260-262 VAN BRUNT, LLC

262 VAN BRUNT STREET

BROOKLYN, NEW YORK

INTERIM REMEDIAL MEASURES WORK PLAN

NYSDEC BCP SITE NO. C244199

JULY 2022

Prepared For:

260-262 Van Brunt, LLC

262 Van Brunt Street

Brooklyn, New York 11231

Prepared By:

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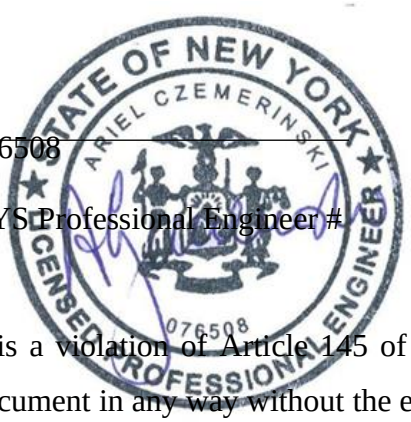
LIST OF ACRONYMS

AOC	Area of Concern
AWQS	Ambient Water Quality Standards
AGV	Air Guidance Value
ASP	Analytical Services Protocol
ASTM	American Society for Testing and Materials
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Grade Surface
CAMP	Community Air Monitoring Program
COC	Chain of Custody
CPP	Citizen Participation Program
CSM	Conceptual Site Model
DER-10	Department of Remediation Technical Guidance
ELAP	Environmental Laboratory Accreditation Program
GPS	Global Positioning System
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IRM	Investigative Remedial Measures
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MDL	Method Detection Limit
NAPL	Non-aqueous Phase Liquid
NYCRR	New York Codes Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation

NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PID	Photo Ionization Detector
QA/QC	Quality Assurance/ Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SVOC	Semi-volatile Organic Compound
TCL	Target Compounds List
TOGS	Technical and Operational Guidance Series
USGS	United States Geological Survey
VOC	Volatile Organic Compound

CERTIFICATION

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



076508	7/8/2022	
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.

1.0 INTRODUCTION

This Interim Remedial Measures (IRM) Work Plan was prepared on behalf of 260-262 Van Brunt, LLC for the properties located at 260 and 262 Van Brunt Street in Brooklyn, New York. The Site is located at 262 Van Brunt Street in the Red Hook section of Brooklyn, Kings County, New York and is identified as Block 517 and Lot 1 on the New York City Tax Map. On July 30, 2019, the New York State Department of Environmental Conservation (NYSDEC) informed 260-262 Van Brunt, LLC that the property was accepted into the Brownfield Cleanup Program (BCP). The Brownfield Cleanup Agreement (BCA) was executed by the DEC on July 31, 2019 (Site No. C224199) with the Applicant classified as a Participant.

A Remedial Investigation (RI) was conducted at the Site between November 8, 2021 and January 25, 2022 in accordance with a NYSDEC approved Remedial Investigation Work Plan (RIWP) dated September 2021. Prior to the RI, previous investigations conducted at the Site confirmed presence of contamination in soil, groundwater, and soil vapor. Furthermore, the RI confirmed presence of chlorinated volatile organic compounds (CVOCs) in groundwater and soil vapor, a shallow soil hotspot with elevated concentrations of semi-volatile organic compounds (SVOCs) and metals in the northern portion of the warehouse, and presence of underground storage tanks (USTs) at the Site.

This IRM Work Plan describes the strategies and technologies to remove a soil hotspot, remove and/or closure-in-place of the USTs, and installation of engineering controls to mitigate the soil vapor beneath the Site. This IRM Work Plan was prepared in accordance with the process and requirements of the BCP and the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10)

2.0 SITE BACKGROUND

2.1 Site Location and Current Usage

The Site is located at 262 Van Brunt Street in the Red Hook section of Brooklyn, Kings County, New York and is identified as Block 517 and Lot 1 on the New York City Tax Map. Figure 1 shows the Site location. The Site is approximately 13,500-square feet and is currently developed with a one-story brick warehouse that occupies most of the tax parcel. A concrete paved area utilized as parking is located in the southern portion. The warehouse is currently used for a glass repair, replacement, and cutting company identified as Sergi's Images, Inc.

The current zoning designation for the property is M2-1, denoting it as manufacturing district. M2 districts occupy the middle ground between light and heavy industrial areas. M2-1 zoning district is limited to manufacturing and commercial uses.

2.2 Description of Surrounding Property

The subject property is located within a primarily mixed residential, commercial, and industrial area of Kings County. The Site is bounded by mixed residential, commercial, and industrial buildings. The Site is bounded by Imlay Street to the north beyond which is a residential building, a commercial building, which is occupied by the Site owner, to the east, industrial uses including a junk yard to the west, Van Brunt Street to the south beyond which are residential and industrial properties.

There are no schools, hospitals, or day-care facilities within a 500-foot radius of the subject property. Figure 2 shows the surrounding land usage.

2.3 Environmental Setting

2.3.1 Topography

According to the United States Geological Survey (USGS) 7.5-Minute Series Topographic Map of Jersey City Quadrangle, the site is about 4 feet above mean sea level (msl), and the surrounding area slopes gently to the west.

2.3.2 Geology

The stratigraphy of the Site, from the surface down, consists of approximately 2 feet of historic fill underlain by 5 feet of brown silty sand with traces of gravel underlain by 8 feet of brown sand. The average depth to groundwater is approximately 6 feet bgs and groundwater beneath the Site flows from east to west.

According to the USGS and prior reports, the Site is underlain by the Hartland Formation, Formation, which is comprised of gray, fin to medium grained biotite-muscovitequartz schist with minor garnet and gray sillimanite-plagioclase-muscovite schist with minor garnet located concentrations of granite and intrusions of coarse-grained granitic pegmatite. These rocks are continental and oceanic in origin and are igneous and metamorphic in composition. Pleistocene sediments from glacial activity cover the bedrock in the area. The estimated depth to bedrock is more than 20 feet below land surface.

2.3.3 Hydrogeology

The Site lies on a relatively level coastal plain within the Red Hook Neighborhood of Kings County. Based on the findings of the recent RI, the average depth to groundwater is 6.01 feet bgs and the range in depth is 4.28 feet to 7.18 feet bgs. Groundwater flow is from east to west.

Groundwater beneath the Site is not used as a potable (drinking) water source. The potable water supply is provided to the Site by the City of New York and is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

2.4 Redevelopment Plans

The intended use of the Site is to utilize the Site for its current zoning designation, combined with a potential for future redevelopment as residential or mixed use subject to approval by the NYC Department of City Planning and NYC Department of Buildings.

3.0 SITE HISTORY

3.1 Past Uses and Ownership

Based on a Phase I Environmental Site Assessment (ESA) Report prepared by EPI Global on March 21, 2014, a site history was established. The Site included residential improvements and buildings utilized for stables and later car barns by the local railroad company prior to 1886. Other buildings on-site included a meat packing facility by 1904 and a pig feet pickling facility by 1915. By 1938, the former improvements on the Site were razed and the land was vacant. The Site was redeveloped in 1944 with the current building. The building was labeled "general merchandise warehouse" and as an auto garage and trucking company during late 1940s and 1950s. By 1959, part of the building was utilized as a “junk shop” including rags and paper and later was utilized as a salvage company. By 1969, the building was utilized for “waste paper baling”. By mid-1970s, the building was occupied by a trucking/motor company and may have included repair activities.

The City Directory database indicates a plastic company as an occupant in 1959. By the late 1990s and mid-2000s, the building was utilized by a theatrical staging company for storage and props and dry goods until 2010. On or about September 2010 to December 31, 2014, the site was occupied by the Standard Bus Maintenance, Inc. for the storage and maintenance of school buses.

The Site currently owned by 260-262 Van Brunt, LLC.

3.2 Previous Investigations

The following prior investigations were conducted at the Site:

Environmental Sampling Report by J.C. Broderick & Associates, Inc. dated July 26, 2005

- J.C. Broderick & Associates, Inc. (JCB) prepared this report on behalf of North Fork Bank in July 2005.
- The subsurface investigation consisted of an investigation of the floor drains, a visual inspection of a concrete oil-water separated, an investigation of the vent and fill pipes identified on the exterior of the building to determine presence of any underground storage tanks (USTs).
- JCB determined that the floor drains discharged into the municipal sewer system.

- The visual inspection did not identify any leaks or spills associated with the concrete oil-water separator.
- Three potential USTs were identified beneath the concrete parking area in the southwestern portion of the Site.
- Total of four soil borings were installed at the Site. Of these, two soil borings were installed in the vicinity of the USTs in the southwestern portion and two soil borings were installed in the central north portion of the warehouse in the vicinity of another suspect UST. However, no soil samples were collected during this sampling event. Based upon the field screenings with a Photo Ionization Detector (PID), visual and textural observations, J.C. Broderick & Associates did not identify evidence of petroleum contamination.

Phase I Environmental Site Assessment Report by EFI Global, Inc. dated March 21, 2014

- EFI Global, Inc. (EFI) prepared this report on behalf of Capital One Bank, N.A. and 260-262 Van Brunt LLC in accordance with ASTM E 1527-13 in March 2014.
- The Site consisted of the current one-story warehouse at the time of the 2014 EFI site reconnaissance.
- The 2014 EFI report included review of a prior Phase I ESA Report prepared by JCB in July 2005. According to the summary included within EFI Report, the Site was occupied by a theatrical staging company at the time of the 2005 JCB assessment. The 2005 JCB Phase I ESA reportedly identified the following recognized environmental conditions (RECs):
    - A prior Phase I ESA conducted in 2004 provided to JCB revealed RECs including: (i) the unknown discharge point of storm drains in the warehouse, (ii) the presence of an oil/water separator in the warehouse; and (iii) evidence that gasoline and fuel oil USTs are present at the Site. While the prior report recommended further investigations, Mr. Sergi was interviewed by JCB and indicated none of this work was completed.
    - JCB indicated that based upon their research, historical USTs were expected to have existed on the Site. JCB further indicated the NYC DOB database identified a permit for a gasoline tank in 1963. In addition, JCB identified a suspect fill and vent

pipe along with the presence of three additional vent pipes on the exterior of the warehouse, which they believed indicated the presence of former gasoline tanks.

- The aforementioned oil/water separator was observed by JCB during their site visit and found to be approximately two feet deep and four square feet. JCB identified several inches of what appeared to be an oil/water mixture inside the unit. No further details regarding the unit were specified, including the construction of the sidewalls and floor of the oil/water separator and the integrity of the unit.
- Three floor drains were observed within the warehouse. JCB did not identify any staining around the drains.
- While JCB did not identify any specific sites on the regulatory database, they indicate "other sites within the approximate minimum search distance of the Site appeared on a number of the Federal and State databases" and further "a potential does exist for contaminated groundwater from these sites, to migrate or flow into the subsurface of the Site. Due to the suspect shallow groundwater table in the area, a potential does exist for a contaminated plume, if such a plume exists, to impact the environmental quality of the Site." However, they do not make any recommendations pertaining to any potential migration of contamination from off-site sources, nor do they identify specific sites of concern, or contaminants of concern.

- The 2014 EFI Phase I ESA identified the following RECs:
  - The former uses of the Site indicate the likely historical uses of petroleum products and chlorinated solvents in association with operations including auto repairs, plate manufacturing, and plastics manufacturing. Additionally, the Site was used for vehicle repairs since the 1940s, therefore it is possible that in the past the buildings had in-ground hydraulic lifts with sub-grade reserves.
  - According to the aforementioned previous Phase I and subsurface investigation, there is evidence of three former gasoline underground storage tanks (USTs) due to vent pipes along the southeastern exterior of the Site.
  - Potential vapor encroachment condition (VEC) due to the shallow groundwater at the subject property.

- Based on their findings, EFI recommended a Phase II investigation to determine if the historical uses and suspect USTs have impacted the subsurface conditions of the Site. EFI also recommended a soil-gas survey to determine if a VEC exists at the Site as well as investigation of the oil/water separator and removal of drums.

Phase II Environmental Site Assessment Report by Enviroscience Consultants, Inc. dated August 12, 2014

- Based on the findings of the 2014 EFI Phase I ESA, Enviroscience Consultants, Inc. (ECI) performed a Phase II ESA at the Site. The Phase II ESA consisted of performance of a focused geophysical investigation, installation of four soil borings to 10 feet bgs and collection of four soil samples and collection of two groundwater samples from two of the soil borings.
- All soil samples were analyzed for CP-51 VOCs, and three soil samples were analyzed for CP-51 SVOCs. The soil results revealed presence of tetrachloroethylene in one soil sample (SB-3 – 1,400 μg/kg) collected at the water table at a concentration slightly above its respective Part 375 Unrestricted Use SCO. The soil results further revealed presence of several SVOCs.
- Both groundwater samples were analyzed for CP-51 VOCs and one groundwater sample was analyzed for CP-51 SVOCs. The results revealed presence of tetrachloroethylene (max. of 27 μg/L) in both groundwater samples at concentrations above its respective AWQS.
- Based on these findings, ECI recommended notification of the NYSDEC due to evidence of contamination, performance of further investigation to delineate the extent of soil and groundwater contamination, and proper abandonment of the out-of-service USTs.

Subsurface Investigation Report by Enviroscience Consultants, Inc. dated October 10, 2014

- Based upon the findings of the previous Phase II ESA dated August 12, 2014 that revealed concentrations of tetrachloroethene (PCE) in one soil sample and two groundwater samples beneath the property, a soil vapor intrusion and subsurface investigation was performed.

- The soil vapor intrusion investigation consisted of collection of three sub-slab vapor samples across the Site, one sub-slab vapor sample and three-indoor air samples at the east adjacent 260 Van Brunt Street building, and one outdoor ambient air sample.
- The results showed elevated concentrations of tetrachloroethylene (160-8,000 μg/m^3) in sub-slab vapor samples from both the Site and east adjacent property. The results also showed elevated concentrations of tetrachloroethylene (360-380 μg/m^3) in indoor air of east adjacent property. Concentrations of trichloroethylene (2.1 and 2.8 μg/m^3) were detected in the indoor air samples above the NYSDOH air guideline on the first and second floors of the adjacent property. Furthermore, PCE was identified in an outdoor air sample at 31 μg/m^3, above the NYSDOH ambient background standard.
- The soil investigation consisted of installation of eight soil borings across the Site to 10 feet bgs and collection of one soil sample from each boring for analysis of VOCs. Additionally, one groundwater sample was collected from each soil boring for analysis of VOCs.
- PCE was detected in all eight soil samples but was only detected at a concentration exceeding its respective Part 375 Unrestricted Use SCO in one soil sample (SB-6 - 2,900 μg/kg).
- PCE was also detected in six out of eight groundwater samples but was only detected above its respective AWQS in one groundwater sample (SB-6 – 8.8 μg/L).
- Based on these findings, ECI recommended providing a copy of the report to the NYSDEC, mitigation of indoor air in the finished office space for PCE and TCE, and excavation and disposal of impacted soils along with installation of a vapor barrier and potential sub-slab depressurization system when the Site is redeveloped.

Remedial Investigation Work Plan by AMC Engineering, PLLC dated September 2021

- The RIWP was prepared on behalf of the Applicant to collect data of sufficient quality and quantity to characterize the nature and extent of residual contamination associated with the historic operations at the Site and to complete a qualitative exposure assessment for future occupants of the proposed building and the surrounding community and to evaluate alternatives to remediate the contamination.

- The RIWP proposed performance of a ground penetrating radar survey to confirm the locations of underground storage tanks and utilities, installation of six soil borings across the Site and collection of 18 soil samples to obtain additional information on soil quality with respect to Soil Cleanup Objective (SCOs), collection of a soil sample from each of the three floor drains to obtain information on soil quality with respect to SCOs, installation of five cluster monitoring wells and the collection of 15 groundwater samples to assess groundwater impacts; and installation of three sub-slab soil gas probes and the collection of three sub-slab soil gas samples, and the collection of three indoor air samples and one outdoor ambient air sample to assess vapor phase VOCs and soil vapor intrusion.

Draft Remedial Investigation Report & Confirmatory Sampling by Vektor Consultants dated March 4, 2022

- The RI consisted of a geophysical survey, installation of six soil borings to 15 feet bgs, and collection of 18 soil samples (plus one duplicate and one MS/MSD samples), installation of five cluster monitoring wells, each consisting of three intervals for a total of 15 monitoring wells, and collection of 15 groundwater samples (plus one duplicate and one MS/MSD sample), installation of three sub-slab vapor probes and collection of three sub-slab vapor samples, three co-located indoor air samples, and one ambient air sample, installation of two sub-slab vapor probes and collection of two co-located indoor air samples on the ground floor of the east adjacent property, as well as collection of one indoor air sample from the second floor of the east adjacent property and collection of three sediment samples from on-site floor drains.

- The confirmatory Soil Vapor Intrusion (SVI) Study on January 25, 2022 consisted of installation and sampling of five sub-slab vapor probes, collection of five co-located indoor air samples (plus one duplicate indoor air sample), and one ambient air sample across the Site, installation and sampling of one soil vapor probe at the Site perimeter, installation of two sub-slab vapor probes and collection of two co-located indoor air samples on the ground floor of the east adjacent property, as well as collection of one indoor air sample from the second floor of the east adjacent property, and an ambient air sample, and collection of one sediment sample (plus a duplicate sample) from the on-site sewer vent pit.

- Three areas of concern with potential USTs: The geophysical survey identified three metallic anomalies indicative of USTs beneath the Site. These included an approximately 16 feet by 9 feet metallic anomaly in the sidewalk along Van Brunt Street and three adjacent anomalies that are approximately 9 feet by 4 feet each (anomaly #1), an approximately 12 feet by 7 feet metallic anomaly in the southern portion of the warehouse (anomaly #2), and another 12 feet by 7 feet metallic anomaly to the north of anomaly #2 in the warehouse (anomaly #3).

- Historic Fill: A historic fill layer predominantly consists of consisting of concrete, brick and glass fragments mixed with silty sand layer extending to approximately 2 feet was identified beneath the Site. Soil results showed presence of SVOCs and metals at concentrations above Part 375 Restricted Commercial and/or Industrial Use SCOs. Shallow soil (0'-2' interval) in the central northern portion (21SB-3) showed SVOCs above 500 ppm.

- Chlorinated VOCs (CVOCs) Impacted Groundwater and Soil Vapor: Tetrachloroethylene (PCE) was detected above AWQS in one shallow groundwater sample (10.3 ug/L at CW2-S). PCE (max. of 8.700 $\mu g/m^3$ on-site in 22SS-6 and 110 $\mu g/m^3$ off-site in 22SS-4) was detected in all sub-slab vapor samples collected during the RI (both on-site and at the adjacent office building). Additionally, its biproduct trichloroethylene (TCE) (240 $\mu g/m^3$) was detected in one of the sub-slab vapor samples (22SS-5) collected at the adjacent office building. PCE and TCE were not detected in the soil vapor sample (22SV-1). When the decision matrices established by the NYSDOH applied, mitigation is required based on the high concentrations of CVOCs. However, it should be noted that concentrations of contaminants of concern collected from the initial soil vapor sampling event on November 9, 2021 do not appear to be representative of actual subsurface conditions. The concentrations of contaminants of concern collected from the second confirmatory soil vapor sampling event on January 25, 2022 are consistent with the historical investigation results. The presence of CVOCs, primarily tetrachloroethylene and its biproduct trichloroethylene, were attributed to the former bus maintenance operations.

- Metals in Sediment Samples: Barium, cadmium, chromium trivalent, copper and nickel were detected at concentrations exceeding their respective Restricted Commercial Use SCOs in the sediment samples collected from the floor drains inside the warehouse.

4.0 SUMMARY OF INTERIM REMEDIAL MEASURES

This IRM Work Plan addresses contaminated historic fill, CVOCs in soil vapor, metals in floor drains, and removal/abandonment of storage tanks. The proposed IRMWP consists of the following tasks:

- Development of a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP);
- Removal of hotspot in shallow soil (21SB-3) in the rear of the warehouse by excavation and off-site disposal;
- Cleanout and disposal of sediment in floor drains;
- Removal of USTs within the footprint of the warehouse;
- Removal/abandonment of storage tanks outside the footprint of the warehouse;
- Collection of post-excavation endpoint soil samples from the tank graves;
- Backfilling and capping excavated areas, as necessary;
- Performance of waste characterization sampling for off-site disposal of excavated materials;
- Sampling of any open excavation area(s);
- Removal and off-site disposal of any soils exceeding Restricted Commercial Use SCOs from any open excavation area(s);
- Installation of an active sub-slab depressurization system; and
- Preparation of a Construction Completion Report (CRR) to document the remedial activities.

