vacated PELs are listed for this chemical. 1,2-benzphenanthrene: No OSHA Vacated PELs are listed for this chemical. Benzo(a)pyrene: No OSHA Vacated PELs are listed for this chemical. 1,2-Benzanthracene: No OSHA Vacated PELs are listed for this chemical. Acenaphthene: No OSHA Vacated PELs are listed for this chemical. Phenanthrene: No OSHA Vacated PELs are listed for this chemical. Fluorene: No OSHA Vacated PELs are listed for this chemical. Pentachlorophenol: 0.5 mg/m3 TWA Naphthalene: 10 ppm TWA; 50 mg/m3 TWA 2-methylnaphthalene: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: not available
Odor: none reported
pH: Not available.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not applicable.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: Insoluble in water.
Specific Gravity/Density: Not available.
Molecular Formula: Mixture
Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: High temperatures.
Incompatibilities with Other Materials: None reported.

Hazardous Decomposition Products: No data available.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 120-12-7: CA9350000
CAS# 129-00-0: UR2450000; UR2450100
CAS# 132-64-9: HP4430000
CAS# 205-99-2: CU1400000
CAS# 206-44-0: LL4025000
CAS# 208-96-8: AB1254000; AB1254200
CAS# 218-01-9: GC0700000
CAS# 50-32-8: DJ3675000
CAS# 56-55-3: CV9275000
CAS# 83-32-9: AB1000000
CAS# 85-01-8: SF7175000
CAS# 86-73-7: LL5670000
CAS# 87-86-5: SM6300000; SM6314000; SM6321000
CAS# 91-20-3: QJ0525000
CAS# 91-57-6: QJ9635000
LD50/LC50:
CAS# 120-12-7:
Oral, mouse: LD50 = 4900 mg/kg;
.

CAS# 129-00-0:
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 170 mg/m3;
Inhalation, rat: LC50 = 170 mg/m3;
Oral, mouse: LD50 = 800 mg/kg;
Oral, rat: LD50 = 2700 mg/kg;
.

CAS# 132-64-9:
.

CAS# 205-99-2:
.

CAS# 206-44-0:
Oral, rat: LD50 = 2 gm/kg;
Skin, rabbit: LD50 = 3180 mg/kg;
.

CAS# 208-96-8:
Oral, mouse: LD50 = 1760 mg/kg;
.

CAS# 218-01-9:
.

CAS# 50-32-8:
.

CAS# 56-55-3:
.

CAS# 83-32-9:
.

CAS# 85-01-8:
Oral, mouse: LD50 = 700 mg/kg;
Oral, rat: LD50 = 1.8 gm/kg;
.

CAS# 86-73-7:
.

CAS# 87-86-5:
Draize test, rabbit, eye: 100 uL/24H Mild;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, mouse: LC50 = 225 mg/m3;
Inhalation, rat: LC50 = 355 mg/m3;
Inhalation, rat: LC50 = 200 mg/m3;
Inhalation, rat: LC50 = 335 mg/m3;
Oral, mouse: LD50 = 36 mg/kg;
Oral, mouse: LD50 = 117 mg/kg;
Oral, mouse: LD50 = 30 mg/kg;
Oral, rabbit: LD50 = 200 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 27 mg/kg;
Oral, rat: LD50 = 50 mg/kg;
Skin, rat: LD50 = 96
CAS# 91-20-3:
Draize test, rabbit, eye: 100 mg Mild;
Inhalation, rat: LC50 = >340 mg/m3/1H;
Oral, mouse: LD50 = 316 mg/kg;
Oral, rat: LD50 = 490 mg/kg;
Skin, rabbit: LD50 = >20 gm/kg;
Skin, rat: LD50 = >2500 mg/kg;
.

CAS# 91-57-6:
Oral, rat: LD50 = 1630 mg/kg;
.

Carcinogenicity:
CAS# 120-12-7:

- **ACGIH:** A1 - Confirmed Human Carcinogen (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 129-00-0:

- **ACGIH:** A1 - Confirmed Human Carcinogen (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 132-64-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 205-99-2:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 206-44-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 208-96-8: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 218-01-9:

- **ACGIH:** A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 50-32-8:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 1 carcinogen

CAS# 56-55-3:

- **ACGIH:** A2 - Suspected Human Carcinogen
- **California:** carcinogen, initial date 7/1/87
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 83-32-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 85-01-8:

- **ACGIH:** A1 - Confirmed Human Carcinogen (listed as 'Coal tar pitches').
- **California:** Not listed.
- **NTP:** Known carcinogen (listed as Coal tar pitches).
- **IARC:** Group 1 carcinogen (listed as Coal tar pitches).