4.1 Remedial Activity Oversight

The Remedial Engineer (RE), Ariel Czemerinski, P.E., will oversee implementation of the IRMWP. The RE is responsible for documenting that the Contractor performs the work as specified in this IRMWP and for providing required documentation to the NYSDEC as part of the CCR described below in Section 8.2. A field scientist/geologist, under the supervision of the PE, will provide full-time oversight during implementation of the IRMWP. Work conducted in

accordance with this IRMWP will be documented in daily field reports, monthly progress reports, and in the CCR.

4.2 Hotspot Soil Excavation

Soil excavation will be performed during site development in accordance with the Soil/Materials Management Plan (SMMP) detailed in Section 5.0. The proposed excavation will be performed as below:

- Excavation to 3 feet below grade in the northern portion of the Site, where SVOCs hotspot (0'-2' interval at 21SB-3) was identified during the RI. This excavation pit will be utilized as one of the sub-slab depressurization pits upon receipt of post-excavation endpoint sample results.

Soil excavated from the Site will be properly disposed of in accordance with all applicable laws and regulations.

Figure 3 shows the location of the hotspot excavation.

4.3 Sediment Removal

All floor drains (total of three) and the sewer pit will be cleaned out and all removed sediment will be placed into 55-gallon drums for off-site disposal in accordance with all applicable laws and regulations. If required by the facility, sediment will be characterized as per the receiving facility requirements. All drains were previously confirmed to have solid bottoms.

Figure 4 shows the locations of floor drains and sewer vent pit.

4.4 Removal/Closure of Storage Tanks

Two suspect USTs are present inside the warehouse, and four suspect USTs are located outside the warehouse footprint at the Site. All USTs will be registered with the NYSDEC Petroleum Bulk Storage (PBS) unit once their capacities are confirmed. The USTs inside the warehouse will be exposed, the contents removed, rendered inert and cleaned, and the UST carcass disposed of as metal scraps, in accordance with Section 5.5 of DER-10. Any material/fluid/sludge remaining inside the USTs will be emptied prior to removal.

The USTs outside the warehouse will either be removed or abandoned-in-place due their proximity to the building foundation. If the USTs are filled with water, the fluids will be pumped out and will be abandoned with sand as a proper closure method.

If impacted soils are identified during the UST removal activities, they will be excavated and stockpiled on-site for off-site disposal. Excavated materials will be characterized as per the receiving facility's protocol. Following the removal of all impacted soils/fill, excavation pits will be screened for visual and olfactory evidence of contamination. Post-excavation endpoint samples will be collected from the sidewalls and the bottom of excavation area(s) and analyzed for CP-51 List volatile organic compounds (VOCs) via EPA Method 8260, CP-51 List semi-volatile organic compounds (SVOCs) via EPA Method 8270, and target analyte list (TAL) metals via EPA Method 6010. Excavation areas will be backfilled with clean fill as described in Section 5.0.

Figure 5 shows the location of the USTs. Figure 6 shows the post-excavation endpoint sampling plan.

4.5 Backfill and Capping

Excavated areas will be backfilled with clean fill, as necessary, in accordance with protocols described in Section 5.7. The UST areas will be capped with concrete upon backfilling to restore the concrete slab.

4.4 Waste Characterization Sampling

Excavated soils will be sampled in accordance with the procedures described in Section 5.3 to meet the waste acceptance criteria of the disposal facility. Impacted soil to be removed from the site will be loaded into roll-off containers and/or dump trucks provided by a licensed waste transport company. Loading will be performed with a back-hoe, excavator, or equivalent.

4.6 Mitigation System

Chlorinated vapors detected in the sub-slab vapor samples will be mitigated through installation of an active sub-slab depressurization system (SSDS) at the Site and the east adjacent office building. Since traditional SSDS requiring installation of trenches across the existing building slab is not feasible, a suction pit system will be installed at the existing buildings. Suction pits will be constructed by excavating 2 feet by 2 feet by 2 foot deep at various locations across the buildings, as indicated in Figures 7 and 8 attached.

Each building will have its own independent SSD system. The constructed pits will be backfilled with virgin-mined, round-edge ¾" blue stone, and protected with a 20-mil vapor barrier prior to slab repair. The installation will be subject to a controlled inspection by the Remedial Engineer or QEP. The inspection will be documented.

Each pit will connect the suction pipe to a solid-wall 4" conveying pipe which will rise up through the slab against the side of the buildings. These risers will be manifolded into a 6" collector pipe, at any height on the interior side of the building, and sent to the rear of the building, from where they will rise up through the roof and connect to a RadonAway fan model RP265. An alarm will be installed at the riser to ensure an alarm condition is sounded when vacuum is lost due to fan malfunction. Total of four monitoring (vacuum) points will be installed at 262 Van Brunt Street and a total of two monitoring points will be installed at 260 Van Brunt Street. Vapor monitoring points will consist of stainless-steel Vapor Pins. These vapor monitoring ports will serve as combined pressure testing port and vapor sampling ports.

As designed, the building at 262 Van Brunt Street will have two independent loops, and a total of 10 pits, the building at 260 Van Brunt Street will have 1 loop and 5 pits.

Design Criteria:

A 27' influence radius was assumed. Prior to installation, a conductivity test will be conducted to establish subslab communications by drilling four openings in the slab, at a distance of 0', 10', 20', and 30'. From the most remove, vacuum will be applied with a suction fan, and vacuum will be read at each one of the openings to assess conductivity. When conductivity is proven at 27', then the installation will proceed. A vacuum of 0.02" W.C. at the most remote point will prove that the system is protective to the health of its occupants. A start-up test will be conducted with one pit once the system is installed.

All SSDS pits will be sampled for TCL VOCs via EPA Method 8260 and TCL SVOCs via EPA Method 8270, and TAL metals via EPA Method 6010 prior to installation of SSDS components. Any soils exceeding Part 375 Restricted Commercial Use SCOs will be over excavated until there is no exceedance remains and will be disposed of off-site properly.

Figure 7 shows the active sub-slab depressurization system design and sampling locations.

Appendix A provides SSDS specifications and cut sheets.

5.0 SOILS/MATERIAL MANAGEMENT PLAN (SMMP)

5.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be conducted during invasive work related to remedial activities under the supervision of the RE. Soil Screening will be performed during all excavations into known or potentially contaminated material regardless of when the invasive work is done.

5.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil. Stockpiles will be used only when necessary and will be removed as soon as practicable. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced. All stockpile activities will be compliant with applicable laws and regulations.

5.3 Characterization of Excavated Materials

Soil/fill or other excavated media that will be transported off-site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Waste characterization sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported to the NYSDEC in the CCR.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material (municipal solid waste per 6NYCRR Part 360-1.2) and will be disposed in accordance with applicable laws and regulations. Historic fill and material that does not meet the lower of the NYSDEC 6 NYCRR Part 375-6.8(b) Restricted-Residential Use and Protection of Groundwater soil cleanup objectives (SCOs) is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility). Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility). A manifest system for off-Site transportation of exported materials will be employed and disposal facilities will be reported to the NYSDEC when they are identified and prior to the off-site transportation.

5.4 Materials Excavation, Load-Out and Departure

The PE/QEP overseeing the work will:

- oversee work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary, before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

Locations where vehicles exit the Site shall be inspected daily for evidence of soil tracking off premises. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

5.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 New York Codes, Rules and Regulations NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation. Material transported by trucks exiting the Site will be secured with tight-fitting covers. If loads contain wet material capable of producing free liquid, truck liners will be used.

5.6 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives for on-Site reuse are listed in NYSDEC 6 NYCRR Part 375-6.8 Unrestricted Use or Restricted Residential. "Reuse on-Site" means material that is excavated during the remedy, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to Engineering Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this SMMP are followed.

5.7 Import of Backfill Soil from Off-Site Sources

The imported backfill and cover soil quality objectives are NYSDEC 6 NYCRR Part 375-6.8 Unrestricted Use.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYSDEC.

All materials received for import to the Site will be approved by RE and will be in compliance with applicable City, State and Federal laws and requirements. The source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed will be reported in the CCR.

Source Screening and Testing

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be reported to the NYSDEC in the CCR. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete.

5.8 Contingency Plan

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to the NYSDEC Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found during on-Site development-related excavation, sampling will be performed on contaminated source material and surrounding soils.

5.9 Odor, Dust and Nuisance Control

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

This odor control plan is capable of controlling emissions of nuisance odors. 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.

Dust management during invasive on-Site work will include, at a minimum:

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated.

6.0 QUALITY ASSURANCE PROJECT PLAN

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers, and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or cold-pak(s) to maintain a temperature of 4^{o}C.

Dedicated disposable sampling materials will be used for soil samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected.

Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil;
- Rinse with tap water;
- Wash with alconox® detergent solution and scrub ;
- Rinse with tap water;
- Rinse with distilled or deionized water.

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will accompany samples each time they are transported to the laboratory. Duplicate soil and groundwater samples will be collected at the rate of one per 20 samples (or 1 per day) submitted to the laboratory. Matrix spike and matrix spike duplicates (MS/MSD) will be collected at the rate of one per 20 samples submitted to the laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability report (DUSR). The DUSR will be applicable to all samples collected during the IRM. Performance monitoring samples will be in a results-only format. The QAPP prepared for the Site is provided in Attachment B.

6.1 Reporting of Results

Sample analysis will be provided by a New York State certified environmental laboratory. Laboratory reports will include ASP category B deliverables for use in the preparation of a data usability summary report (DUSR). All results will be provided in accordance with the NYSDEC Environmental Information Management System (EIMS) electronic data deliverable (EDD) format (EQuIS).

6.2 DUSR

A Data Usability Summary Report (DUSR) will be prepared by an independent, third part data validator. The primary objective of a DUSR is to determine whether the data, as presented, meets the site/project specific criteria for data quality and data use. Verification and/or performance monitoring samples collected under this IRMWP will be reviewed and evaluated in accordance with the Guidance for the Development of Data Usability Summary Reports as presented in Appendix 2B of DER-10. The completed DUSR for verification/performance samples collected during implementation of this IRMWP will be included in the Construction Completion Report (CRR).

7.0 HEALTH AND SAFETY PLAN

A site-specific Health and Safety Plan (HASP) is prepared for this project. All field personnel involved in investigation and remedial 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. An emergency contact sheet is included in the site-specific HASP.

All investigative and remedial work performed under this IRMWP will comply with all applicable health and safety laws and regulations, including OSHA worker safety requirements and HAZWOPER requirements. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed.

A copy of the site-specific Health and Safety Plan is provided as Appendix C.

8.0 COMMUNITY AIR MONITORING PLAN (CAMP)

Community air monitoring will be performed during the implementation of this IRMWP as required by the DER-10 (Appendix 1A, NYSDOH, Generic CAMP). Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels will be performed during intrusive activities such as soil boring and monitoring well installation. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media.

Periodic monitoring for VOCs will be performed during non-intrusive activities such as collection of endpoint soil samples. Depending upon the proximity of potentially exposed individuals, continuous monitoring may be performed during sampling activities.

A detailed Community Air Monitoring Plan is provided as Appendix D.

9.0 REPORTING

9.1 Daily Report

Daily reports providing a general summary of activities for each day of work will be submitted to the NYSDEC Project Manager by the end of the following business day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP results noting all excursions. CAMP data may be reported;
- Photograph of notable Site conditions and activities.

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

9.2 Construction Completion Report

A Construction Completion Report (CCR) describing interim remedial activities will be prepared and submitted to the NYSDEC 90 days after completion of remedial actions described in this work plan. The CRR will include specific UST removal and disposal information, soil disposal volumes, and manifests, backfill quantity and sources, post-excavation endpoint sampling results, site restoration details, results of CAMP, and as-built drawings of the SSDS.

10.0 SCHEDULE

Appendix E provides a schedule for the proposed IRMWP activities and reporting. If the schedule for IRM activities changes, it will be updated and submitted to NYSDEC.

Notification

The NYSDEC will be notified at least ten days prior to the start of field work. A pre-construction meeting will be coordinated between the RE, the contractor, and the NYSDEC. This meeting must take place prior to the implementation of this IRMWP.

FIGURES

vEKtor consultants

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f: +1.347.402.7735
e: info@vektorconsultants.com
www.vektorconsultants.com

Legend:

Site Boundary

Notes:

1. Base Map provided by Google Earth

Scale:

0 200' 400'

Figure No.	1
Figure Name:	Site Location Map
Report:	IRMWP
Date:	6/20/2022
Drawn By:	EK
Site Address:	260-262 Van Brunt Street Brooklyn, New York

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Legend:

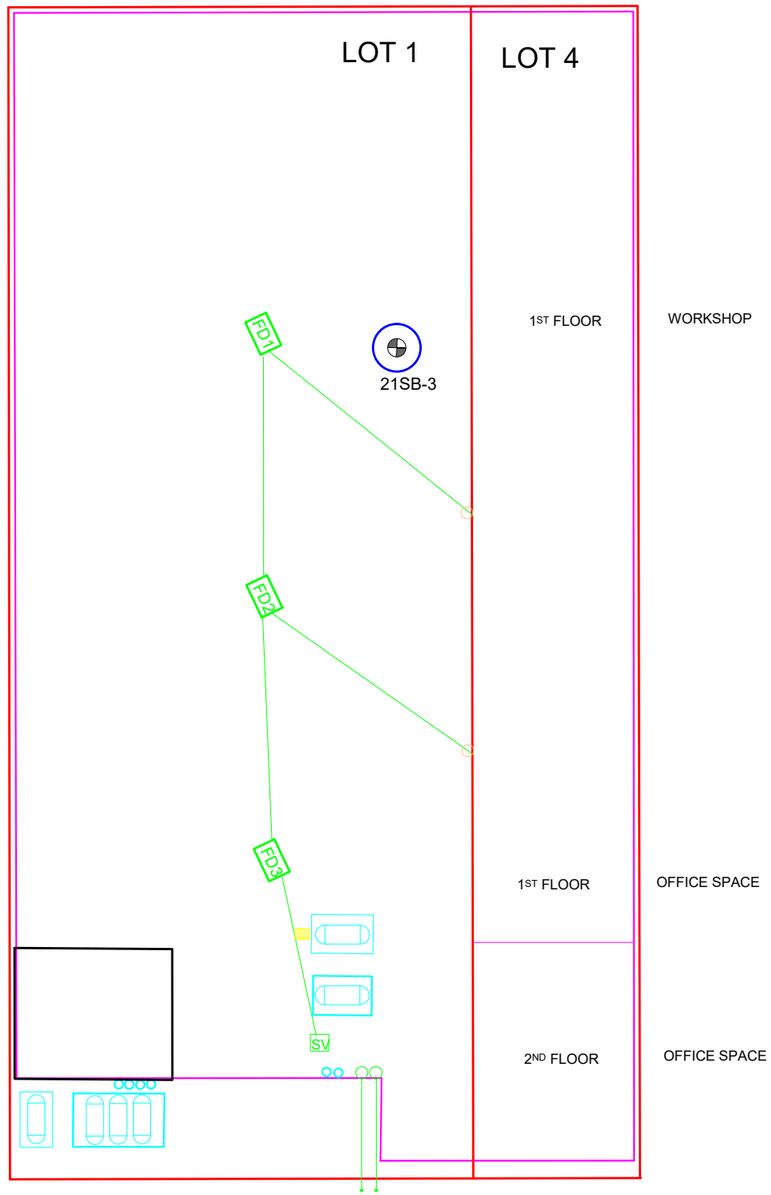
- One and Two Family Buildings
- Multi-Family Walk-Up Buildings
- Multi-Family Elevator Buildings
- Mixed Residential and Commercial Buildings
- Commercial and Office Buildings
- Industrial and Manufacturing
- Transportation and Utility
- Public Facilities and Institutions
- Open Space and Outdoor Recreation
- Parking Facilities
- Vacant Land
- Other
- Mandatory Inclusionary Housing Areas
- Site Boundary

Base map provided by NYC Planning

Scale: 0 100' 200'

Figure No.	2
Figure Name:	Surrounding Use
Report:	Remedial Investigation Report
Date:	2/9/2021
Drawn By:	EK
Site Address:	260-262 Van Brunt Street Brooklyn, New York

IMLAY STREET



VAN BRUNT STREET

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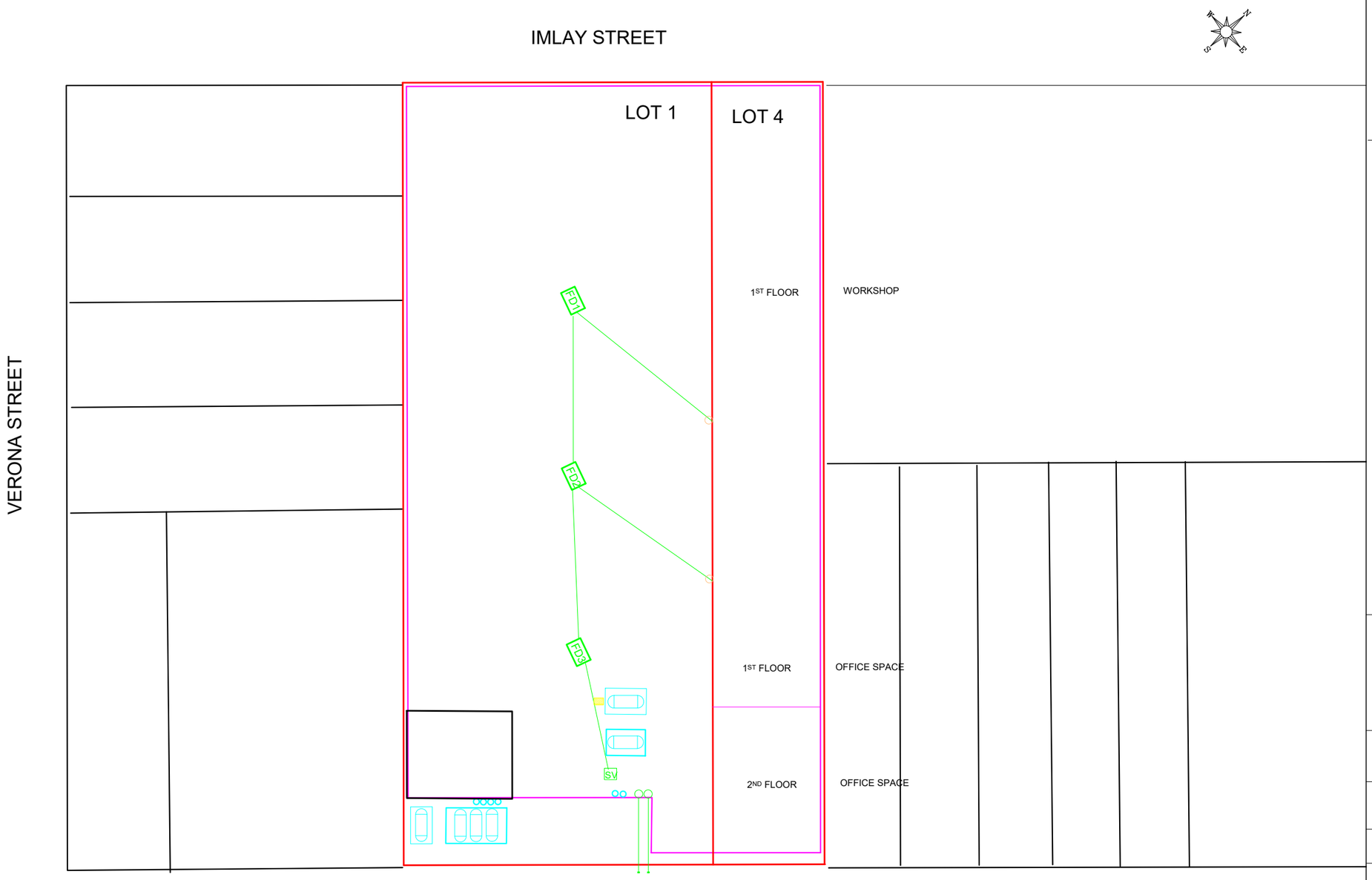
Legend:

- Site Boundary
- Building Boundary
- FD — Floor Drain Location and ID
- SV — Sewer Vent Pit
- Roof Drain
- 550-Gallon Underground Storage Tanks (USTs)
- UST Vent Pipes
- Suspect Former Oil/Water Separator
- 21SB-3 — PAH Hotspot in Shallow Soil
- Approximate Hotspot Removal Area

Scale: 0 — 25' — 50'

Figure No.	3
Figure Name:	Hotspot Excavation Area
Report:	IRMWP
Date:	5/20/2022
Drawn By:	EK
Site Address:	260-262 Van Brunt Street Brooklyn, New York



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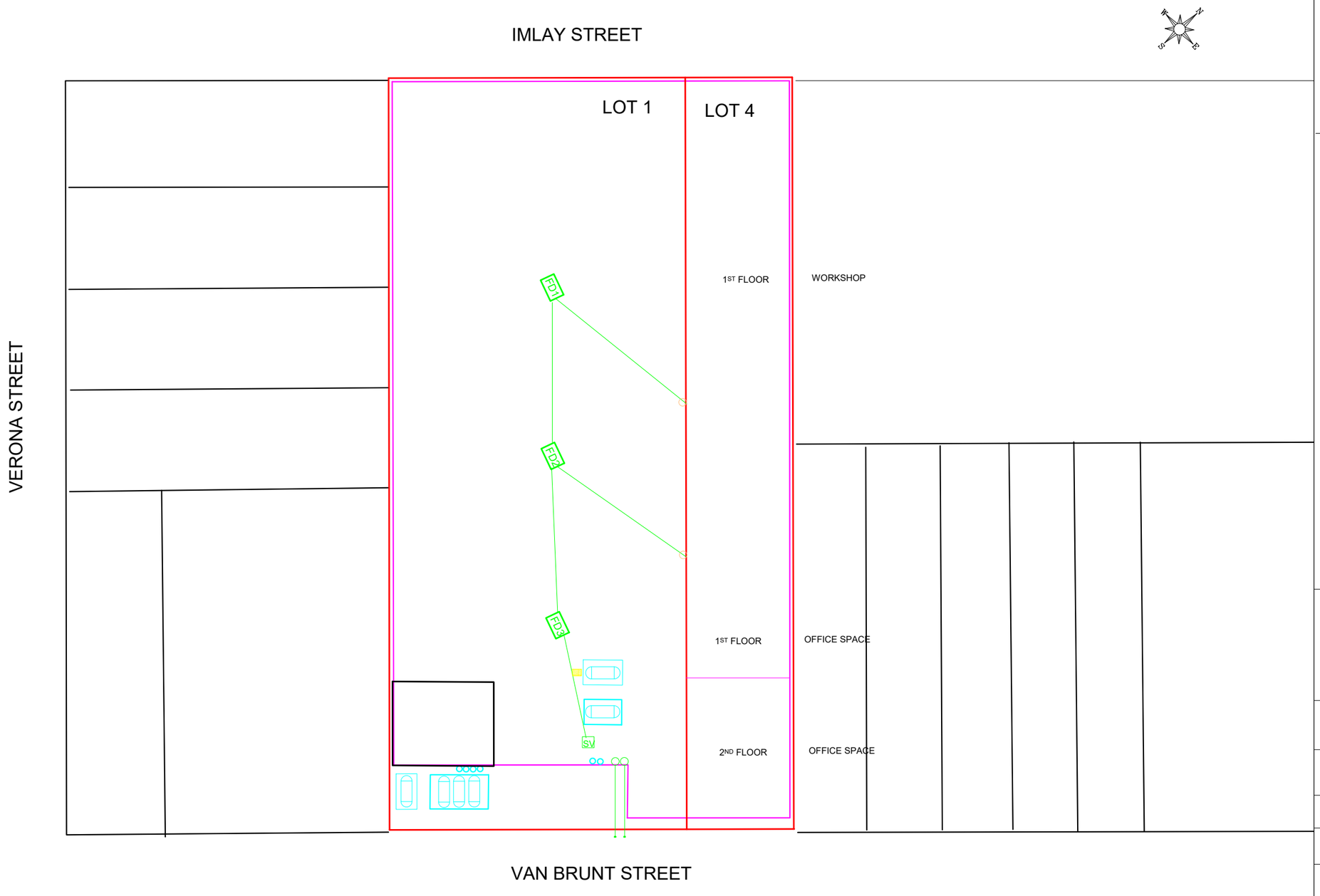
Legend:

- Site Boundary
- FD — Floor Drain Location and ID
- SV — Sewer Vent Pit
- Roof Drain
- 550-Gallon Underground Storage Tanks (USTs)
- UST Vent Pipes
- Suspect Former Oil/Water Separator

Notes: 1. All floor drain and pits to be cleaned out

Scale: 0 — 25' — 50'

Figure No.	4
Figure Name:	Floor Drain Locations
Report:	IRMWP
Date:	5/20/2022
Drawn By:	EK
Site Address:	260-262 Van Brunt Street Brooklyn, New York



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Legend:

- Site Boundary
- FD — Floor Drain Location and ID
- SV — Sewer Vent Pit
- Roof Drain
- 550-Gallon Underground Storage Tanks (USTs)
- UST Vent Pipes
- Suspect Former Oil/Water Separator

Notes:

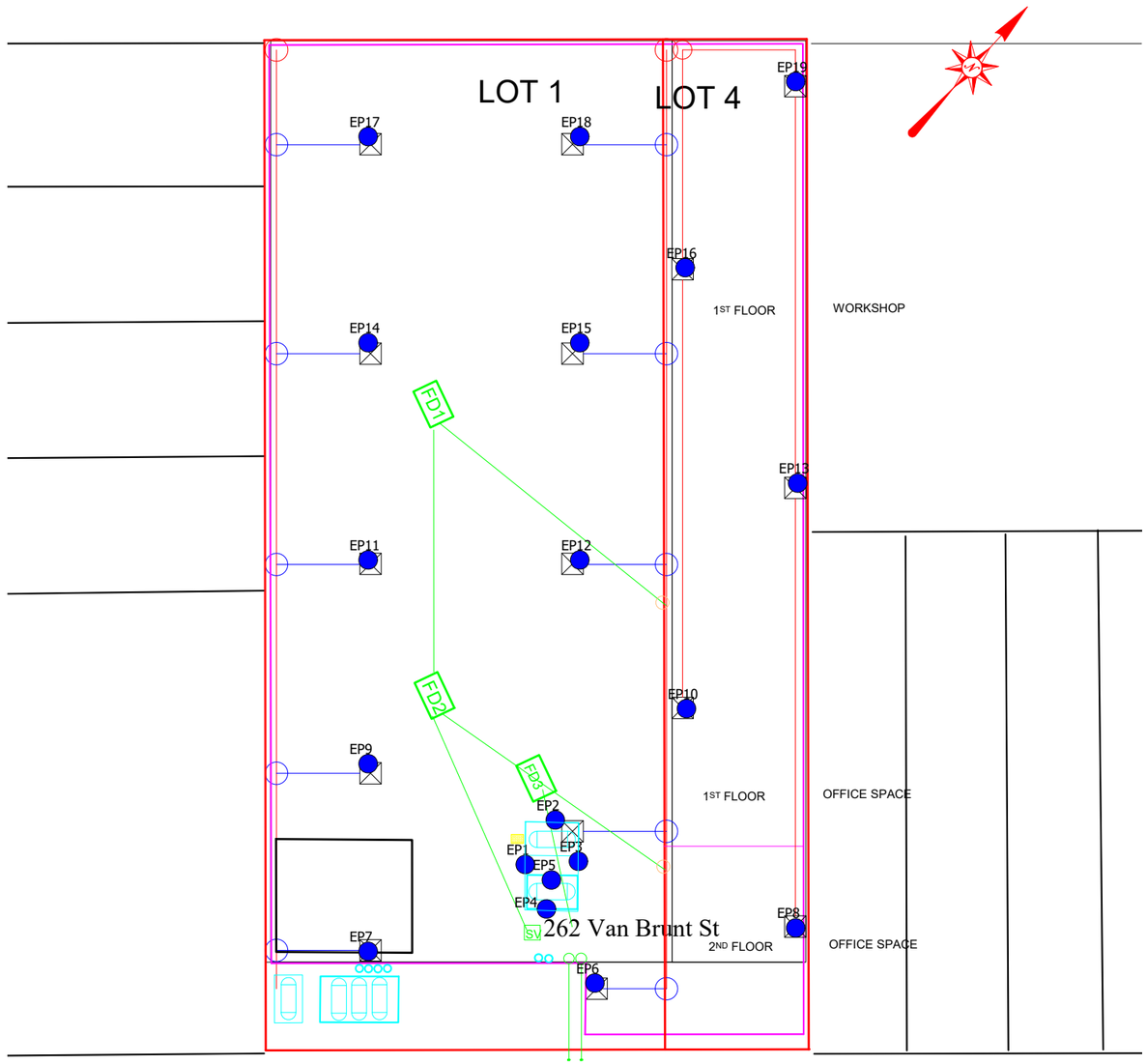
1. Two USTs inside the building footprint will be removed
2. Four USTs outside the building footprint will be exposed, and abandoned in place

Scale: 0 — 25' — 50'

Figure No.	5
Figure Name:	Underground Storage Tanks
Report:	IRMWP
Date:	5/20/2022
Drawn By:	EK
Site Address:	260-262 Van Brunt Street Brooklyn, New York

Imlay Street

IMLAY STREET



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Legend:

- Site Boundary
- FD — Floor Drain Location and ID
- SV — Sewer Vent Pit
- Roof Drain
- 550-Gallon Underground Storage Tanks (USTs)
- UST Vent Pipes
- Suspect Former Oil/Water Separator
- EP — End Point Sampling

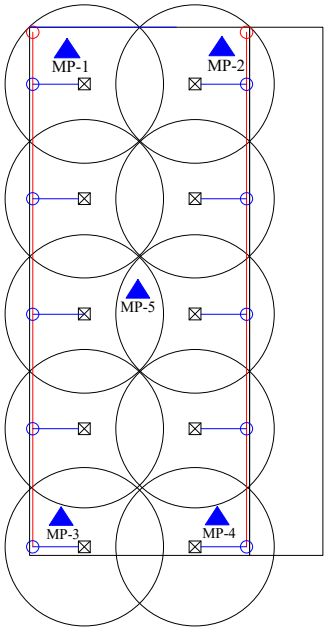
Notes:

1. Two USTs inside the building footprint will be removed
2. Four USTs outside the building footprint will be exposed, and abandoned in place

Scale: 0 — 25' — 50'

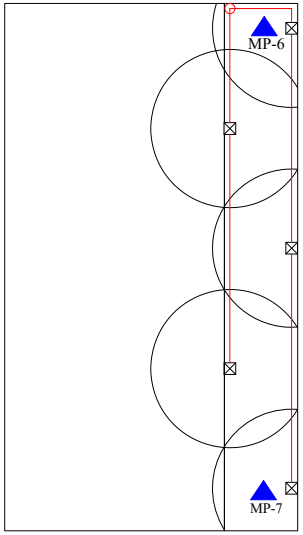
Figure No.	6
Figure Name:	END POINT SAMPLING
Report:	IRMWP
Date:	5/20/2022
Drawn By:	EK
Site Address:	260-262 Van Brunt Street Brooklyn, New York

Imlay Street

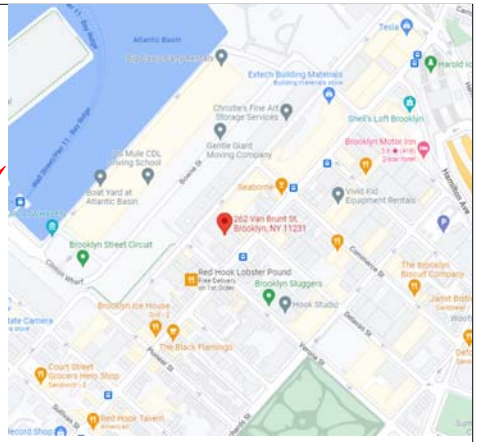


262 Van Brunt St

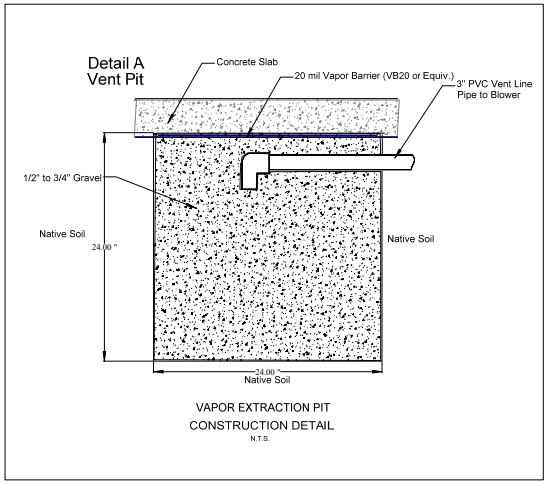
Imlay Street



260 Van Brunt St



Van Brunt Street



Van Brunt Street

LEGEND

- Riser through roof
- Riser through slab
- Above-slab solid pipe
- Subslab solid pipe
- Monitoring Point (Vacuum Point)

AMC ENGINEERING PLLC
18-36 42ND STREET
ASTORIA, NY 11105
(718) 545-0474

PROJECT

260-262 Van Brunt LLC
260 Van Brunt Street
Brooklyn, NY 11209

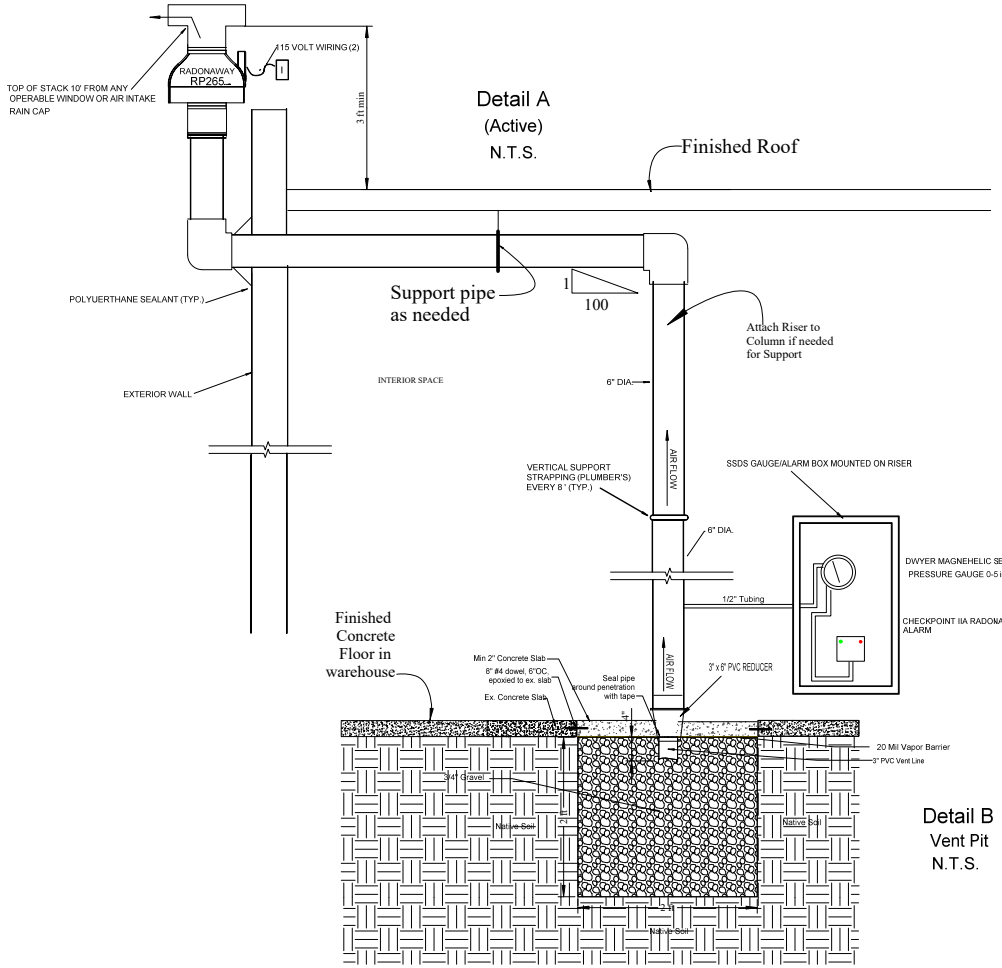
TITLE:

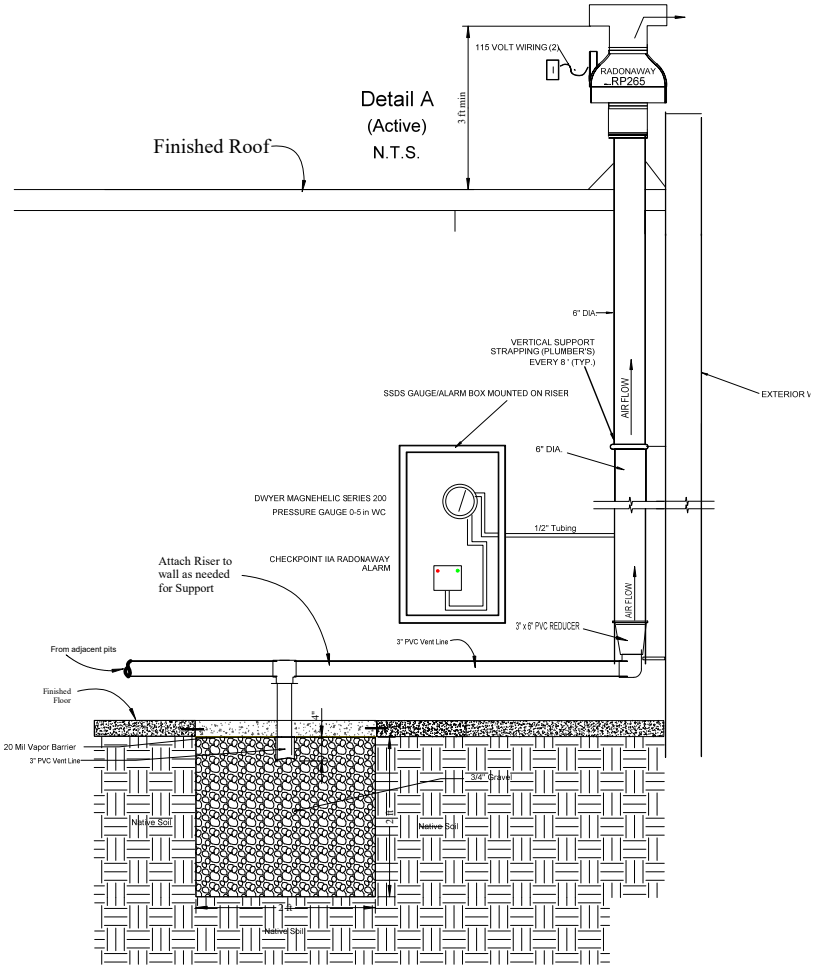
FIGURE 7 - SSDS

SEAL & SIGNATURE:

DATE: JUL 6, 2022
PROJECT No:
DRAWING BY: AC
CHK BY:

CADD FILE No:





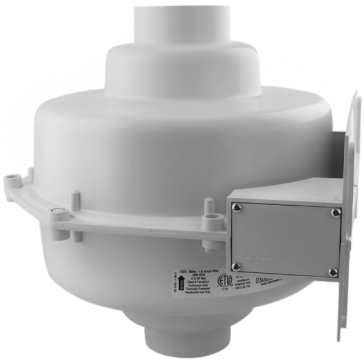
AMC Engineering, PLLC 18-36 42nd Street Astoria, NY 11105	*Figure No.* **8** 6/8/22	Site Name:	260-262 Van Brunt LLC
		Site Address:	260-262 Van Brunt Street, Brooklyn
		Drawing Title:	SSDS Detail

APPENDICES

APPENDIX A SUBSLAB DEPRESSURIZATION SYSTEM SPECIFICATIONS

RadonAway®

The world's leading radon fan manufacturer



RP, GP, XP Pro Series Installation Instructions

DO NOT CONNECT POWER SUPPLY UNTIL FAN IS COMPLETELY INSTALLED. MAKE SURE ELECTRICAL SERVICE TO FAN IS LOCKED IN "OFF" POSITION. DISCONNECT POWER BEFORE SERVICING FAN.