CAS# 86-73-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 87-86-5:

- **ACGIH:** A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
- **California:** carcinogen, initial date 1/1/90
- **NTP:** Not listed.
- **IARC:** Group 2B carcinogen

CAS# 91-20-3:

- **ACGIH:** Not listed.
- **California:** carcinogen, initial date 4/19/02
- **NTP:** Suspect carcinogen
- **IARC:** Group 2B carcinogen

CAS# 91-57-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.

Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 206-44-0: waste number U120.
CAS# 218-01-9: waste number U050.
CAS# 50-32-8: waste number U022.
CAS# 56-55-3: waste number U018.
CAS# 91-20-3: waste

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

Soil is not listed on the TSCA inventory. It is for research and development use only.
CAS# 120-12-7 is listed on the TSCA inventory.
CAS# 129-00-0 is listed on the TSCA inventory.
CAS# 132-64-9 is listed on the TSCA inventory.
CAS# 205-99-2 is not listed on the TSCA inventory. It is for research and development use only.
CAS# 206-44-0 is listed on the TSCA inventory.
CAS# 208-96-8 is listed on the TSCA inventory.
CAS# 218-01-9 is listed on the TSCA inventory.
CAS# 50-32-8 is listed on the TSCA inventory.
CAS# 56-55-3 is listed on the TSCA inventory.
CAS# 83-32-9 is listed on the TSCA inventory.
CAS# 85-01-8 is listed on the TSCA inventory.
CAS# 86-73-7 is listed on the TSCA inventory.

CAS# 87-86-5 is listed on the TSCA inventory.
CAS# 91-20-3 is listed on the TSCA inventory.
CAS# 91-57-6 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 129-00-0: Effective 6/1/87, Sunset 6/1/97 CAS# 91-20-3: Effective 6/1/87, Sunset 6/1/97

Chemical Test Rules

CAS# 91-20-3: 40 CFR 799.5115

Section 12b

CAS# 91-20-3: Section 4, 0.1 % de minimus concentration

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 120-12-7: 5000 lb final RQ; 2270 kg final RQ CAS# 129-00-0: 5000 lb final RQ; 2270 kg final RQ CAS# 132-64-9: 100 lb final RQ; 45.4 kg final RQ CAS# 205-99-2: 1 lb final RQ; 0.454 kg final RQ CAS# 206-44-0: 100 lb final RQ; 45.4 kg final RQ CAS# 208-96-8: 5000 lb final RQ; 2270 kg final RQ CAS# 218-01-9: 100 lb final RQ; 45.4 kg final RQ CAS# 50-32-8: 1 lb final RQ; 0.454 kg final RQ CAS# 56-55-3: 10 lb final RQ; 4.54 kg final RQ CAS# 83-32-9: 100 lb final RQ; 45.4 kg final RQ CAS# 85-01-8: 5000 lb final RQ; 2270 kg final RQ CAS# 86-73-7: 5000 lb final RQ; 2270 kg final RQ CAS# 87-86-5: 10 lb final RQ; 4.54 kg final RQ CAS# 91-20-3: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 129-00-0: 1000 lb lower threshold TPQ; 10000 lb upper threshold T PQ

SARA Codes

CAS # 120-12-7: immediate.
CAS # 129-00-0: immediate, delayed.
CAS # 206-44-0: immediate.
CAS # 50-32-8: immediate, delayed.
CAS # 56-55-3: delayed.
CAS # 83-32-9: immediate.
CAS # 85-01-8: immediate.
CAS # 91-20-3: immediate, delayed, fire.
CAS # 91-57-6: immediate.

Section 313

This material contains Anthracene (CAS# 120-12-7, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Dibenzofuran (CAS# 132-64-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Benzo(b)fluoranthene (CAS# 205-99-2, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Fluoranthene (CAS# 206-44-0, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains 1,2-benzphenanthrene (CAS# 218-01-9, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Benzo(a)pyrene (CAS# 50-32-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains 1,2-Benzanthracene (CAS# 56-55-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Phenanthrene (CAS# 85-01-8, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

This material contains Pentachlorophenol (CAS# 87-86-5, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR

This material contains Naphthalene (CAS# 91-20-3, 0-2%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 132-64-9 is listed as a hazardous air pollutant (HAP).

CAS# 87-86-5 is listed as a hazardous air pollutant (HAP).
CAS# 91-20-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 87-86-5 is listed as a Hazardous Substance under the CWA. CAS# 91-20-3 is listed as a Hazardous Substance under the CWA. CAS# 120-12-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 129-00-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 205-99-2 is listed as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Priority Pollutant under the Clean Water Act. CAS# 208-96-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 218-01-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 50-32-8 is listed as a Priority Pollutant under the Clean Water Act. CAS# 56-55-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Priority Pollutant under the Clean Water Act. CAS# 85-01-8 is listed as a Priority Pollutant under the Clean Water Act.

CAS# 86-73-7 is listed as a Priority Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Priority Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Priority Pollutant under the Clean Water Act. CAS# 206-44-0 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 83-32-9 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 87-86-5 is listed as a Toxic Pollutant under the Clean Water Act. CAS# 91-20-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 120-12-7 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 129-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 132-64-9 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 205-99-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 206-44-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 208-96-8 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 218-01-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 50-32-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 56-55-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 83-32-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

CAS# 85-01-8 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, (listed as Coal tar pitches), Massachusetts.

CAS# 86-73-7 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

CAS# 87-86-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-20-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

CAS# 91-57-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

WARNING: This product contains Benzo(b)fluoranthene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-benzphenanthrene, a chemical known to the state of California to cause cancer. WARNING: This product contains Benzo(a)pyrene, a chemical known to the state of California to cause cancer. WARNING: This product contains 1,2-Benzanthracene, a chemical known to the state of California to cause cancer. WARNING: This product contains Pentachlorophenol, a chemical known to the state of California to cause cancer. WARNING: This product contains Naphthalene, a chemical known to the state of California to cause cancer.

California No Significant Risk Level: CAS# 205-99-2: 0.096 æg/day NSRL (oral) CAS# 218-01-9: 0.35 æg/day NSRL (oral) CAS# 50-32-8: 0.06 æg/day NSRL CAS# 56-55-3: 0.033 æg/day NSRL (oral) CAS# 87-86-5: 40 æg/day NSRL CAS# 91-20-3: 5.8 æg/day NSRL

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 120-12-7: 2
CAS# 129-00-0: No information available.
CAS# 132-64-9: No information available.
CAS# 205-99-2: No information available.
CAS# 206-44-0: No information available.
CAS# 208-96-8: No information available.
CAS# 218-01-9: No information available.
CAS# 50-32-8: No information available.
CAS# 56-55-3: No information available.
CAS# 83-32-9: No information available.
CAS# 85-01-8: No information available.
CAS# 86-73-7: No information available.
CAS# 87-86-5: 3
CAS# 91-20-3: 2
CAS# 91-57-6: No information available.

Canada - DSL/NDSL

CAS# 120-12-7 is listed on Canada's DSL List.
CAS# 129-00-0 is listed on Canada's DSL List.
CAS# 132-64-9 is listed on Canada's DSL List.
CAS# 218-01-9 is listed on Canada's DSL List.
CAS# 50-32-8 is listed on Canada's DSL List.
CAS# 83-32-9 is listed on Canada's DSL List.
CAS# 85-01-8 is listed on Canada's DSL List.
CAS# 86-73-7 is listed on Canada's DSL List.
CAS# 87-86-5 is listed on Canada's DSL List.
CAS# 91-20-3 is listed on Canada's DSL List.
CAS# 91-57-6 is listed on Canada's DSL List.
CAS# 206-44-0 is listed on Canada's NDSL List.
CAS# 208-96-8 is listed on Canada's NDSL List.
CAS# 56-55-3 is listed on Canada's NDSL List.