1. **WARNING!** For General Ventilating Use Only. Do Not Use to Exhaust Hazardous, Corrosive or Explosive Materials, Gases or Vapors. See Vapor Intrusion Application Note #AN001 for important information on VI Applications. RadonAway.com/vapor-intrusion

2. **NOTE:** Fan is suitable for use with solid state speed controls; however, use of speed controls is not generally recommended.

2. **WARNING!** Check voltage at the fan to insure it corresponds with nameplate.

3. **WARNING!** Normal operation of this device may affect the combustion airflow needed for safe operation of fuel burning equipment. Check for possible backdraft conditions on all combustion devices after installation.

4. **NOTICE!** There are no user serviceable parts located inside the fan unit.
   Do NOT attempt to open. Return unit to the factory. (See Warranty, p. 8, for details.)

5. **WARNING!** Do not leave fan unit installed on system piping without electrical power for more than 48 hours. Fan failure could result from this non-operational storage.

6. **WARNING!** TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

   a) Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer. (See p. 8.)

   b) Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.

   c) Installation work and electrical wiring must be done by qualified person(s) in accordance with all applicable codes and standards, including fire rated construction.

   d) Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturers' guidelines and safety standards such as those published by any National Fire Protection Association, and the American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), and the local code authorities.

   e) When cutting or drilling into a wall or ceiling, do not damage electrical wiring and other hidden utilities.

   f) Ducted fans must always be vented to outdoors.

   g) If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) protected branch circuit.

1.0 SYSTEM DESIGN CONSIDERATIONS

1.1 INTRODUCTION

The RP, GP and XP Series Radon Fans are intended for use by trained, professional, certified/licensed radon mitigators. The purpose of these instructions is to provide additional guidance for the most effective use of RP, GP and XP Series Fans. These instructions should be considered supplemental to EPA/radon industry standard practices, state and local building codes and regulations. In the event of a conflict, those codes, practices and regulations take precedence over these instructions.

1.2 FAN SEALING

The RP, GP and XP Series Fans are factory sealed; no additional caulk or other materials are required to inhibit air leakage.

1.3 ENVIRONMENTALS

The RP, GP and XP Series Fans are designed to perform year-round in all but the harshest climates without additional concern for temperature or weather. For installations in an area of severe cold weather, please contact RadonAway for assistance. When not in operation, the fan should be stored in an area where the temperature is never less than 32 degrees F or more than 100 degrees F.

1.4 ACOUSTICS

The RP, GP and XP Series Fans, when installed properly, operate with little or no noticeable noise to the building occupants. The velocity of the outgoing air should be considered in the overall system design. In some cases the "rushing" sound of the outlet air may be disturbing. In these instances, the use of a RadonAway Exhaust Muffler is recommended.

(To ensure quiet operation of inline and remote fans, each fan shall be installed using sound attenuation techniques appropriate for the installation. For bathroom and general ventilation applications, at least 8 feet of insulated flexible duct shall be installed between the exhaust or supply grille(s) and the fan(s). RP, GP and XP Series Fans are not suitable for kitchen range hood remote ventilation applications.)

1.5 GROUND WATER

In the event that a temporary high water table results in water at or above slab level, water may be drawn into the riser pipes, thus blocking air flow to the RP, GP and XP Series Fan. The lack of cooling air may result in the fan cycling on and off as the internal temperature rises above the thermal cutoff. Should this condition arise, it is recommended that the fan be turned off until the water recedes, allowing for return to normal operation.

1.6 SLAB COVERAGE

The RP, GP and XP Series Fans can provide coverage up to 2000+ sq. ft. per slab penetration. This will primarily depend on the sub-slab material in any particular installation. In general, the tighter the material, the smaller the area covered per penetration. Appropriate selection of the RP, GP and XP Series Fan best suited for the sub-slab material can improve the slab coverage. The RP, GP and XP Series have a wide range of models to choose from to cover a wide range of sub-slab materials. The RP140 and 145 are best suited for general purpose use. The RP 260 can be used where additional airflow is required, and the RP265 and RP 380 are best suited for large slab, high airflow applications. Additional suction points can be added as required. It is recommended that a small pit (5 to 10 gallons in size) be created below the slab at each suction hole.

1.7 CONDENSATION & DRAINAGE

Condensation is formed in the piping of a mitigation system when the air in the piping is chilled below its dew point. This can occur at points where the system piping goes through unheated space such as an attic, garage or outside. The system design must provide a means for water to drain back to a slab hole to remove the condensation. The RP, GP and XP Series Fan MUST be mounted vertically plumb and level, with the outlet pointing up for proper drainage through the fan. Avoid mounting the fan in any orientation that will allow water to accumulate inside the fan housing. The RP, GP and XP Series Fans are NOT suitable for underground burial.

For RP, GP and XP Series Fan piping, the following table provides the minimum recommended pipe diameter and pitch under several system conditions.

Pipe Diameter	Minimum Rise per Ft of Run*		
	@25 CFM	@50 CFM	@100 CFM
4”	1/8”	1/4”	3/8”
3”	1/4”	3/8”	1 1/2”

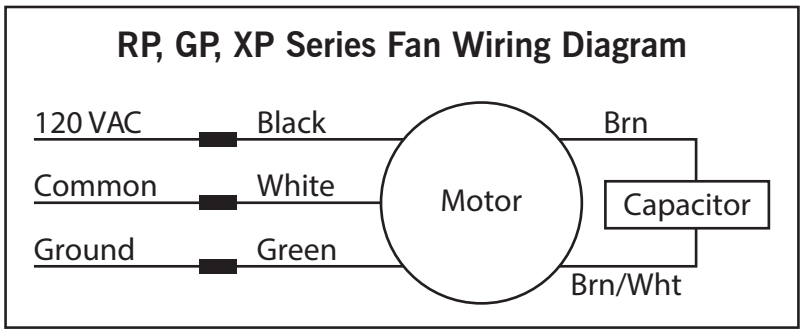
See p. 7 for detailed specifications.

1.8 SYSTEM MONITOR & LABEL

A System Monitor, such as a manometer (P/N 50017) or audible alarm (P/N 28001-2, 28001-4 or 28421), is required to notify the occupants of a fan system malfunction. A System Label (provided with Manometer P/N 50017) with instructions for contacting the installing contractor for service and identifying the necessity for regular radon tests to be conducted by the building occupants must be conspicuously placed in a location where the occupants frequent and can see the label.

1.9 ELECTRICAL WIRING

The RP, GP and XP Series Fans operate on standard 120V, 60Hz AC. All wiring must be performed in accordance with National Fire Protection (NFPA) National Electrical Code, Standard #70, current edition, for all commercial and industrial work, and state and local building codes. All wiring must be performed by a qualified and licensed electrician. Outdoor installations require the use of a UL Listed watertight conduit. Ensure that all exterior electrical boxes are outdoor rated and properly sealed to prevent water penetration into the box. A means, such as a weep hole, is recommended to drain the box.



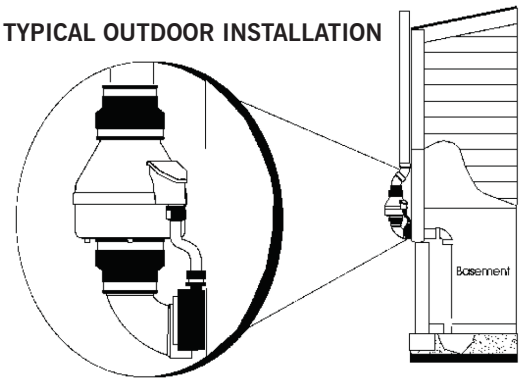
1.10 SPEED CONTROLS

The RP, GP and XP Series Fans are rated for use with electronic speed controls; however, speed controls are generally not recommended. If used, the recommended speed control is Pass & Seymour Solid State Speed Control (Cat. No. 94601-1).

2.0 INSTALLATION

The RP, GP and XP Series Fans can be mounted indoors or outdoors. (It is suggested that EPA and radon mitigation standards recommendations be followed in choosing the fan location.) The GP fans have an integrated mounting bracket; RP and XP Series Fans may be mounted directly on the system piping or fastened to a supporting structure by means of an optional mounting bracket.
The ducting from the fan to the outside of the building has a strong effect on noise and fan energy use. Use the shortest, straightest duct routing possible for best performance, and avoid installing the fan with smaller ducts than recommended. Insulation around the ducts can reduce energy loss and inhibit mold growth. Fans installed with existing ducts may not achieve their rated airflow.

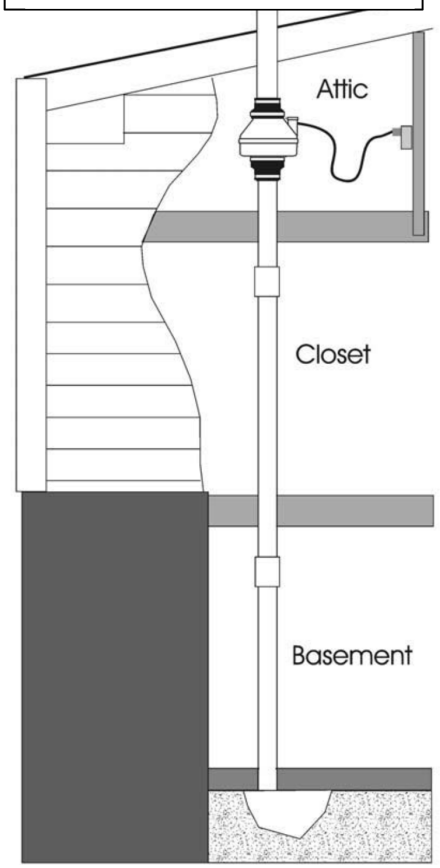
TYPICAL OUTDOOR INSTALLATION



2.1 MOUNTING

Mount the RP, GP and XP Series Fan vertically with outlet up. Insure the unit is plumb and level. When mounting directly on the system piping assure that the fan does not contact any building surface to avoid vibration noise.

TYPICAL INDOOR INSTALLATION



2.2 MOUNTING BRACKET (optional)

The RP and XP Series Fans may be optionally secured with the RadonAway P/N 25007 mounting bracket. Foam or rubber grommets may also be used between the bracket and mounting surface for vibration isolation.

2.3 SYSTEM PIPING

Complete piping run, using flexible couplings as a means of disconnect for servicing the unit and for vibration isolation. As the fan is typically outside of the building thermal boundary and is venting to the outside, installation of insulation around the fan is not required.

2.4 ELECTRICAL CONNECTION

Connect wiring with wire nuts provided, observing proper connections (See Section 1.9). Note that the fan is not intended for connection to rigid metal conduit.

2.5 VENT MUFFLER (optional)

Install the muffler assembly in the selected location in the outlet ducting. Solvent weld all connections. The muffler is normally installed at the end of the vent pipe.

2.6 OPERATION CHECKS & ANNUAL SYSTEM MAINTENANCE

_____ **Verify** all connections are tight and **leak-free**.

_____ **Ensure** the RP, GP and XP Series Fan and all ducting are **secure and vibration-free**.

_____ **Verify system vacuum pressure** with manometer. **Insure** vacuum pressure is within normal operating range and **less than** the maximum recommended operating pressure.
(Based on sea-level operation, at higher altitudes reduce by about 4% per 1000 feet)
(Further reduce Maximum Operating Pressure by 10% for High Temperature environments.)
See Product Specifications. If this is exceeded, increase the number of suction points.

_____ **Verify Radon levels** by testing to EPA Protocol and applicable testing standards.

THE FOLLOWING CHARTS SHOW THE PERFORMANCE OF THE RP, GP and XP SERIES FANS

RP Series Product Specifications

Typical CFM Vs. Static Pressure "WC									
Model	**0"**	**.25"**	**.5"**	**.75"**	**1.0"**	**1.25"**	**1.5"**	**1.75"**	**2.0"**
RP140	135	103	70	14	-	-	-	-	
RP145	166	146	126	104	82	61	41	21	3
RP260	251	209	157	117	70	26	-	-	-
RP265	375	330	282	238	204	170	140	108	70
RP380	531	490	415	340	268	200	139	84	41

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
RP140	15 - 21 watts	0.7" WC
RP145	41 - 72 watts	1.7" WC
RP260	47-65 watts	1.3" WC
RP265	95 - 139 watts	2.3" WC
RP380	96 - 138 watts	2.0" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet	L.2
RP140	8.5"H x 9.7" Dia.	5.5 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)	25
RP145	8.5"H x 9.7" Dia.	5.5 lbs	4,5" OD	15
RP260	8.6"H x 11.75" Dia.	5.5 lbs	6.0" OD	48
RP265	8.6"H x 11.75" Dia.	6.5 lbs	6.0" OD	30
RP380	10.53"H x 13.41" Dia.	11.5 lbs	8.0" OD	57

L.2 = Estimated Equivalent Length of Rigid Metal Ducting resulting in .2" WC pressure loss for Duct Size listed. Longer Equivalent Lengths can be accommodated at Flows Lower than that at .2" WC pressure loss (see CFM Vs Static Pressure "WC Table).

XP Series Product Specifications

Typical CFM Vs. Static Pressure "WC						
	0"	**.5"**	**1.0"**	**1.5"**	**1.75"**	**2.0"**
XP151	150	115	69	-	-	-
XP201	112	95	70	40	-	-

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
XP151	45 - 60 watts	1.3" WC
XP201	45 - 66 watts	1.7" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet
XP151	9.5"H x 8.5" Dia.	6 lbs	4.5"OD (4.0" PVC Sched 40 size compatible)
XP201	9.5"H x 8.5" Dia.	6 lbs	4.5" OD

GP Series Product Specifications

Typical CFM Vs. Static Pressure "WC							
	1.0"	**1.5"**	**2.0"**	**2.5"**	**3.0"**	**3.5"**	**4.0"**
GP201	54	42	11	-	-	-	-
GP301	64	54	41	4	-	-	-
GP401	-	61	52	44	22	-	-
GP501	-	-	66	58	50	27	4

Model	Power Consumption 120VAC, 60Hz, 1.5 Amp Maximum	Maximum Recommended Operation Pressure* (Sea Level Operation)**
GP201	31-65 watts	1.8" WC
GP301	56-100 watts	2.3" WC
GP401	62-128 watts	3.0" WC
GP501	68 - 146 watts	3.8" WC

**Reduce by 10% for High Temperature Operation **Reduce by 4% per 1000 ft. of altitude.*

Model	Size	Weight	Inlet/Outlet
GP201	13"H x 12.5" Dia.	12 lbs	3.5"OD (3.0" PVC Sched 40 size compatible)
GP301	13"H x 12.5" Dia.	12 lbs	3.5" OD
GP401	13"H x 12.5" Dia.	12 lbs	3.5" OD
GP501	13"H x 12.5" Dia.	12 lbs	3.5" OD

RP, XP and GP Series Additional Specifications

Model	Recommended Duct	PVC Pipe Mounting	Thermal Cutout	Insulation Class
RP140	3" or 4" Schedule 20/40 PVC	Mount on the duct pipe or with optional mounting bracket. For Ventilation: 4", 6" or 8" Rigid or Flexible Ducting.	130°C/266°F	Class B Insulation
RP145			130°C/266°F	Class F Insulation
RP260			150°C/302°F	
RP265			150°C/302°F	
RP380	6" Schedule 20/40 PVC Pipe		150°C/302°F	
XP151	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
XP201				
GP201	3" or 4" Schedule 20/40 PVC	Fan may be mounted on the duct pipe or with integral flanges.	120°C/248°F	Class B Insulation
GP301				
GP401				
GP501				

Continuous Duty
3000 RPM
Thermally Protected
RP, GP Residential and Commercial
XP Residential Only
Rated for Indoor or Outdoor Use

LISTED
Electric Fan

Intertek
77728

Conforms to
UL STD. 507
Certified to
CAN/CSA STD.
C22.2 No.113

IMPORTANT INSTRUCTIONS TO INSTALLER

Inspect the RadonAway® RP, GP and XP Series Fan for shipping damage within 15 days of receipt. **Notify RadonAway of any damages immediately.** RadonAway is not responsible for damages incurred during shipping. However, for your benefit, RadonAway does insure shipments.

There are no user serviceable parts inside the fan. **Do not attempt to open the housing.** Return unit to factory. (See Warranty below).

Install the RP, GP and XP Series Fan in accordance with all EPA, ANSI/AARST standard practices, and state and local building codes and regulations.

Provide a copy of this instruction or comparable radon system and testing information to the building occupants after completing system installation.

Warranty

RadonAway® warrants that the RP, GP (excluding GP500) and XP Series Fan (the "Fan") will be free from defects in materials and workmanship for a period of 12 months from the date of purchase or 18 months from the date of manufacture, whichever is sooner (the "Warranty Term").

RadonAway® will replace any fan which fails due to defects in materials or workmanship during the Warranty Term. This Warranty is contingent on installation of the Fan in accordance with the instructions provided. This Warranty does not apply where any repairs or alterations have been made or attempted by others, or if the unit has been abused or misused. Warranty does not cover damage in shipment unless the damage is due to the negligence of RadonAway®.

The Fan must be returned (at Owner's cost) to the RadonAway® factory. Any Fan returned to the factory will be discarded unless the Owner provides specific instructions along with the Fan when it is returned regardless of whether or not the Fan is actually replaced under this warranty. Proof of purchase must be supplied upon request for service under this Warranty.

5-YEAR EXTENDED WARRANTY WITH PROFESSIONAL INSTALLATION.

RadonAway® will extend the Warranty Term of the fan to 60 months (5 years) from date of purchase or 66 months from date of manufacture, whichever is sooner, provided that the fan is installed by a professional radon mitigation contractor. Proof of purchase and/or proof of professional installation may be required for service under this warranty. No extended warranty is offered outside the Continental United States and Canada beyond the standard 12 months from the date of purchase or18 months from the date of manufacture, whichever is sooner.

RadonAway® is not responsible for installation, removal or delivery costs associated with this Warranty.

LIMITATION OF WARRANTY

EXCEPT AS STATED ABOVE, THE RP, GP (excluding GP500) and XP SERIES FANS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULARPURPOSE.

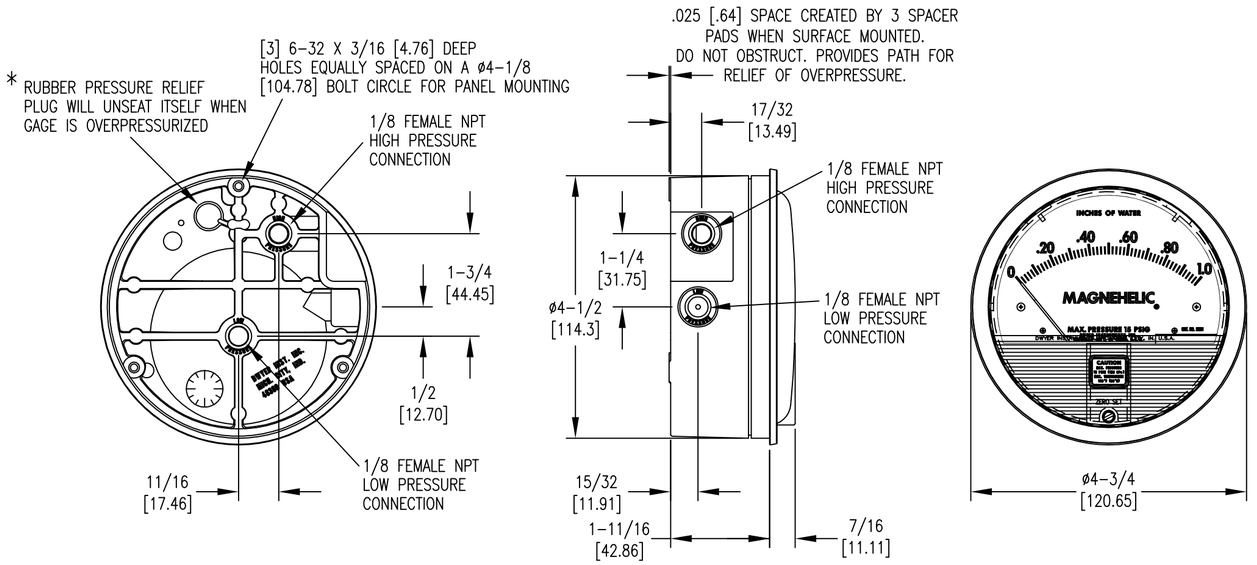
IN NO EVENT SHALL RADONAWAY BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR RELATING TO, THE FAN OR THE PERFORMANCE THEREOF. RADONAWAY'S AGGREGATE LIABILITY HEREUNDER SHALL NOT IN ANY EVENT EXCEED THE AMOUNT OF THE PURCHASE PRICE OF SAID PRODUCT. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE THE REPAIR OR REPLACEMENT OF THE PRODUCT, TO THE EXTENT THE SAME DOES NOT MEET WITH RADONAWAY'S WARRANTY AS PROVIDED ABOVE.

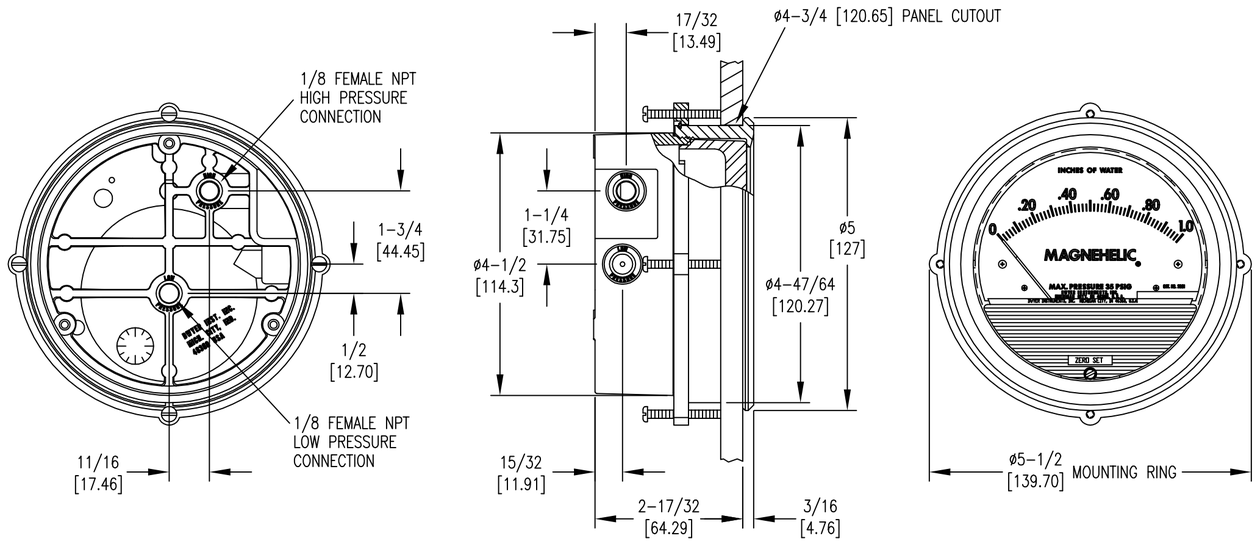
For service under this Warranty, contact RadonAway for a Return Material Authorization (RMA) number and shipping information. No returns can be accepted without an RMA. If factory return is required, the customer assumes all shipping costs, including insurance, to and from factory.

RadonAway® 3 Saber Way
Ward Hill, MA 01835 USA TEL (978) 521-3703
FAX (978) 521-3964
Email to: Returns@RadonAway.com

Record the following information for your records:

Serial Number: _____ Purchase Date: _____





CD = CRITICAL DIMENSION

STANDARD TOLERANCES UNLESS NOTED:
ALL DECIMAL DIMENSIONS ± .005
ALL ANGLES ± 1°

SCALE 1:2

NO.	CHANGES	BY/DATE

DATE
DWN BY
CHKD
APPD

NAME: 2000 MAGNEHELIC ARTWORK (FOR REFERENCE ONLY)

ACAD2002

MATERIAL

FINISH

DWYER INSTRUMENTS, INC.
MICHIGAN CITY, INDIANA 46360 U.S.A.

FR. NO. 12-700060-05

VaporPin®

Product Catalog 2018

ABOUT VAPOR PIN®

The Vapor Pin® a unique, patented, re-usable sampling device, has a variety of applications, including but not limited to: sub-slab soil-gas sampling, de-pressurization studies/ testing, stray gas evaluations, source area characterization, pilot testing and mitigation progress monitoring. The Vapor Pin® specifically, manufactured and marketed by Vapor Pin Enterprises, was designed to eliminate many of the problems associated with traditional sub-slab soil-gas sampling methods.

The patented design of the Vapor Pin® provides environmental professionals a means of collecting high-quality, low-cost soil-gas samples and pressure readings within minutes.

Plus, the Vapor Pin® is made in the USA.

*Protected under US Patent # 8,220,347 B2, US 9,291,531 B2 and other US and International Patents pending.

THE VAPOR PIN® ADVANTAGE

- Reduces damage to the slab
- Improves diagnostic testing
- Improves spatial resolution
- Connects easily to sampling equipment
- Is easily installed, sampled, and retrieved for reuse
- Eliminates the need for grout, increasing productivity
- Reduces sampling time, allowing collection of more samples for less cost, and improves the understanding of site conditions
- Unique patented design reduces the potential for leaks and improves sample quality

VAPOR PIN® KITS

Vapor Pin® Kits are the all-in-one solution to your gas sampling needs.

The Standard Kits come in 3 varieties* and Include:

- 10 VAPOR PINS®
- 20 VAPOR PIN® Sleeves
- 20 VAPOR PIN® Caps
- 10 Plastic Flush Mount Covers
- 1 Installation/Extraction Tool
- 1 Bottle Brush
- 1 Water Dam for leak testing
- Vapor Pin® SOPs
- Hard-sided carrying Case

STANDARD KITS

* Brass, Stainless Steel, or FLX-VP Stainless Steel

CONTRACTOR KITS

* Brass, Stainless Steel, FLX-VP, or FLX-VP with Quick Connect

The Contractor Kits come in 4 varieties* and Include:

- 10 VAPOR PINS®
- 20 VAPOR PIN® Sleeves
- 20 VAPOR PIN® Caps
- 10 Stainless Steel Secure Covers
- 1 Spanner Screwdriver
- 1 Stainless Steel Drilling Guide
- 1 Installation/Extraction Tool
- 1 Bottle Brush
- 1 Water Dam for leak testing
- Vapor Pin® SOPs
- Hard-sided carrying Case

Single Point Installation

Not all Projects call for multiple installation points, sometimes you only need one. In this case the essentials will get the job done.

At a minimum you will need:

- 1 VAPOR PIN®
- 1 installation/ Extraction tool
- 1 Bag of sleeves
- 1 Bag of white protective caps

Additionally, if you want a finished look, or if you are in an area with some foot traffic, you may want the optional plastic or stainless steel secure covers. The Stainless Steel Drilling Guide and Stainless Steel Secure Covers are recommended for flush mount installations in high traffic areas.

Individual Products

When you need an “a la carte” product we’ve got you covered. Order individual parts and pieces for your projects as you see fit. Placing an order is easy. The website works like Amazon, place items in your cart and checkout online at https://www.vaporpin.com/. If you have any questions, please contact us at 614-504-6915.

FLX-VPSS

The FLX-VPSS provides additional connectivity for the collection of soil-gas samples and subslab pressure readings. In addition to the barbed fitting that comes with the FLX-VPSS, the FLX-VPSS allows you to connect to sampling equipment though the use of Swagelok® fittings or Quick Connects. With the FLX-VPSS you can directly connect to TO-17 tubes connected to a Swagelok® fitting or to Bottle-VacsTM equipped with Quick Connects. Available in stainless steel only.

Stainless Steel Vapor Pin®

The barb at the top of the Vapor Pin® connects to ¼-inch OD sample tubing (typically Nylon or Teflon®) with softer tubing, preferably Tygon®. Because stainless steel is more durable than brass and more corrosion resistant, we recommend stainless steel for long-term installations and in corrosive environments.

Brass Vapor Pin®

Brass Vapor Pins® are less durable than stainless steel, but they can be reused repeatedly with proper care. We recommend brass Vapor Pins® for short-term installations, especially those installed in the stick-up configuration.

Mini Pin

The Mini Pin is ideal for use in buildings with thin slabs (as thin as 2 inches). Additionally, the Mini Pin is installed in the flush-mount position after drilling only a 5/8-inch hole. Mini Pins are supplied with Secure Covers, which act as a seal. While Mini Pins are designed for permanent installation and cannot be removed and reused, they are constructed of anodized aluminum, making them very economical.

FLX-VPBarb

The FLX-VPSS comes with a removable ¼-inch barb fitting, but the barb can be replaced, should it become lost or damaged. Available in stainless steel only.

MQT-SVPS Quick Connect

The optional Quick Connect attaches to the top of the FLX-VPPS, and connects directly to some sample containers, including Entech's glass Bottle-Vacs™. Quick Connect fittings provide the fastest way to connect to sample containers or field instruments, and they minimize the loss of soil gas to indoor air. Available in stainless steel only. Contact your analytical lab to make sure they provide compatible connections between the pin and the container.

Swagelok® and Ferrules

The optional Swagelok® fitting replaces the barb on top of the FLX-VPSS, should you desire to connect ¼-inch OD nylon or Teflon® tubing directly to the Vapor Pin®. The Swagelok® fitting also connects directly to most TO-17 sorbent tubes. Dedicated Swagelok® ferrules (not shown) are used to make connections, and are discarded whenever sample tubing is replaced. These are the same ferrules used for connecting ¼-inch OD sample tubing to most Summa-type canisters. Available in stainless steel only.

Vapor Pin® Filters

Vapor Pin® Filters screw into the bottom of Vapor Pins® to prevent particulates from entering the sample train. Due to the process used to manufacture them, Vapor Pin® Filters are available in brass only.

Vapor Pin® Barb Extension

With the Vapor Pin® Barb Extension screwed into to the bottom of the Vapor Pin®, sample tubing can be attached to extend deeper beneath the slab. The Barb Extension is the same diameter as the barb on top of the Vapor Pin®, and it accepts the same tubing. A Vapor Pin® Filter or Vapor Pin® Sieve can be attached to the bottom of the nylon tubing with Tygon® to prevent clogging the opening with soil.

Vapor Pin® 1.5" Extension

The Vapor Pin® 1.5" Extension is an alternative to the Barb Extension, and is screwed into the bottom of the Vapor Pin® to minimize contact between soil gas and the slab. Vapor Pin® Extensions can be connected end-to-end for collecting soil gas at various depths in increments of 1.5 inch. They can also be used with the Sealing Extension, described below.

Sealing Extension

Like the Vapor Pin® Barb Extension or the Vapor Pin® 1.5-inch Extension, the Sealing Extension is placed beneath the Vapor Pin®. The Sealing Extension is used to isolate the slab from the soil-gas environment to ensure that collected soil-gas samples are not affected by VOCs that may have saturated the slab. Depending on slab thickness, one or more Vapor Pin® 1.5" Extensions can be placed between the Vapor Pin® and the Sealing Extension to extend the assembly to the bottom of the slab. Available in stainless steel only.

Vapor Pin® Sieve

The Vapor Pin® Sieve can be attached to the bottom of a Vapor Pin®, a Barb Extension with tubing, or a Vapor Pin® 1.5" Extension to prevent soil from clogging the sample train.

Stainless Steel Drilling Guide

When installing Vapor Pins® in the flush-mount configuration, the Stainless Steel Drilling Guide is placed in the 1.5-inch hole prior to drilling the 5/8-inch hole, to ensure that the holes are co- centered, and perpendicular to the slab. The guide also functions as a depth gauge while drilling the 1.5-inch hole. When the flange on the Drilling Guide just touches the slab, the hole is at the proper depth.

Stainless Steel Secured Cover

The Stainless Steel Secured Cover screws onto the Vapor Pin® installed in the flush-mount configuration, to reduce trip hazards and to discourage tampering. The Secured Cover can be used with brass or stainless steel Vapor Pins®, and with the FLX-VPSS. The Secure Cover is available in stainless steel only.

Flush Mount Covers

The basic Flush Mount Cover is made of black plastic, and is a low-cost alternative to the Stainless Steel Secured Cover used in flush-mount installations.

Vapor Pin® Sleeves

The Vapor Pin® Sleeve is what distinguishes the Vapor Pin® from other sampling points. The Vapor Pin® Sleeve instantly forms a tight seal between the concrete slab and the Vapor Pin®, without the use of grout, cement, or adhesives. Like most plastic parts, including sample tubing, Vapor Pin® Sleeves are replaced each time the Vapor Pin® is installed.

Vapor Pin® Caps

Vapor Pin® Caps are placed on top of any type of Vapor Pins® equipped with barb fittings, and prevent soil gas from escaping between sample events. Caps should be replaced each time the Vapor Pin® is installed.

Spanner for Secured Cover

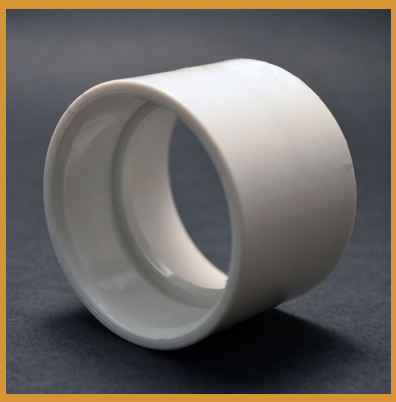
The spanner is used to secure and remove the Stainless Steel Secured Cover from Vapor Pins® installed in the flush-mount configuration.

Installation/Extraction Tool

The Installation/Extraction Tool is placed on the barb of the Vapor Pin® or FLX-VPSS during installation to prevent damage to the barb while hammering it into the slab. At project completion, the Vapor Pin® is extracted by screwing the Installation/Extraction Tool onto the Vapor Pin® and twisting, in the way one extracts a wine cork.

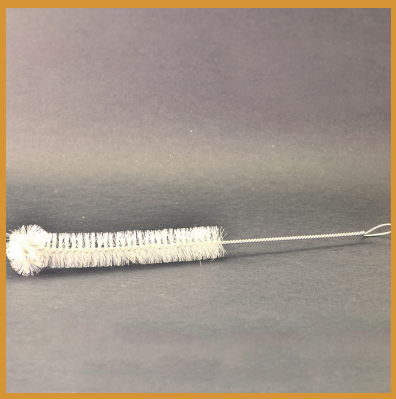
Elastrator Tool

The elastrator simplifies placing the Vapor Pin® Sleeve onto the Vapor Pin®. While wearing work gloves, screw the Vapor Pin® into a Stainless Steel Secured Cover, and place it upside down on a desk or work bench. Place the elastrator into the end of a sleeve, squeeze the elastrator handles, and with the other hand, push the sleeve onto the Vapor Pin®.



Water Dam

The Water Dam is used to leak test the seal between the Vapor Pin® and the concrete slab. The Water Dam is placed around the Vapor Pin® and in contact with the slab using a ring of clean modeling clay or Play-Doh®. Make your sample train connections, then pour distilled water into the Water Dam before purging, and if water isn't lost into the slab, the seal is tight.



Bottle Brush

The Bottle Brush is used to remove dust from the 5-8-inch hole prior to hammering in the Vapor Pin®.

O-Rings

The O-Rings form the seal between the FLX-VPSS and the interchangeable Barb Fitting, Swagelok® fitting, Quick Connect fitting or MiniPin cover. These fittings are sold with O-rings, but the rings can be replaced if desired.

Tygon® Tubing

Tygon® Tubing connects the Vapor Pin® ¼-inch barb to ¼-inch OD Nylon or Teflon® tubing. Tygon® is the best available tubing for making connections, but like all soft tubing, it is less chemically inert than Nylon or Teflon®, and it should not be used for longer tubing runs. Tygon® tubing should be replaced between samples.

Nylaflow® Tubing

Nylon tubing (¼-inch OD) has low chemical reactivity, and it should make up as much of the sample train as possible. Nylaflow® LM tubing is comparable to Teflon® at a lower cost. Nylaflow® tubing should be replaced between samples.

Hard Sided Case

The Vapor Pin® Contractor Kit is sold with a Hard Sided Case, but you can replace it should your case become lost or damaged.

Countersink Drill Bit

The Stainless Steel Secure Cover projects approximately 1/16" above grade and poses minimal trip hazard. The Countersink Drill Bit allows you to place the entire cover below grade, and drills both the 1.5-inch diameter hole, and a shallow 2-inch diameter hole. Besides making installations even neater, the Countersink Drill Bit makes it obvious when the 1.5-inch hole reaches total depth, without periodically having to stop and check.

Snap a shot of our QR code
and start shopping Now!

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Plain City, Ohio. 3064

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FAX (614) 526-2041

Laurie_Chilcote@vaporpin.com

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APPENDIX B QUALITY ASSURANCE PROJECT PLAN

vEKtor consultants

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QUALITY ASSURANCE PROJECT PLAN

Prepared For: 260-262 Van Brunt, LLC

Project Name: Sergi's Images

Project Location: 262 Van Brunt Street, Brooklyn, New York 11231

Date: July 2022

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

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Attachments

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared on behalf of 260-262 Van Brunt, LLC (the Applicant) for the implementation of an Interim Remedial Measures Work Plan (IRMWP) prepared by AMC Engineering (AMC) and its subcontractors at the property located at 260 Van Brunt, New York (the Site). The Site is identified by the City of New York as Borough of Bronx, Block 517 and Lot 1.

The Applicant is accepted into the Brownfield Cleanup Program (BCP) as a Participant on July 31, 2015. The IRM activities will be conducted in accordance with a New York State Department of Environmental Conservation (NYSDEC) approved IRMWP.

This QAPP describes the protocols and procedures to be followed during the implementation of the NYSDEC approved IRMWP. This QAPP was prepared in accordance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation and the NYSDEC BCP Guide.

1.1 Scope of Work

The IRM proposed herein will addresses contaminated historic fill, chlorinated volatile organic compounds (CVOCs) in soil vapor, metals in floor drains, and removal/abandonment of underground storage tanks (USTs).

The proposed remedial investigation will consist of the following scope of work:

- Development of a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP);
- Removal of hotspot in shallow soil (21SB-3) in the rear of the warehouse by excavation and off-site disposal;
- Cleanout and disposal of sediment in floor drains;
- Removal of USTs within the footprint of the warehouse;
- Removal/abandonment of storage tanks outside the footprint of the warehouse;
- Collection of post-excavation endpoint soil samples from the tank graves;
- Backfilling and capping excavated areas, as necessary;
- Performance of waste characterization sampling for off-site disposal of excavated materials;

- Sampling of any open excavation area(s);
- Removal and off-site disposal of any soils exceeding Restricted Commercial Use SCOs from any open excavation area(s);
- Installation of an active sub-slab depressurization system; and
- Preparation of a Construction Completion Report (CRR) to document the remedial activities.

An excavator operated by a licensed subcontractor will be utilized for the installation of all pits and removal of the USTs at the Site.

2.0 PROJECT TEAM

AMC's professional engineers, engineers, and Vektor's team of trained and experienced environmental scientists, geologists, and engineers along with qualified subcontractors will perform the below-listed tasks in a manner consistent with DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

Principal Engineer, P.E.	Ariel Czemerinski	AMC Engineering PLLC
Project Director	Ezgi Karayel	Vektor Consultants
Project Manager	David Klein	Vektor Consultants
Field Leader	Peter Rathsack, Robert Bennett	Vektor Consultants
Laboratory QA/QC Officer	Sarah Widomski	York Analytical Laboratories, Inc.
Third-party Data Validator	Don Anne	Alpha Geoscience

2.1 Principal Engineer

Ariel Czemerinski, Professional Engineer, will act as the Principal Engineer and will oversee the successful completion of this project. He will have the direct responsibility of the installation of engineering controls, preparation and certification of the Construction Completion Report (CRR).