Canada - WHMIS

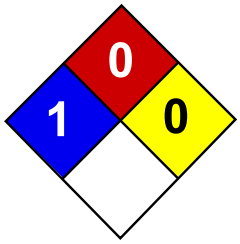
This product has a WHMIS classification of D2A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 120-12-7 is listed on the Canadian Ingredient Disclosure List.
CAS# 129-00-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 205-99-2 is listed on the Canadian Ingredient Disclosure List.
CAS# 206-44-0 is listed on the Canadian Ingredient Disclosure List.
CAS# 208-96-8 is not listed on the Canadian Ingredient Disclosure List.
CAS# 218-01-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 50-32-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 56-55-3 is listed on the Canadian Ingredient Disclosure List.
CAS# 83-32-9 is listed on the Canadian Ingredient Disclosure List.
CAS# 85-01-8 is listed on the Canadian Ingredient Disclosure List.
CAS# 86-73-7 is not listed on the Canadian Ingredient Disclosure List.
CAS# 87-86-5 is not listed on the Canadian Ingredient Disclosure List.
CAS# 91-20-3 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #5 Date: 11/20/2008



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:21 PM

Last Updated: 05/21/2013 12:00 PM

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Attachment 2

Job Hazard Analysis Worksheets

JOB HAZARD ANALYSIS WORKSHEET			
Phase Description:	Full Implementation ISS (Soil Mixing)		
Task or Operation:	Mobilization, Drilling/Auguring, Excavation, Disposal, Sampling		
Specific Location:	Eastern Portion of Site		
Task or Operation Start Date(s):	September 2024	**Task or Operation Duration:**	1 month
Date of Hazard Analysis:	September 2024		
Job Hazard Analysis Developed by:	TG		
Job Hazard Analysis Reviewed by:	TG		

POTENTIAL HAZARDS DURING THIS TASK and/or OPERATION			
Chemical*	**Physical**	**Biological**	**Radiological**
» VOCs » SVOCs » Metals	» Hand Tool Use » Heavy Manual Lifting/Moving » Material Handling » Noise (Sound Pressure Level), dBA » Sharp Objects » Slips/Trips/Falls » Traffic - On or Near Site » Utilities (electrical, gas, water, etc.) - Overhead » Utilities (electrical, gas, water, etc.) - Underground		» N/A

HAZARD CONTROL MEASURES USED DURING THIS TASK and/or OPERATION

Administrative Controls: Log In/Out Sheets

PPE Description:

Component	Description
Level A Ensemble	
Boots, chemical-resistant, steel toe and shank	
Gloves, inner, chemical-resistant	
Gloves, outer, chemical-resistant	
Supplied Air Respirator - air-line	
Totally-encapsulating vapor tight chemical protective suit	
Level B Ensemble	
Boots, chemical-resistant, steel toe and shank	
Disposable one-piece hooded chemical resistant splash clothing suit	
Gloves, inner, chemical-resistant	
Gloves, outer, chemical-resistant	

Supplied Air Respirator - air-line

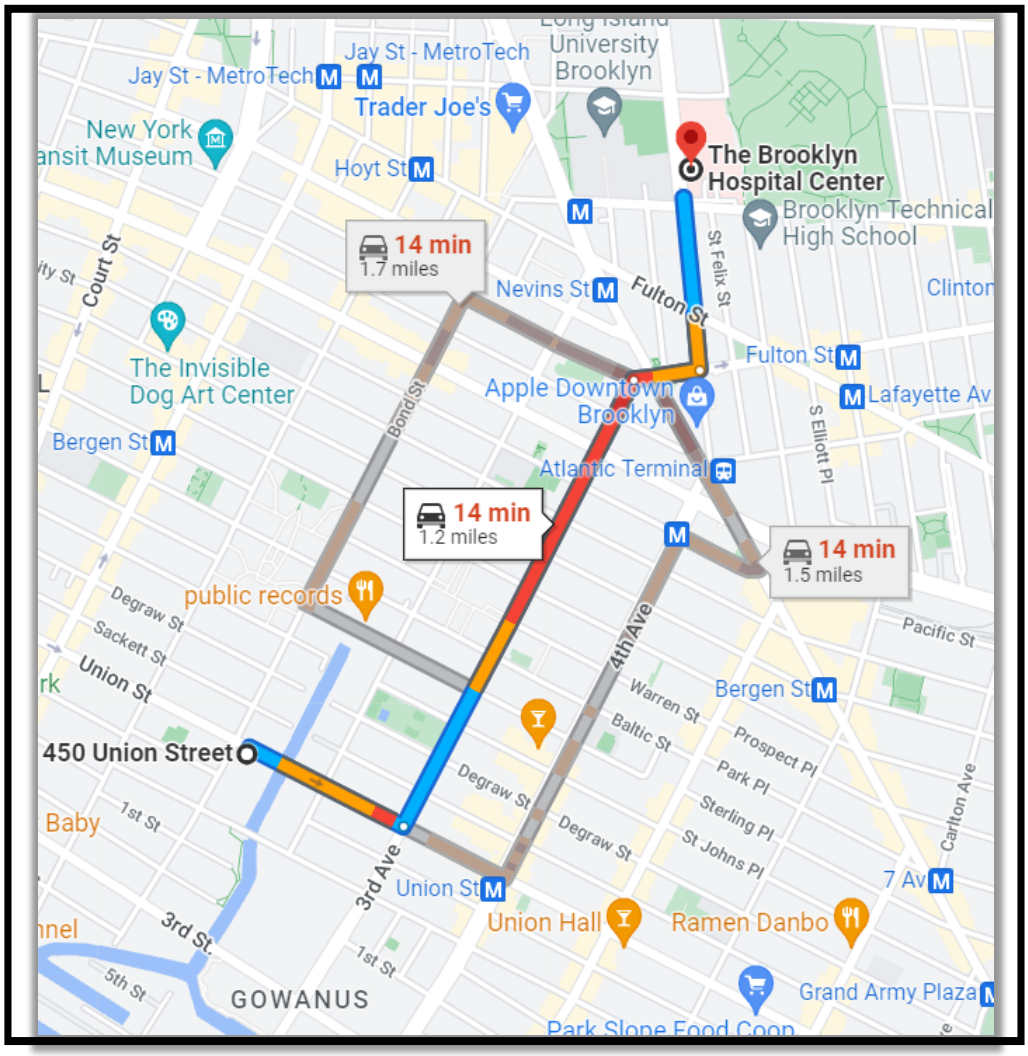
	Level C Ensemble
	Air purifying respirator - full face
	Boots, chemical-resistant, steel toe and shank
	Coveralls
	Disposable one-piece hooded chemical resistant splash clothing suit
	Escape Mask
	Gloves, inner, chemical-resistant
	Gloves, outer, chemical-resistant
	Level D Ensemble
	Dust Mask
	Escape Mask
	Gloves
Air-Purifying Respirator Cartridge/Canister Change Schedule:	
Decon Procedures for People & Equipment:	Alconox Tap Water Distilled Water
Required Permit(s):	N/A
Other Information:	

*Detailed Chemical Information is listed on attached Hazardous Substance Profiles and/or SDS

Attachment 3

Directions to Hospital

Directions to Hospital



450 Union St
Brooklyn, NY 11231

1. Head southeast on Union St toward Nevins St
0.2 mi

2. Turn left at the 2nd cross street onto 3rd Ave
Pass by Fairfield Inn & Suites by Marriott New York Brooklyn (on the right)
0.6 mi

3. 3rd Ave turns right and becomes Lafayette Ave
449 ft

4. Turn left onto Ashland Pl
0.2 mi

The Brooklyn Hospital Ctr
121 DeKalb Ave, Brooklyn, NY 11201

APPENDIX C

NYSDEC IN-SITU SOLIDIFCATION QA/QC PROTOCOLS

NYSDEC In-Situ Solidification QA/QC

1.0 GENERAL

1.1 Introduction

Technology Description

In-situ solidification (ISS) is an established remediation treatment technology which can prevent migration of and exposure to certain contaminants in media including soil, sludge, and sediment. The ISS process is increasingly being used within remedial programs in the New York State Department of Environmental Conservation (Department).

ISS is a process that involves the mixing of reagents with contaminated soil to create a low permeability mass which encapsulates the contamination in the soil in place. Bucket excavators augers, or other technologies are used to mix the contaminated media and one or more reagents, entrapping the contaminated material within a low permeability mass. This reduces or eliminates non-aqueous phase liquid (NAPL) mobility and contaminant migration into exposure pathways, thus eliminating the treated area as a source of future exposure or contamination of groundwater, surface water, or vapor.

Complete mixing of the contaminated soil and the ISS reagents must be achieved for the process to be effective and protective of human health and the environment. Incomplete mixing can result in a non-homogenous mass, untreated areas, or large fractures within the ISS mass, which may allow mobility of NAPL and groundwater within the treated areas.