2.2 Project Director

Ezgi Karayel will act as the Project Director and Quality Assurance/Quality Control (QA/QC) officer and will ensure the successful completion of the IRM.

2.3 Project Manager

Dacid Klein of Vektor will act as the Project Manager. He will oversee the field activities and coordinate for all elements of the IRMWP implementation. He will be responsible for coordinating with the field leader and other field crew as necessary.

2.4 Field Leader

Peter Rathsack and Robert Bennett of Vektor will lead the field activities and ensure implementation of Health and Safety Plan (HASP) during all field work. They have the authority to stop all work if unsafe conditions are observed. They will be responsible for coordinating with all subcontractors under the supervision of the PM. They will oversee the subcontractors in the field and collect samples outlined in the IRMWP and in this QAPP.

2.4 Laboratory Quality Assurance/Quality Control Officer

Laboratory analysis will be completed by York Analytical Laboratories (York) of Stratford, CT. York is a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory (NY Cert. Numbers 10854 and 12058). Kriston Simmons is the Client Manager who will ensure that all glassware including laboratory prepared trip blanks and chain of custodies are properly packaged and shipped. QA/QC Officer is Sarah Widomski who will ensure that quality assurance procedures are followed. Quality Assurance requirements for analytical laboratory data include accuracy, precision, sensitivity, representativeness, and completeness. Data will be supplied in Analytical Services Protocol (ASP) Category B Data Packages.

2.5 Third-Party Data Validator

Don Anne of Alpha Geoscience will be the third-party validator. Data validation will be performed in accordance with the EPA validation guidelines for organic and inorganic data review. A Data Usability Summary Report (DUSR) will be prepared by Don Anne upon receipt of the analytical laboratory reports. The DUSR will present the results of the data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness of each analytical method.

2.6 Other Subcontractors

- East Coast Geophysics, Inc. (ECG) of Bensalem, Pennsylvania, will conduct a geophysical survey.
- Brookside Environmental, Inc. (Brookside) of Copiague, New York will perform the removal of USTs and installation of SSDS pits, and any other required excavations.

3.0 SAMPLING METHODS PROCEDURES

This section describes the field protocol and procedures to be followed during the interim remedial measures.

Table 1 provides a copy of the sampling summary. Figure 1 provides a copy of the proposed sampling plan.

3.1 Hotspot Soil Excavation

Excavation to 3 feet below grade in the northern portion of the Site, where SVOCs hotspot (0'-2' interval at 21SB-3) was identified during the RI. This excavation pit will be utilized as one of the sub-slab depressurization pits upon receipt of post-excavation endpoint sample results.

3.2 Removal/Closure of Storage Tanks

Two suspect USTs are present inside the warehouse, and four suspect USTs are located outside the warehouse footprint at the Site. All USTs will be registered with the NYSDEC Petroleum Bulk Storage (PBS) unit once their capacities are confirmed. The USTs inside the warehouse will be exposed, the contents removed, rendered inert and cleaned, and the UST carcass disposed of as metal scraps, in accordance with Section 5.5 of DER-10. Any material/fluid/sludge remaining inside the USTs will be emptied prior to removal.

The USTs outside the warehouse will either be removed or abandoned-in-place due their proximity to the building foundation. If the USTs are filled with water, the fluids will be pumped out and will be abandoned with sand as a proper closure method.

If impacted soils are identified during the UST removal activities, they will be excavated and stockpiled on-site for off-site disposal. Excavated materials will be characterized as per the receiving facility's protocol. Following the removal of all impacted soils/fill, excavation pits will be screened for visual and olfactory evidence of contamination. Post-excavation endpoint samples will be collected from the sidewalls and the bottom of excavation area(s).

3.3 Mitigation System

Chlorinated vapors detected in the sub-slab vapor samples will be mitigated through installation of an active sub-slab depressurization system (SSDS) at the Site and the east

adjacent office building. Since traditional SSDS requiring installation of trenches across the existing building slab is not feasible, a suction pit system will be installed at the existing buildings. Suction pits will be constructed by excavating 2 feet by 2 feet by 2 foot deep at various locations across the buildings.

The building at 262 Van Brunt Street will have two independent loops, and a total of 10 pits, the building at 260 Van Brunt Street will have 1 loop and 5 pits.

All SSDS pits (total of 15) will be sampled prior to installation of its components.

- A Geologist will be on Site to visually characterize the soils in open excavations, and field screen them with a photo ionization detector (PID) equipped with 10.6 electron Volt (eV) lamp for the presence of petroleum contamination.
- All soil samples will be collected with disposable dedicated spoons to prevent cross contamination.
- All soil samples will immediately be placed in laboratory supplied glassware and labeled properly. Sample labels include Site address, sample identification and depth, date and time of sampling, analysis to be performed, and sampler's initials.
- Soil samples will be placed in coolers with ice to maintain a temperature of 4^{o} C.
- A chain of custody that includes Site name and address, sample identification and depth, analysis to be performed, glassware summary, sampler's name and signature, turn-around-time and any additional notes will be prepared.
- All field observations including boring logs and PID readings will be recoded in a field book.
- Sampling equipment will be decontaminated between borings as further described in Section 3.0.
- All samples will be picked up from the Site on a daily basis by the laboratory's courier. The courier will sign the chain of custody upon pick up and provide a copy to Vektor.

The endpoint soil samples from the SSDS pits including the hotspot excavation area will be analyzed for:

- Target Compound List (TCL) volatile organic compounds (VOCs) via Environmental Protection Agency (EPA) Method 8260C/5035
- TCL semi-volatile organic compounds (SVOCs) via EPA Method 8270D
- Total analyte list (TAL) metals via EPA Method 6010D/7471B

The endpoint soil samples from the USTs excavation area area will be analyzed for:

- CP-51 List VOCs via EPA Method 8260C/5035

- CP-51 List SVOCs via EPA Method 8270D
- TAL Metals via EPA Method 6010D/7471B

Attachment 1 provides a copy of blank chain of custody samples.

3.4 Waste Characterization Sampling

Excavated soils will be sampled to meet the waste acceptance criteria of the disposal facility. Impacted soil to be removed from the site will be loaded into roll-off containers and/or dump trucks provided by a licensed waste transport company. Loading will be performed with a back-hoe, excavator, or equivalent. Waste characterization samples will not be subject to QAPP.

3.5 Quality Assurance (QA)/ Quality Control (QC) Sampling

The accuracy, precision and completeness of the samples will be addressed by the certified laboratory for all data generated. One blind duplicate sample and one matrix spike/matrix spike duplicate (MS/MSD) sample will be collected for every 20 samples media and submitted to the laboratory for analysis of the same parameters. One field blank per sampling media will be collected and analyzed for the same parameters as the respective media. It is assumed that all soil samples will be collected in three days. Trip blanks will be included in each cooler whenever samples are collected and transported to the laboratory for analysis of VOCs.

3.5.1 Trip Blanks

A trip blank consisting of two 40-ml vials filled with distilled, deionized water, will be provided by the laboratory. Trip blanks will be included in each cooler and will be analyzed for VOCs.

3.5.2 Field Blanks

Field blanks will be collected at a rate of one per 20 per soil samples. Field blanks will be analyzed for the same analysis as the soil samples collected on the day of the sampling.

3.5.3 Blind Duplicate

A blind duplicate sample will be collected at a rate of one per 20 soil samples. Blind duplicates will be analyzed for the same analysis as the soil samples collected on the day of the sampling.

3.5.4 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD samples will be collected at a rate of one per 20 soil samples. MS/MSD samples will be analyzed for the same analysis as the soil samples collected on the day of the sampling.

Table 2 provides laboratory analytical methods, glassware, and holding times for each analysis.

3.6 Field Instrumentation

The field instruments to be used during the remedial investigation will be calibrated at the beginning of each day as per the manufacturers' specifications. Calibration records will be recorded in the field book.

4.0 DECONTAMINATION

All sampling equipment will be decontaminated between sampling locations unless they are dedicated disposable tools. Decontamination of non-dedicated sampling equipment will consist of the following procedure:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash with Alconox detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

All spoons, if not disposable, will be decontaminated between sampling locations and between different sampling depths at the same location.

4.1 Investigation Derived Waste

All investigation derived waste will either be stockpiled or stored in a roll-off container. Samples will be collected for waste characterization purposes prior to off-site disposal of the soil/fill/sediment at a regulated facility. All stockpiled soil or roll-off container(s) will be secured with a tarp at the end of each day.

TABLES

Table 1
Sampling Rationale and Summary
260-262 Van Brunt, LLC

Sample Matrix	Sample ID	Sample Interval (feet below surface grade)	Rationale	Estimated Number of Samples	Analysis
SOIL	EP-1 (Depth)	Sidewall of USTs excavation	To assess potential impacts from USTs	1	CP-51 List volatile organic compounds (VOCs), CP-51 List semivolatile organic compounds (SVOCs), Target Analyte List (TAL) Metals
	EP-2 (Depth)	Sidewall of USTs excavation		1	
	EP-3 (Depth)	Sidewall of USTs excavation		1	
	EP-4 (Depth)	Sidewall of USTs excavation		1	
	EP-5 (Depth)	Bottom of USTs excavation		1	
	EP-6 (Depth) through EP-19 (Depth)	Bottom of excavation	To assess the extent of historic fill and overall soil quality beneath the Site	14	Target Compound List (TCL) VOCs, TCL SVOCs, TAL Metals
	EP-DUP-1 (Depth)	Blind Duplicate: One per 20 soil samples	QA/QC	1	Target Compound List (TCL) VOCs, TCL SVOCs, TAL Metals
	EP-MS/MSD (Depth)	One per 20 soil samples	QA/QC	1	
	FB-1	Field Blank	QA/QC	1	
	TB-x	Trip Blank: 1 per cooler per day (Lab-prepared)	QA/QC	3	TCL VOCs
			Total Quantity	25	

* Additional soil samples may be collected based on field conditions (i.e: elevated PID readings, odor, sheen, etc.)

Table 2
Preservation and Holding Times
260-262 Van Brunt, LLC

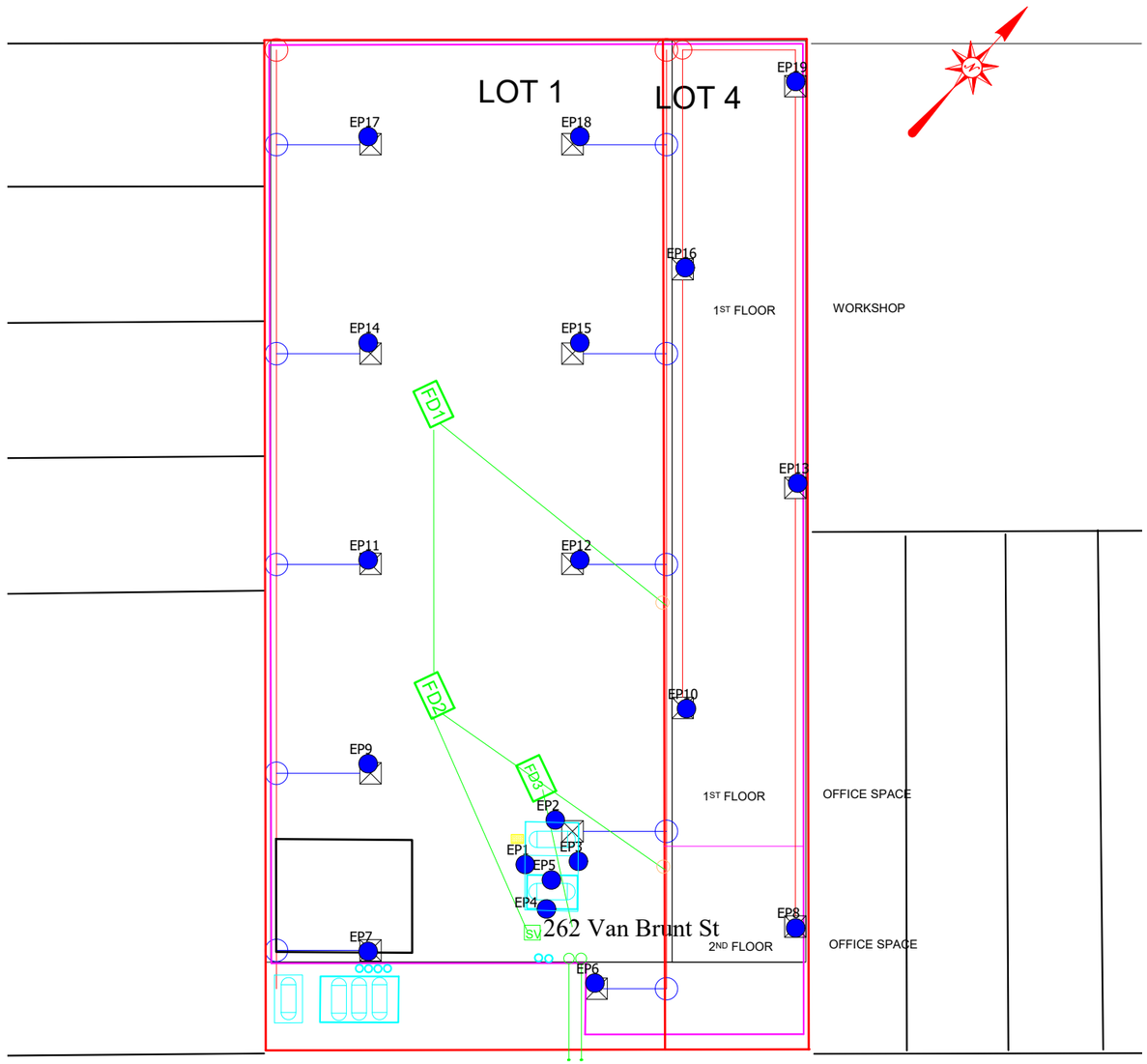
Sample Matrix	Analysis	Container	Preservation	Holding Time
Soil and Soil QA/QC Samples	VOCs	Glass, Four 40-ml vials with teflon-lined cap: 2 VOA vials with 5-ml H_2O, 1 VOA vial with MeOH, and 1 blank vial or 5-g Encore samplers	Cool, 4°C	14 days
	SVOCs	Glass, 8-oz teflon-line cap	Cool, 4°C	14 days to extract, 40 days after extraction to analyze
	Metals	Glass, 2-oz teflon-lined cap	Cool, 4°C	6 months (except for mercury 28 days)

FIGURE 1

PROPOSED SAMPLING PLAN

Imlay Street

IMLAY STREET



VAN BRUNT STREET

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f: +1.347.402.7735
e: info@vektorconsultants.com
www.vektorconsultants.com

Legend:

- Site Boundary
- FD — Floor Drain Location and ID
- SV — Sewer Vent Pit
- Roof Drain
- 550-Gallon Underground Storage Tanks (USTs)
- UST Vent Pipes
- Suspect Former Oil/Water Separator
- EP — End Point Sampling

Notes:

1. Two USTs inside the building footprint will be removed
2. Four USTs outside the building footprint will be exposed, and abandoned in place

Scale: 0 — 25' — 50'

Figure No.	1
Figure Name:	Proposed Endpoint Sampling Plan
Report:	QAPP
Date:	7/8/2022
Drawn By:	EK
Site Address:	260-262 Van Brunt Street Brooklyn, New York

ATTACHMENTS

ATTACHMENT 1
CHAIN OF CUSTODY EXAMPLES

York Analytical Laboratories, Inc.
120 Research Drive, Stratford, CT 06615
132-02 89th Ave, Queens, NY 11418
clientservices@yorklab.com
www.yorklab.com

YORK
ANALYTICAL LABORATORIES INC

Field Chain-of-Custody Record

NOTE: YORK's Standard Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization for YORK to proceed with the analyses requested below.
Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No.

Page _____ of _____

YOUR Information	Report To:	Invoice To:
Company:	Company:	Company:
Address:	Address:	Address:
Phone.:	Phone.:	Phone.:
Contact:	Contact:	Contact:
E-mail:	E-mail:	E-mail:

YOUR Project Number

YOUR Project Name

YOUR PO#:

Turn-Around Time

RUSH - Next Day	
RUSH - Two Day	
RUSH - Three Day	
RUSH - Four Day	
Standard (5-7 Day)	

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Samples Collected by: (print your name above and sign below)

Matrix Codes

S - soil / solid
GW - groundwater
DW - drinking water
WW - wastewater
O - Oil ⋮ Other

Samples From

New York	
New Jersey	
Connecticut	
Pennsylvania	
Other	

Report / EDD Type (circle selections)

Summary Report	CT RCP	Standard Excel EDD
QA Report	CT RCP DQA/DUE	EQuIS (Standard)
NY ASP A Package	NJDEP Reduced Deliverables	NYSDEC EQuIS
NY ASP B Package		NJDEP SRP HazSite
	NJDKQP	Other:

YORK Reg. Comp.

Compared to the following Regulation(s): (please fill in)

Sample Identification	Sample Matrix	Date/Time Sampled	Analysis Requested	Container Description

Comments:

Preservation: (check all that apply)

HCl ___ MeOH ___ HNO_3 ___ H_2SO_4 ___ NaOH ___ ZnAc ___
Ascorbic Acid ___ Other: _____

Special Instruction

Field Filtered ____
Lab to Filter _____

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time
Samples Received by / Company	**Date/Time**	**Samples Relinquished by / Company**	**Date/Time**	**Samples Received by / Company**	**Date/Time**
Samples Relinquished by / Company	**Date/Time**	**Samples Received by / Company**	**Date/Time**	**Samples Received in LAB by**	**Date/Time**

Temp. Received at Lab

Degrees C

ATTACHMENT 2
RESUMES

AMC Engineering PLLC
18-36 42nd Street
Astoria, NY 11105
Phone: (516) 417-8588

ARIEL CZEMERINSKI, P.E.
Email: Ariel@AMC-Engineering.com

SUMMARY:

New York State Professional Engineer. Chemical and Environmental Engineer, with 29 years of experience in the chemical and environmental areas. Areas of expertise include inspections and sign off on Large Scale Vapor Barrier Installations at Various NYC schools, Design and inspections of Sub Slab Depressurization Systems, wastewater treatment systems, Large scale dewatering system design for construction, process control and automation, process optimization, productivity improvement, quality systems, environmental compliance, Phase I Environmental Site Assessments, Phase II Environmental Investigations, Phase III: Remedial Activities, process and plant safety, and management of a production facility. Special Inspector with New York City Department of Buildings. Registered PE in NY.

Professional Experience:

AMC: 18 Years
Prior: 6 years

Education

Master of Science in Chemical Engineering, Columbia University, New York, NY, Feb. 1990.
Bachelor of Science in Chemical Engineering, University Of Buenos Aires, Buenos Aires, Argentina, May 1987

Areas of Expertise

- Vapor Intrusion - Barrier and Sub Slab Venting System Design
- Environmental Assessment Statements under CEQR, ULURP
- Remedial Program Design and Management
- Environmental Compliance, Clean Water Act, Clean Air Act, Hazardous Materials
- Dewatering & Treatment System Design
- SWPPP design and implementation. Preparation and Submittal of NOIs.
- NYCDEP Sewer Discharge Permitting
- Transfer Station Permitting and Compliance
- Wastewater Treatment Systems and Permitting, SPDES, LI Well permit, Water Withdrawal Permit.
- Air Permits and Registration
- Zoning Regulations and Permitting
- Safety and Environmental Training
- Waste Management Plans
- Professional Certifications
- OSHA 40-hr HAZWOPER
- OSHA 10-hr Construction Safety and Health

AMC Engineering PLLC
18-36 42nd Street
Astoria, NY 11105
Phone: (516) 417-8588

Project Experience

Project: Bergen Basin Sewer - CS-JA-BBS -Queens, NY
Project Description: NYC infrastructure (sewer, water) upgrade, drainage channel installation. Dewatering Design. Permits with NYCDEP and NYSDEC. Soil contaminated with petroleum requiring excavation, soil management and disposal under a Materials Handling Plan, Construction Health and Safety Plan. SWPPP design and implementation.
Client: JR Cruz - NYCDDC
Regulatory Authority: NYSDEC, NYCDEP
Role: Mr. Czemerinski served as the Environmental Consultant for the project.