1.2 Document Purpose

The purpose of this document is to provide a method of Quality Assurance (QA)/Quality Control (QC) to ensure the effectiveness of ISS after field implementation is complete. This includes coring, and testing for hydraulic conductivity and unconfined compressive strength. The use of coring for QA/QC may not be suitable for all ISS projects and other QA/QC methods such as excavation/visual inspection will be considered an option on a case by case basis.

Failure to meet QA/QC goals, particularly incomplete mixing, is of greatest concern when it occurs along the edges of the solidified mass. The Department has noted a tendency for DNAPL to accumulate in permeable soils and sediments immediately above the bedrock surface, creating a potential pathway for DNAPL migration. Such zones can be quite difficult to mix adequately, whether using augers or bucket mixing. Thus, attention is required to ensure that “top of rock” zones are thoroughly solidified, and that this solidification is adequately documented.

To ensure the integrity of the treated material, the Department has identified QA/QC procedures, specifically coring, which are essential to ensure that ISS treatment processes are protective of the environment. This document has been developed to provide guidance on a coring program to be conducted to ensure confidence regarding complete mixing and ISS installation in the remedial area.

2.0 EQUIPMENT

2.1 Coring Drilling Method

To allow early coring information to be used for adjusting ISS operations, it is recommended that coring operations be conducted prior to complete curing of the ISS material. For high-strength material, a rock core is frequently required. Driven split spoons (typically using Direct Push tools but potentially using augers as well) may be used to collect core samples of the ISS material for lower strength materials. Rotosonic and compressed air drilling methods have not been successful in obtaining representative core samples.

Cores must be no longer than five (5) feet. If less than 60% of the core material is recovered from any of the coring runs, one (1) new core hole must be drilled adjacent to the previous location. If the recovery from the adjacent core hole continues to be less than 60%, the contractor may abandon the location. This is not intended to justify an inadequate sampling program. A representative number of successfully completed cores must be provided. Close communication with the Department's project manager (PM) is strongly encouraged to discuss and reach concurrence on the coring program.

2.2 Trenching

While trenching has not been used to date, there could potentially be instances where trenching would be a viable alternative. A trenching plan would have to be submitted to the Department during the remedial design. In the event trenching is proposed after the remedial design phase, but prior to field implementation of the ISS, a minimum of two weeks' notice should be provided to the Department for review of the trenching design.

2.3 Sample Collection for strength and permeability

Samples of the mixed soil will be collected while wet and formed into cylinders in accordance with the approved testing methods (ASTM D5084 for hydraulic conductivity, ASTM D2166 or D1633 for unconfined compressive strength). Samples should be collected every 500 cubic yards. Additional sampling may be appropriate on a site-specific basis in areas of particular concern.

3.0 EXECUTION

3.1.1 Coring Implementation

- One core borehole shall be completed for every 5,000 square feet of ISS treatment area, but not less than two bore holes per treatment area.
- To allow early coring information to be incorporated in adjusting ISS operations, the first coring location shall be completed when the ISS treatment project area is no more than 25 percent complete.
- Core borehole locations shall be biased towards areas with the greatest soil contamination, areas where contamination is in direct contact with the bedrock surface, and/or locations where difficulties in the ISS process were encountered.

- Core boreholes shall be placed in locations where individual treatment columns or cells overlap, to the extent possible.
- Core boreholes should be advanced to at least a foot below the monolith design or bedrock, if encountered. If coring reveals previously undocumented areas of contamination, delineation (and remediation, as necessary) of that contamination may be required outside the QA/QC program.
- Cores shall be archived following coring activities. Cores may be discarded upon final inspection by the Department. Following initial inspection, the Department may require cores to be retained to compare to future cores or to document issues that will need to be resolved.
- To allow any needed corrective actions to commence before the monolith cures to a point making corrective action difficult or impossible, core inspection by the Department will occur as soon as possible but not later than 48 hours of the core's collection.
- In order to identify potential areas of concern for the coring program, documentation on the volume/shrinkage of grout obtained during ISS installation shall be reviewed. Areas where excessive grout was lost during ISS implementation should be targeted for coring.