Project: SER002326- Storm and Sanitary Sewers in Wardwell Avenue, Staten Island, New York
Project Description: NYC infrastructure (sewer, water) upgrade.
Dewatering Design. Permits with NYCDEP and NYSDEC. SWPPP design and implementation.
Client: E.E. Cruz - NYCDDC
Regulatory Authority: NYSDEC, NYCDEP
Role: Mr. Czemerinski served as the Environmental Consultant for the project.

Project: HED568-Installation of New 20" Subaqueous water main extension, and new 12" sub-aqueous high pressure gas main from the Bronx to Randall's Island, New York
Project Description: NYC infrastructure (gas, water) upgrade.
Soil contaminated with petroleum requiring excavation, soil management and disposal under a Materials Handling Plan, Construction Health and Safety Plan. Dewatering Design. Permits with NYCDEP and NYSDEC.
Client: E.E. Cruz - NYCDDC
Regulatory Authority: NYSDEC, NYCDEP
Role: Mr. Czemerinski served as the Environmental Consultant for the project.

Project: Domsey Fiber Corp. - 431 Kent Avenue, Brooklyn NY
Project Description: NYS Brownfield cleanup project / NYC E-Designation. Soil contaminated with chlorinated solvents, petroleum and heavy metals requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: Express Builders
Regulatory Authority: NYSDEC, NYCOER
Role: Mr. Czemerinski served as the Remedial Engineer for the project.

Project: SE-807 –Construction of Storm and Sanitary Sewers and Water Main in 20th Ave between 126th St and US Bulkhead Line Area, College Point, Queens, NY
Project Description: NYC Residential infrastructure (sewer, water) upgrade, outfall reconstruction, Soil characterization, soil management and disposal under a Materials Handling Plan, Construction Health and Safety Plan and Community Air Monitoring Plan. SWPPP design and implementation, Public Participation Plan, Marine HASP, Dewatering Design and permit application.

Client: EIC Associates
Regulatory Authority: NYCDDC
Role: Mr. Czemerinski served as the Environmental Consultant for the project.

Project: Springfield Gardens Residential Area BMP - Springfield Gardens, Queens, NY
Project Description: NYC Residential infrastructure (sewer, gas, water) upgrade, drainage channel installation and pond restoration. Soil contaminated with, petroleum and heavy metals requiring excavation, soil management and disposal under a Materials Handling Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: EIC Associates - NYCEDC
Regulatory Authority: NYSDEC, NYCParks
Role: Mr. Czemerinski served as the Environmental Consultant for the project.

Project: Former Domino Sugar Site - Kent Avenue, Brooklyn NY
Project Description: NYC E-Designation. Soil contaminated with semi-volatile organic compounds and heavy metals requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: Two Trees Management
Regulatory Authority: NYCOER
Role: Mr. Czemerinski served as the Remedial Engineer for the project.

Project: Former Uniforms For Industry Site - Jamaica Avenue, Queens NY
Project Description: NYS Brownfield cleanup project / NYC E-Designation. Soil contaminated with chlorinated solvents, petroleum, mop oil and heavy metals requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: The Arker Companies
Regulatory Authority: NYSDEC, NYCOER
Role: Mr. Czemerinski served as the Remedial Engineer for the project

Project: Former Sunbelt Equipment Site – 25 Kent Avenue, Brooklyn, NY
Project Description: NYS Brownfield cleanup project. Soil contaminated with petroleum, and heavy metals and coal tar, requiring deep excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan, Dewatering Design and implementation, SWPPP design and implementation
Client: 19 Kent Acquisition LLC
Regulatory Authority: NYSDEC
Role: Mr. Czemerinski served as the Remedial Engineer for the project.

AMC Engineering PLLC
18-36 42nd Street
Astoria, NY 11105
Phone: (516) 417-8588

Project Experience

Project: Former Charles Pfizer & Co. Site - 407 Marcy Avenue, Brooklyn, NY
Project Description: NYS Brownfield cleanup project / NYC E-Designation. Soil contaminated with chlorinated solvents, petroleum, and heavy metals requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: The Rabsky Group
Regulatory Authority: NYSDEC, NYCOER
Role: Mr. Czemerinski served as the Remedial Engineer for the project.

Project: Former East Coast Industrial Uniforms Site - 39 Skillman Street, Brooklyn, NY
Project Description: NYS Brownfield cleanup project / NYC E-Designation. Soil contaminated with chlorinated solvents, petroleum, and heavy metals requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: Riverside Builders
Regulatory Authority: NYSDEC, NYCOER
Role: Mr. Czemerinski served as the Remedial Engineer for the project.

Project: Former BP Amoco Service Station Site - 1800 Southern Boulevard, Bronx, NY
Project Description: NYS Brownfield cleanup project / NYC E-Designation. Soil contaminated with petroleum, and heavy metals requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: SoBro, Joy Construction
Regulatory Authority: NYSDEC, NYCOER
Role: Mr. Czemerinski served as the Remedial Engineer for the project.

Project: Former Dico G Auto & Truck Repair Site - 3035 White Plains Road, Bronx, NY
Project Description: NYS Brownfield cleanup project. Soil contaminated with petroleum, and heavy metals requiring excavation, soil management and disposal under a Remedial Action Work Plan, Soil / Materials Management Plan, Construction Health and Safety Plan and Community Air Monitoring Plan
Client: The Arker Companies
Regulatory Authority: NYSDEC
Role: Mr. Czemerinski served as the Remedial Engineer for the project.

Ezgi Karayel

Principal

Contact

347.871.0750
ezgi@vektorconsultants.com

Ezgi Karayel is an environmental engineer with extensive experience in brownfield redevelopment. She is the founder and Principal of Vektor Consultants and serves as Operations Officer of the firm. Ms. Karayel guides firm's clients through their due diligence processes. She manages all aspects of the firm strongly focusing on brownfield redevelopment and E-Designation projects across New York Metropolitan area. She has worked with major real estate developers and shareholders by developing strategic approaches to the environmental challenges of complex real estate transactions and brownfield redevelopment. Her experience also includes a broad range of environmental services including regulatory compliance, due diligence assessments, acquisition support, design and implementation of engineering controls and remediation systems, excavation support and soil disposal plans, and facility decommissioning.
She is the chair of the Partnership's Scholarship Program and works closely with committee members to support the education and training of students who are pursuing environmental careers.

Education

B.S. Environmental Engineering
University at Buffalo

Professional Registration

OSHA 10-hour Construction and 40-hour General Industry
OSHA 40-hour HAZWOPER and 8-hour HAZWOPER Refresher
Certified Environmental Manager and Certified Environmental Inspector

Affiliations

New York City Brownfield Partnership, President

Brownfield Coalition of the Northeast, Advisory Board Member

Select Projects

Linden Boulevard, Queens, New York – Site Investigation and Remediation of a 7-acre former landfill with a Restrictive Declaration. The scope of work for the project included preparation of a Remedial Investigation Work Plan for review and approval by the NYCOER, NYSDEC and NYCDOH, implementation of Remedial Investigation, preparation of Remedial Investigation Report, Remedial Action Work Plan, preparation and implementation of a waste characterization plan for soils for proper disposal, supervision of site remediation activities, coordination with remediation engineer to design a methane mitigation system as well as vapor barrier system and managing field staff during remediation.

Ezgi Karayel, Principal

Former Tunnel Diner, Jersey City, New Jersey – Remedial Investigation (RI) of a 1⁄2-acre property in accordance with the New Jersey Technical Requirements for Site Remediation. Ms. Karayel worked closely with the Licensed Site Remediation Professional (LSRP) of the project. Followed by the approval of the RAWP prepared by her, Ms. Karayel directed remediation activities at the site and managed field staff on a daily basis. Upon completion of remediation, she has prepared Remedial Action Outcome for review and certification of the LSRP.

249 North 7th Street, Brooklyn, New York – As a Project Director for a Remedial Investigation of a former auto repair shop with an active spill, Ms. Karayel was responsible for remediation of the property under the direct supervision of NYCOER and NYSDEC. Her responsibilities consisted of preparing the required reports and supervision of remediation including excavation, and installation of engineering controls. By successful coordination with NYCOER, she has managed to enroll the project in City's Clean Soil Bank program and saving the client over $160,000 for soil disposal.

9029 Flatlands Avenue, Brooklyn, New York – E-Designation for HazMat. She conducted a Phase I ESA prior to development, followed by remedial investigation and preparation of Remedial Investigation Report and Remedial Action Work Plan for the remediation. Remediation for the project included design and implementation of an active sub-slab depressurization system. For the engineering controls design and implementation, Ms. Karayel worked closely with the Professional Engineer for the project and performed all required pilot tests, initial start-up and inspections.

37-23 33rd Street, Queens, New York – Removal of "P" Designation. Ms. Karayel managed to prevent the property from becoming a Class II site by performing a thorough due-diligence and disproving the prior consultant's findings and recommendations. Furthermore, her due-diligence study and evaluation saved the client over $1,000,000 clean-up costs, regulatory and legal fees.

261 Grand Concourse, Bronx, New York – Brownfield Redevelopment
1-9 Wythe Avenue, Brooklyn, New York – Brownfield Redevelopment
42 Reeve Place, Brooklyn, New York – Spill Closure
21-01 21st Street, Queens, New York – Former Gasoline Station Decommissioning and Storage Tank Removal
260-262 Van Brunt Street, Brooklyn, New York – Brownfield Cleanup
299 East 161st Street, Bronx, New York – Voluntary Cleanup Program
122 East 32nd Street, New York, New York – Community Center, Remediation under Voluntary Cleanup Program
346 Metropolitan Avenue, Brooklyn, New York – Voluntary Cleanup Program
574 Broome Street, New York, New York – Voluntary Cleanup Program
173-175 McGuinness Boulevard, Brooklyn, New York – Voluntary Cleanup Program
4790 Broadway, New York, New York – Voluntary Cleanup Program

David B. Klein

Project Manager

Contact

347.871.0750
dklein@vektorconsultants.com

David B. Klein is a project manager with Vektor Consultants. David authored Remedial Action Work Plans, Remedial Investigation Reports, Remedial Action Reports, Final Engineering Reports, Noise Sampling Reports, Soil Vapor/Air Sampling Work Plans, Construction Health and Safety Plans, Interim Remedial Measures Summary Reports, Brownfield Cleanup Program Applications, Volunteer Cleanup Program Applications, Disposal Facility Applications, Underground Storage Tank Closure Reports, Phase I and Phase II Environmental Site Assessment Reports. David manages construction activities, drilling teams, excavations, tank removals, and waste disposals at multiple sites concurrently.

Education

B.S. Environmental Science &
Minor in Geology
University at Albany

Professional Registration

OSHA 10-hour Construction
OSHA 40-hour HAZWOPER and 8-hour HAZWOPER Refresher
10-Hour Site Safety Training
SWPPP Certification

Affiliations

New York City Brownfield Partnership

Select Projects

Far Rockaway Project Phases I, II, III, IV, and V, Queens, New York
Responsible for oversight and preparation of the Remedial Action Work Plan, Remedial Action Report, Final Engineering Report, Interim Remedial Measures Summary Report, NYSDEC Letter reports, and daily reports. Managed construction, drilling, excavation, waste disposal oversight of multiple phases concurrently.

Cropsey Avenue LLC, Brooklyn, New York
Authored Indoor Air Sampling Work Plan, Construction Health and Safety Plan, Interim Remedial Measures Summary Report and managed pilot tests for sub-slab depressurization system design and provided oversight during the installation of the engineering controls.

1815 West Farms Road, Bronx, New York – Voluntary Cleanup Program
261 Grand Concourse, Bronx, New York – Brownfield Redevelopment

Peter Rathsack

Environmental Scientist

Contact

347.871.0750
prathsack@vektorconsultants.com

Peter Rathsack is an environmental scientist with Vektor Consultants, and he is responsible for conducting field investigations and site assessments. His responsibilities include providing environmental oversight at construction project sites in New York City Metropolitan area, performing site visits and preparing Phase I Environmental Site Assessments, as well as, performing Phase II Environmental Site Assessments and preparing associated reports. His experience and education with sampling processes and urban development provides knowledge and insight for navigating projects through different regulatory programs.

Education

B.A. Environmental Studies
Concentration Urban Planning
University of Toledo

Professional Registration

OSHA 30-hour Construction

OSHA 40-hour HAZWOPER

10-Hour Site Safety Training

Affiliations

New York City Brownfield Partnership

Select Projects

Oversaw water quality sampling program to maintain excellent watershed health. Collected and organized data for 50 years of water quality information. Carried out sampling of multiple sites throughout watershed and coordinated with team members for efficient sampling processes. Communicated with University of New Hampshire for further lab testing including cyanobacteria monitoring. Partnered with stakeholders through education and outreach.

APPENDIX C HEALTH AND SAFETY PLAN

vEKtor consultants

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HEALTH AND SAFETY PLAN

Prepared For: 260-262 Van Brunt, LLC

Project Name: Sergi Images

Project Location: 262 Van Brunt Street, Brooklyn, New York 11231

Date: May 2022

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

Table of Contents

Emergency Contacts			
Position	**Name**	**Organization**	**Phone**
Remedial Engineer	Ariel Czemerinski	AMC Engineering	(718) 545-0474
Project Director	Ezgi Karayel	Vektor Consultants	(347) 871-0750
Project Manager	David Klein	Vektor Consultants	(347) 871-0750
Field Representative	Saranda Alka	Vektor Consultants	(347) 871-0750
Site Health and Safety Supervisor	Saranda Alka	Vektor Consultants	(347) 871-0750
Client Contact	Louis Sergi	260-262 Van Brunt, LLC	(718) 935-0002
Project Manager	Mark Sergott	NYSDOH	(518) 402-7897
Project Manager	Jared Donaldson	NYSDEC	(518) 402-9627
Emergency Response		FDNY	911
Spill Hotline		NYSDEC	(800) 457-7362

Emergency Medical Facility	
Primary	***Alternate***
NYU Langone Hospital Brooklyn 150 55th St, Brooklyn, NY 11220 Tel: (718) 630-7000 Open 24 Hours	CityMD Cobble Hill Urgent Care- Brooklyn 228-230 Court St, Brooklyn, NY 11201 Tel: (718) 280-5362 Monday-Friday: 8 am to 8 pm Saturday-Sunday: 9 am to 6 pm
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 Plan (HASP) has been prepared on behalf of 260-262 Van Brunt, LLC for the implementation of an Interim Remedial Measures Work Plan (IRMWP) by AMC Engineering (AMC) and its subcontractors at the property located at 260-262 Van Brunt, Brooklyn, New York (the Site). The Site is identified by the City of New York as Borough of Brooklyn, Block 517 and Lot 1.

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 amd AMC field personnel will implement this HASP during the implementation of IRMWP.

1.1 Site Location and Description

The Site is bounded by Imlay Street to the north beyond which is a residential building, a commercial building, which is occupied by the Site owner, to the east, industrial uses including a junk yard to the west, Van Brunt Street to the south beyond which are residential and industrial properties. The Site is approximately 13,500-square feet and is currently developed with a one-story brick warehouse that occupies most of the tax parcel. The legal description of the subject property is Block 517 and Lot 1. A site location map is provided as Figure 1.

1.2 Summary of Previous Investigations

The following reports were reviewed during the preparation of this HASP in order to determine potential hazards:

Environmental Sampling Report by J.C. Broderick & Associates, Inc. dated July 26, 2005

- J.C. Broderick & Associates, Inc. (JCB) prepared this report on behalf of North Fork Bank in July 2005.
- The subsurface investigation consisted of an investigation of the floor drains, a visual inspection of a concrete oil-water separated, an investigation of the vent and fill pipes identified on the exterior of the building to determine presence of any underground storage tanks (USTs).
- JCB determined that the floor drains discharged into the municipal sewer system.
- The visual inspection did not identify any leaks or spills associated with the concrete oil-water separator.
- Three potential USTs were identified beneath the concrete parking area in the southwestern portion of the Site.

- Total of four soil borings were installed at the Site. Of these, two soil borings were installed in the vicinity of the USTs in the southwestern portion and two soil borings were installed in the central north portion of the warehouse in the vicinity of another suspect UST. However, no soil samples were collected during this sampling event. Based upon the field screenings with a Photo Ionization Detector (PID), visual and textural observations, J.C. Broderick & Associates did not identify evidence of petroleum contamination.

Phase I Environmental Site Assessment Report by EFI Global, Inc. dated March 21, 2014

- EFI Global, Inc. (EFI) prepared this report on behalf of Capital One Bank, N.A. and 260-262 Van Brunt LLC in accordance with ASTM E 1527-13 in March 2014.
- The Site consisted of the current one-story warehouse at the time of the 2014 EFI site reconnaissance.
- The 2014 EFI report included review of a prior Phase I ESA Report prepared by JCB in July 2005. According to the summary included within EFI Report, the Site was occupied by a theatrical staging company at the time of the 2005 JCB assessment. The 2005 JCB Phase I ESA reportedly identified the following recognized environmental conditions (RECs):
    - A prior Phase I ESA conducted in 2004 provided to JCB revealed RECs including: (i) the unknown discharge point of storm drains in the warehouse, (ii) the presence of an oil/water separator in the warehouse; and (iii) evidence that gasoline and fuel oil USTs are present at the Site. While the prior report recommended further investigations, Mr. Sergi was interviewed by JCB and indicated none of this work was completed.
    - JCB indicated that based upon their research, historical USTs were expected to have existed on the Site. JCB further indicated the NYC DOB database identified a permit for a gasoline tank in 1963. In addition, JCB identified a suspect fill and vent pipe along with the presence of three additional vent pipes on the exterior of the warehouse, which they believed indicated the presence of former gasoline tanks.
    - The aforementioned oil/water separator was observed by JCB during their site visit and found to be approximately two feet deep and four square feet. JCB identified several inches of what appeared to be an oil/water mixture inside the unit. No further details regarding the unit were specified, including the construction of the sidewalls and floor of the oil/water separator and the integrity of the unit.

  - Three floor drains were observed within the warehouse. JCB did not identify any staining around the drains.
  - While JCB did not identify any specific sites on the regulatory database, they indicate "other sites within the approximate minimum search distance of the Site appeared on a number of the Federal and State databases" and further "a potential does exist for contaminated groundwater from these sites, to migrate or flow into the subsurface of the Site. Due to the suspect shallow groundwater table in the area, a potential does exist for a contaminated plume, if such a plume exists, to impact the environmental quality of the Site." However, they do not make any recommendations pertaining to any potential migration of contamination from off-site sources, nor do they identify specific sites of concern, or contaminants of concern.

- The 2014 EFI Phase I ESA identified the following RECs:
  - The former uses of the Site indicate the likely historical uses of petroleum products and chlorinated solvents in association with operations including auto repairs, plate manufacturing, and plastics manufacturing. Additionally, the Site was used for vehicle repairs since the 1940s, therefore it is possible that in the past the buildings had in-ground hydraulic lifts with sub-grade reserves.
  - According to the aforementioned previous Phase I and subsurface investigation, there is evidence of three former gasoline underground storage tanks (USTs) due to vent pipes along the southeastern exterior of the Site.
  - Potential vapor encroachment condition (VEC) due to the shallow groundwater at the subject property.
- Based on their findings, EFI recommended a Phase II investigation to determine if the historical uses and suspect USTs have impacted the subsurface conditions of the Site. EFI also recommended a soil-gas survey to determine if a VEC exists at the Site as well as investigation of the oil/water separator and removal of drums.

Phase II Environmental Site Assessment Report by Enviroscience Consultants, Inc. dated August 12, 2014

- Based on the findings of the 2014 EFI Phase I ESA, Enviroscience Consultants, Inc. (ECI) performed a Phase II ESA at the Site. The Phase II ESA consisted of performance of a focused geophysical investigation, installation of four soil borings to 10 feet bgs and collection of four soil samples and collection of two groundwater samples from two of the soil borings.