3.1.2 Trenching Implementation

- If trenching is used, it will be completed at the perimeter of the ISS treatment area and locations within the ISS treatment area. The minimum depth of excavation should be the design depth of the ISS treatment.
- If the bottom of the ISS treatment cannot be visually inspected, the Department may require cores to be collected.
- To allow inspection information to be incorporated in adjusting ISS operations, trenching shall commence when the ISS treatment project area is no more than 25 percent complete.

3.1.3 Sample analysis

- Typically, multiple cylinders are collected at each location for testing unconfined compressive strength. This allows testing after 3-5 days to get an initial indication of the strength of the mix, while reserving cylinders for compliance testing after they have achieved full strength (28 days).
- Cylinders tested for hydraulic conductivity in accordance with the approved plans. The maximum permeability should generally be 1x10-6 cm/sec, as measured using ASTM D 5084-00.

3.2 Performance Evaluations

3.2.1 Visual Inspection

Core samples and related equipment will be visually inspected for the following criteria, and the results recorded:

- Visible NAPL
- Non-mechanical induced cracking within the core
- Percent of core sample recovered

In addition, indirect indications of unmixed NAPL should be recorded, such as:

- NAPL coating on drilling tools
- NAPL in drill wash tub, if water-based drilling methods are employed

3.2.2 Performance Concerns

Performance testing must be completed early enough to identify problems. Substandard results cannot be ignored with the intention to "average-out" the results over the course of project. The purpose of this guidance is to detect installation of an inadequate remedy in time to correct the problems and avoid costly retreatment or repairs to ensure effectiveness of the ISS remedy, the following conditions will warrant further attention and will be documented during ISS implementation:

- A continuous layer or seam of NAPL is noted within the core.
- NAPL coating is visible on drilling tools
- Visible NAPL is noted in the drill wash tub
- Unconfined compressive strength below 50 psi
- Hydraulic conductivity greater than 1.0 x 10-6 cm/sec or project specific goal.
- Large sections (> 1 cf) of unmixed material.

If one or more of the above conditions are noted, the Department must be notified to discuss the severity of the problem, the degree of concern, and whether any corrective action will be necessary.

A notification, by itself, does not necessarily mean a corrective action or additional borings or testing are warranted. For instance, small NAPL blebs may be present within properly mixed areas of the ISS monolith, and coring through such a bleb, especially before the monolith has achieved its maximum strength, could result in NAPL coating on drilling tools and/or NAPL in the drill wash water. The first step to determining whether corrective action is required will be to complete additional borings around the area of concern and determine if identified NAPL within the ISS mass is encapsulated, thus eliminating NAPL mobility and impact to the surrounding environment. The results of all the samples taken within a given treatment area cannot be averaged to show compliance. While each sample must satisfy the definition on its own, a single test showing slightly elevated hydraulic conductivity would not necessarily require corrective action for that cell/column, but evaluation to ensure that it is not a systemic problem is required.

If NAPL is detected in the additional borings, particularly on the edges of the ISS monolith, or at the bottom of the ISS monolith, corrective actions may be necessary in order to fully encapsulate the source area.

3.2.3 Corrective Actions

If the ISS installation is deemed unsatisfactory after a collaborative evaluation of the coring program, measures will be put in-place to address the deficiencies and ensure that the remedy is protective of human health and the environment. Such measures may include:

- Repair, re-mixing, or isolation of the concerned area using jet grouting or other suitable method
- Excavation and disposal of the concerned area, where feasible and practicable.

3.2.4 Core Hole/Trench Abandonment

When a core has been drilled from the top to the bottom elevation of the targeted ISS treatment zone, and samples collected, it will be considered complete. Following completion of each coring location, the borings will be filled with grout using tremie methods.

If trenching is used for QA/QC activities, backfill material should meet the approved ISS specifications.

3.3 Field Documentation and Approvals

3.3.1 Field Documentation

Documentation of the ISS QA/QC activities shall be included with the Final Engineering Report (FER). Documentation will include (but not be limited to):

- Figure depicting boring/trenching locations
- Photographs of each core boring/trench referenced
- Type of drilling method or excavator used
- Field coring/trench logs

3.3.2 Department Approval

The Department should be notified of the ISS QA/QC activities as soon as possible, with a minimum of 72 hours' notice or two business days. Department personnel will attempt to be on-site, unless the remedial party is informed otherwise, to inspect the QA/QC activities and provide informal approval or recommend corrective actions.

Following on-site Department inspection of the ISS QA/QC, email correspondence should be sent to the Department project manager which summarizes observations of the coring results. The Department project manager will provide an email reply within 48 hours confirming that the ISS QA/QC objectives have been met. If the Department project manager does not feel the ISS

QA/QC objectives have been adequately satisfied, the response email will include any additional corrective actions required.

3.3.3. Resolution of Disagreements

In the event there is a disagreement regarding the ISS QA/QC program the remedial party will submit a written request for resolution to the project manager's supervisor. The correspondence shall include the ISS QA/QC activities, relevant documentation, and the nature of the dispute. The project manager's supervisor will meet with the Project Manager, Construction Inspector (if applicable) and the Bureau Director to discuss the request. If necessary, a meeting will be arranged which will include the remedial party, Department project manager, supervisor, and the Bureau Director to discuss the matter.

Following the meeting, the supervisor will send correspondence to the remedial party outlining the Department final decision.

APPENDIX D

NYSDEC IMPORT / REUSE SOIL OR FILL FORM

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.

SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that passes a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

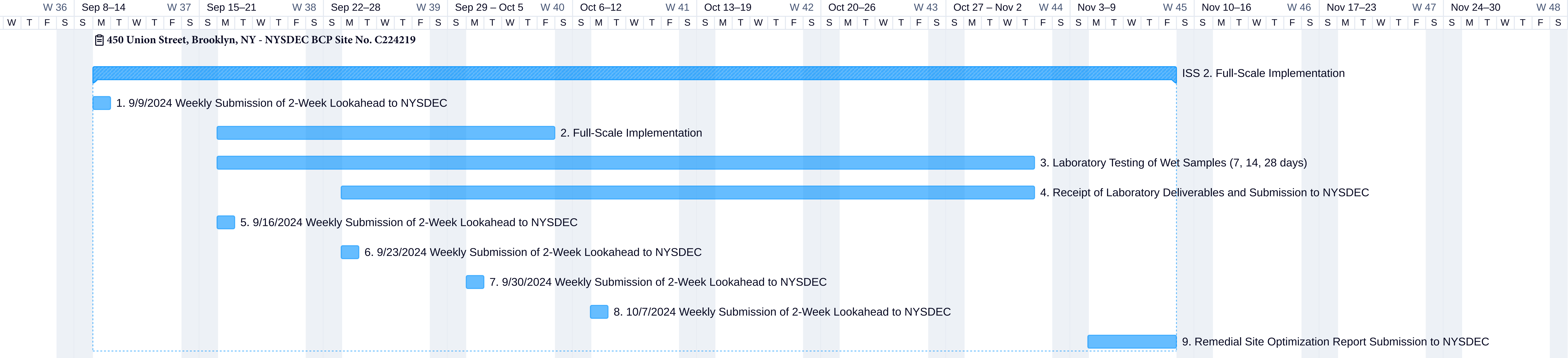
_____

Firm

Revised April 2023

APPENDIX E

SCHEDULE


W 36
Sep 8–14
W 37
Sep 15–21
W 38
Sep 22–28
W 39
Sep 29 – Oct 5
W 40
Oct 6–12
W 41
Oct 13–19
W 42
Oct 20–26
W 43
Oct 27 – Nov 2
W 44
Nov 3–9
W 45
Nov 10–16
W 46
Nov 17–23
W 47
Nov 24–30
W 48
450 Union Street, Brooklyn, NY - NYSDEC BCP Site No. C224219
ISS 2. Full-Scale Implementation
1. 9/9/2024 Weekly Submission of 2-Week Lookahead to NYSDEC
2. Full-Scale Implementation
3. Laboratory Testing of Wet Samples (7, 14, 28 days)
4. Receipt of Laboratory Deliverables and Submission to NYSDEC
5. 9/16/2024 Weekly Submission of 2-Week Lookahead to NYSDEC
6. 9/23/2024 Weekly Submission of 2-Week Lookahead to NYSDEC
7. 9/30/2024 Weekly Submission of 2-Week Lookahead to NYSDEC
8. 10/7/2024 Weekly Submission of 2-Week Lookahead to NYSDEC
9. Remedial Site Optimization Report Submission to NYSDEC