- All soil samples were analyzed for CP-51 VOCs, and three soil samples were analyzed for CP-51 SVOCs. The soil results revealed presence of tetrachloroethylene in one soil sample (SB-3 – 1,400 μg/kg) collected at the water table at a concentration slightly above its respective Part 375 Unrestricted Use SCO. The soil results further revealed presence of several SVOCs.
- Both groundwater samples were analyzed for CP-51 VOCs and one groundwater sample was analyzed for CP-51 SVOCs. The results revealed presence of tetrachloroethylene (max. of 27 μg/L) in both groundwater samples at concentrations above its respective AWQS.
- Based on these findings, ECI recommended notification of the NYSDEC due to evidence of contamination, performance of further investigation to delineate the extent of soil and groundwater contamination, and proper abandonment of the out-of-service USTs.

Subsurface Investigation Report by Enviroscience Consultants, Inc. dated October 10, 2014

- Based upon the findings of the previous Phase II ESA dated August 12, 2014 that revealed concentrations of tetrachloroethene (PCE) in one soil sample and two groundwater samples beneath the property, a soil vapor intrusion and subsurface investigation was performed.
- The soil vapor intrusion investigation consisted of collection of three sub-slab vapor samples across the Site, one sub-slab vapor sample and three-indoor air samples at the east adjacent 260 Van Brunt Street building, and one outdoor ambient air sample.
- The results showed elevated concentrations of tetrachloroethylene (160-8,000 $\mu g/m^3$) in sub-slab vapor samples from both the Site and east adjacent property. The results also showed elevated concentrations of tetrachloroethylene (360-380 $\mu g/m^3$) in indoor air of east adjacent property. Concentrations of trichloroethylene (2.1 and 2.8 $\mu g/m^3$) were detected in the indoor air samples above the NYSDOH air guideline on the first and second floors of the adjacent property. Furthermore, PCE was identified in an outdoor air sample at 31 $\mu g/m^3$, above the NYSDOH ambient background standard.
- The soil investigation consisted of installation of eight soil borings across the Site to 10 feet bgs and collection of one soil sample from each boring for analysis of VOCs. Additionally, one groundwater sample was collected from each soil boring for analysis of VOCs.
- PCE was detected in all eight soil samples but was only detected at a concentration exceeding its respective Part 375 Unrestricted Use SCO in one soil sample (SB-6 - 2,900 μg/kg).

- PCE was also detected in six out of eight groundwater samples but was only detected above its respective AWQS in one groundwater sample (SB-6 – 8.8 μg/L).
- Based on these findings, ECI recommended providing a copy of the report to the NYSDEC, mitigation of indoor air in the finished office space for PCE and TCE, and excavation and disposal of impacted soils along with installation of a vapor barrier and potential sub-slab depressurization system when the Site is redeveloped.

Remedial Investigation Report by Vektor Consultants dated March 4, 2022)

- The RIR performed by Vektor provides the data and findings of the RI conducted at the Site between November 8, 2021 and January 25, 2022. Based on the results of this RI, the following conclusions were made:
    - The stratigraphy of the Site, from the surface down, consists of approximately 2 feet of historic fill, consisting of concrete, brick and glass fragments mixed with silty sand, underlain by 5 feet of brown silty sand with traces of gravel underlain by 8 feet of brown sand. Bedrock was not encountered during this RI.
    - The topography of the Site is relatively flat and no perched groundwater was observed. Shallow groundwater elevation was encountered between 4.28 feet below grade surface to 7.18 feet below grade surface. The groundwater flow direction is from east to west.
    - Geophysical survey identified three areas of concern indicative of anomalies consistent with USTs. Four potential USTs were identified outside the building immediately to the south of the building. Two potential USTs were identified in the southeastern portion of the building.
    - Contaminants of concern for the Site include PAHs and metals in historic urban fill, CVOCs in groundwater and soil vapor. The presence of CVOCs, primarily tetrachloroethylene and its biproduct trichloroethylene, may be attributed to the former bus maintenance operations.
    - PFAS compounds were detected in groundwater and sediment samples collected from floor drains; however, no on-site source was identified.
- Based on the results of the RI, remedial action will be necessary to address the AOCs. Applicable strategies and technologies may include, but are not limited to, excavation of hotspot in shallow soil, removal of all USTs in accordance with all applicable laws and regulations, and installation of an engineering control such as an active sub-slab depressurization system.

1.3 Interim Remedial Measure Work Plan

An Interim Remedial Measure (IRM) Work Plan proposed herein will supplement the prior assessments to characterize the nature and extent of contamination at the Site. The

supplemental data will be analyzed to characterize the nature and extent of contamination at the Site and to evaluate remedial action alternatives.

The proposed IRM Work Plan will consist of the following scope of work:

- Excavation of a hotpot to 3 feet below grade in the northern portion of the Site, where SVOCs hotspot (0'-2' interval at 21SB-3) was identified during the RI,
- Sediment removal from all three floor drains,
- Removal/abandonment of two suspect USTs are present inside the warehouse, and four suspect USTs are located outside the warehouse footprint,
- Backfilling of any excavated areas with clean gravel for sub-slab depressurization system installation,
- Waste characterization sampling of excavated soils, and
- Installation of an active sub-slab depressurization system as a mitigation system.

2.0 ORGANIZATIONAL STRUCTURE

Vektor 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 or they can adopt this HASP during the RI 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 RI. 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)*, Saranda Alka (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, 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	David Klein	Vektor Consultants	(347) 871-0750
Field Representative	Saranda Alka	Vektor Consultants	(347) 871-0750
Site Health and Safety Supervisor	Saranda Alka	Vektor Consultants	(347) 871-0750
Client Contact	Louis Sergi	260-262 Van Brunt, LLC	(718) 935-0002
Project Manager	Mark Sergott	NYSDOH	(518) 402-7897
Project Manager	Jared Donaldson	NYSDEC	(518) 402-9627
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, 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 Interim Remedial Measure (IRM) Work Plan phase at the Site. This HASP will apply to the following Tasks and/or Operations that will be accomplished during the RI:

- Drilling (installation of soil borings, monitoring wells, and soil vapor points)
- Test pits, if necessary
- Decontamination
- Inspection
- Sampling (soil, groundwater, soil vapor, air, investigative derived waste)

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.

Below is a list of chemical hazards that may be encountered on this site.

Chemical Name	OSHA PEL (ppm)	OSHA PEL (mg/m^3)	NIOSH REL (ppm)	NIOSH REL (mg/m^3)	IDLH (ppm)	IDLH (mg/m^3)
Polycyclic Aromatic Hydrocarbons (PAHs)		5		0.5		50
Volatile Organic Compounds (VOCs)						
Chromium Total (Hexavalent &Trivalent)		1		0.5		250
Tetrachloroethylene (PCE)		170				

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 RI 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

Below is a list of biological hazards that may be encountered during RI 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.

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.

3.0 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.

3.1 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)*.

3.2 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

3.3 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.

4.0 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)*.

5.0 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, IRM 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.

5.1 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.

6.0 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)*.

6.1 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 IRM work plan activities to identify conditions that may cause death or serious harm and to permit preliminary selection of site controls
- Periodic monitoring throughout IRM work plan

6.2 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.

6.3 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

6.4 Direct-Reading Instrument Monitoring Procedures

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

- VOCs by photoionization detector (PID)

Monitoring equipment calibration and maintenance procedures on this site are:

- Every morning

7.0 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

7.1 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.

7.2 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.

7.3 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.

7.4 Disposal of Waste from Decontamination

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

7.5 Monitoring the Effectiveness of Decontamination Procedures

Decontamination procedures shall be monitored by a representative of Vektor Consultants, 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.

8.0 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.

8.1 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.

8.2 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

8.3 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

8.4 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:

NYU Langone Hospital Brooklyn
150 55th St, Brooklyn, NY 11220
Tel: (718) 630-7000
Open 24 Hours

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

SAFETY DATA SHEET

Revision Date 24-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Hexavalent Chromium, standard solution, Specpure®, Cr(+6) 1000µg/ml**

Cat No. : **42234**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B

Label Elements

Signal Word
Danger

Hazard Statements
May cause genetic defects
May cause cancer
May damage fertility or the unborn child

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Response
IF exposed or concerned: Get medical attention/advice
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	99.76
Ammonium bichromate	7789-09-5	0.24

4. First-aid measures

General Advice — If symptoms persist, call a physician.

Eye Contact — Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact — Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation — Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion — Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects — None reasonably foreseeable.

Notes to Physician — Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media — Not combustible.

Unsuitable Extinguishing Media — No information available

Flash Point — No information available

Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
None reasonably foreseeable.

Hazardous Combustion Products
Nitrogen oxides (NOx). Ammonia. Chromium oxide.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	-

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional Ecological Information. Do not allow material to contaminate ground water system. Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Ammonium bichromate	TWA: 0.0002 mg/m³ STEL: 0.0005 mg/m³ Skin	(Vacated) Ceiling: 0.1 mg/m³ Ceiling: 0.1 mg/m³	IDLH: 15 mg/m³ TWA: 0.0002 mg/m³	TWA: 0.05 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures	Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection 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.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	<=1100 hPa @ 50 °C
Vapor Density	No information available
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	(NH4)2 Cr2 O7 in H2 O

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Nitrogen oxides (NOx), Ammonia, Chromium oxide

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	
Oral LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Vapor LC50	Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.
Component Information	

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Ammonium bichromate	LD50 = 48 mg/kg (Rat)	LD50 = 1860 mg/kg (Rabbit)	LC50 = 0.2 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Ammonium bichromate	7789-09-5	Group 1	Known	A1	X	A1

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects California Proposition 65. Reproductive toxicity.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ammonium bichromate	Not listed	LC50: = 136 mg/L, 96h	Not listed	Not listed

		(Gambusia affinis)		

Persistence and Degradability based on information available. May persist

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Ammonium bichromate	7789-09-5	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export

Component	CAS-No	**TSCA 12(b)** - Notices of Export
Ammonium bichromate	7789-09-5	Section 6

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X	X	X	KE-35400
Ammonium bichromate	7789-09-5	X	-	232-143-1	X	X	X	X	KE-01653

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Ammonium bichromate	7789-09-5	0.24	0.1 1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Ammonium bichromate	X	10 lb	X	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ammonium bichromate	X		-

OSHA - Occupational Safety and Health Administration: Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Ammonium bichromate	5 µg/m³ TWA 2.5 µg/m³ Action Level	-

CERCLA: Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Ammonium bichromate	10 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Ammonium bichromate	7789-09-5	Carcinogen Developmental Female Reproductive Male Reproductive	0.001 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Ammonium bichromate	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant: N
DOT Severe Marine Pollutant: N

U.S. Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: No information available

16. Other information

Prepared By
Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Revision Date 24-Feb-2020
Print Date 24-Feb-2020
Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 2,327.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of 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

SAFETY DATA SHEET

Creation Date 10-Dec-2009 **Revision Date** 28-Dec-2021 **Revision Number** 6

1. Identification

Product Name **Tetrachloroethylene**

Cat No. : **AC445690000; ACR445690010; AC445690025; AC445691000**

CAS No 127-18-4
Synonyms Perchloroethylene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Contaminated work clothing should not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Tetrachloroethylene	127-18-4	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated.

Hazardous Combustion Products
Chlorine. Phosgene. Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation.
Storage.	Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight. Incompatible Materials. Strong acids. Strong oxidizing agents. Strong bases. Metals. Zinc.

Amines. Aluminium.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Tetrachloroethylene	TWA: 25 ppm STEL: 100 ppm	(Vacated) TWA: 25 ppm (Vacated) TWA: 170 mg/m^3 Ceiling: 200 ppm TWA: 100 ppm	IDLH: 150 ppm	TWA: 25 ppm STEL: 100 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection 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 and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection 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.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic, sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-22 °C / -7.6 °F
Boiling Point/Range	120 - 122 °C / 248 - 251.6 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	6.0 (Ether = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	18 mbar @ 20 °C
Vapor Density	No information available
Density	1.619
Specific Gravity	1.625
Solubility	0.15 g/L water (20°C)
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 150°C
Viscosity	0.89 mPa s at 20 °C
Molecular Formula	C2 Cl4

Molecular Weight 165.83

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Exposure to moist air or water.

Incompatible Materials Strong acids, Strong oxidizing agents, Strong bases, Metals, Zinc, Amines, Aluminium

Hazardous Decomposition Products Chlorine, Phosgene, Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrachloroethylene	LD50 = 2629 mg/kg (Rat)	LD50 > 10000 mg/kg (Rat)	LC50 = 27.8 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Tetrachloroethylene	127-18-4	Group 2A	Reasonably Anticipated	A3	X	A3

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Tetrachloroethylene	Group II Chemical	Not applicable	Not applicable

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrachloroethylene	EC50: > 500 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 12.4 - 14.4 mg/L, 96h flow-through (Pimephales promelas) LC50: 8.6 - 13.5 mg/L, 96h static (Pimephales promelas) LC50: 11.0 - 15.0 mg/L, 96h static (Lepomis macrochirus) LC50: 4.73 - 5.27 mg/L, 96h flow-through (Oncorhynchus mykiss)	EC50 = 100 mg/L 24 h EC50 = 112 mg/L 24 h EC50 = 120.0 mg/L 30 min	EC50: 6.1 - 9.0 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Insoluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrachloroethylene	2.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Tetrachloroethylene - 127-18-4	U210	-

14. Transport information

DOT

UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE

Hazard Class 6.1
Packing Group III

TDG
UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IATA
UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IMDG/IMO
UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Tetrachloroethylene	127-18-4	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Tetrachloroethylene	127-18-4	X	-	204-825-9	X	X	X	X	X	KE-33294

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Tetrachloroethylene	127-18-4	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Tetrachloroethylene	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Tetrachloroethylene	X		-

OSHA - Occupational Safety and Health Administration: Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Tetrachloroethylene	100 lb 1 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Tetrachloroethylene	127-18-4	Carcinogen	14 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Tetrachloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant Y
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Tetrachloroethylene	-	Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Tetrachloroethylene	127-18-4	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Tetrachloroethylene	127-18-4	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other information

Prepared By: Regulatory Affairs
Thermo Fisher Scientific

Email: EMSDS.RA@thermofisher.com

Creation Date	10-Dec-2009
Revision Date	28-Dec-2021
Print Date	28-Dec-2021
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

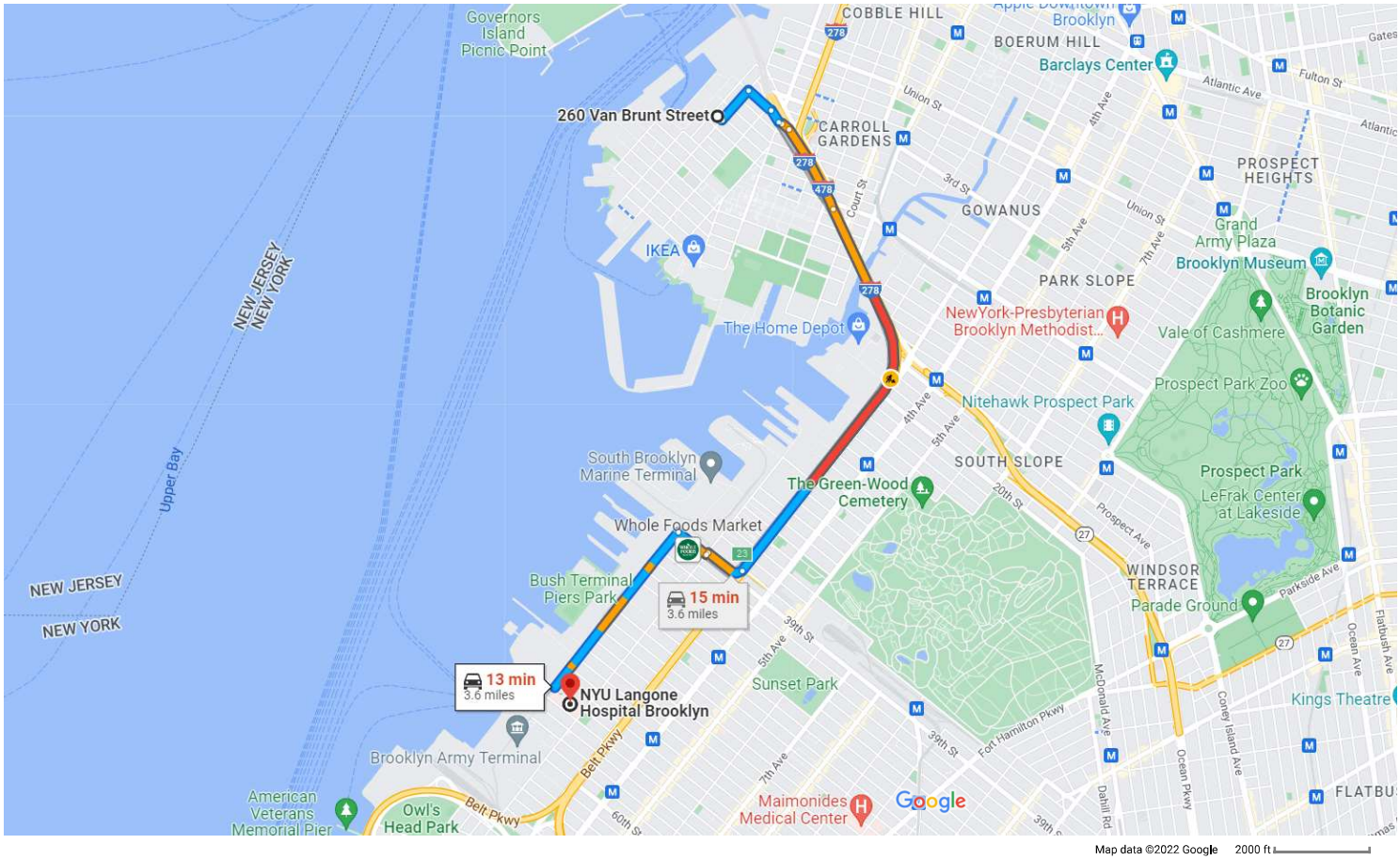
Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Google Maps 260 Van Brunt St, Brooklyn, NY 11231 to NYU Langone Hospital Brooklyn

Drive 3.6 miles, 13 min



260 Van Brunt St
Brooklyn, NY 11231

Get on I-478 from Van Brunt St and Bowne St

1 min (0.4 mi)

1. Head northeast on Van Brunt St toward Delavan St

0.2 mi

2. Turn right onto Bowne St

0.1 mi

3. Turn right onto Hamilton Ave

295 ft

4. Slight left onto the I-278 ramp to Brooklyn-Queens Expy

85 ft

5. Keep left and merge onto I-478

180 ft

Take I-278 W to 2nd Ave. Take exit 23 from I-278 W

4 min (2.2 mi)

6. Merge onto I-478

0.4 mi

7. Merge onto I-278 W

1.7 mi

8. Take exit 23 toward 39 St

0.2 mi

Drive to 1st Ave

4 min (0.9 mi)

9. Turn left onto 2nd Ave

52 ft

10. Turn right at the 1st cross street onto 39th St

0.1 mi

11. Turn left onto 1st Ave

0.8 mi

NYU Langone Hospital Brooklyn

APPENDIX D COMMUNITY AIR MONITORING PROGRAM

vEKtor consultants

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COMMUNITY AIR MONITORING PLAN

Prepared For: 260-262 Van Brunt, LLC

Project Name: Sergi's Images

Project Location: 262 Van Brunt Street, Brooklyn, New York 11231

Date: May 2022

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

Table of Contents

1.0 INTRODUCTION

This site-specific Community Air Monitoring Plan (CAMP) has been prepared on behalf of 260-262 Van Brunt, LLC for the implementation of an Interim Remedial Measures Work Plan (IRMWP) by AMC Engineering (AMC) and its subcontractors at the property located at 260 Van Brunt, New York (the Site). The Site is identified by the City of New York as Borough of Brooklyn, Block 517 and Lot 1.

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 was conducted by Vektor Consultants. LLC from 2021 to 2022 and the findings of their assessment was provided in a Draft Remedial Investigation Report & Confirmatory Sampling dated March 4, 2022. Based on the results of this investigation, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals are the constituents of concern at the Site. 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. APeriodic@ 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
ACTION LIMIT REPORT

Project Location: _____

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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_____
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APPENDIX E SCHEDULE

TASK	SCHEDULE
IRMWP Submission	June 2022
45-Day Public Comment Period	July - August 2022
7-Day Notification to DEC & DOH	September 2022
IRMWP Implementation	September-October 2022
Construction Completion Report	November-December 2022