Interim Remedial Measure (IRM) Work Plan

1810-1818 Cropsey Avenue,
Brooklyn, NY 11214
(Site #224320 / Spill #2007751)

July 13, 2023

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CERTIFICATION

I, Karen Tyll, certify that I am currently a Registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Interim Remedial Measure Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10).

In order to address full compliance with New York State Education Laws, all engineering work is performed by Karen Tyll, P.E., under direct contract to 1810 Cropsey Ave, LLC. Karen Tyll, P.E. is a fully licensed NYS Engineer and Tyll Engineering and Consulting, PC is fully authorized to provide engineering services in New York State.

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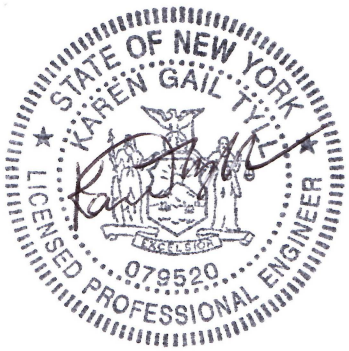
Name



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PE License Number

Signature

7/13/23

Date:

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BER	Business Environmental Risk
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
CCR	Construction Completion Report
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IEC	Institutional & Engineering Controls
IRM	Interim Remedial Measure
IRMWP	Interim Remedial Measure Work Plan
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYS DEC	New York State Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYC VCP	New York City Voluntary Cleanup Program
NYCRR	New York Codes Rules and Regulations
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
O&M	Operation & Maintenance

ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
PRR	Periodic Review Report
QACP	Quality Assurance Control Plan
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
REC	Recognized Environmental Conditions
RI	Remedial Investigation
ROI	Radius of Influence
RSRA	Records Search/ Risk Assessment
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SMMP	Soil Materials & Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SSDV	Sub-slab Diagnostic Value
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TIC	Tentatively-Identified Compounds
USGS	United States Geological Survey
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Tyll Engineering and Consulting, PC (TEC) has prepared this Interim Remedial Measures Work Plan (IRMWP) to address contamination identified in the Site Characterization Report (SCR) dated August 4, 2022_rev.1, for the site located at 1810-1818 Cropsey Avenue, Brooklyn, NY (hereafter referred to as the Site). The Site is currently being remediated under Order on Consent Index# CO2-20210315-158 which requires submittal of an IRMWP within 60-days of NYSDEC approval of the SCR.

This IRMWP provides specific details on implementation of the IRM to meet the remedial objectives and in accordance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation (May 2010).

2.0 PROJECT BACKGROUND

2.1 Site Location and Description

The Site is also identified as Block: 6463, Lot: 137, and is located south of Cropsey Avenue (a.k.a. Victor V. Allegretti Way), north of Shore Parkway, east of 18th Avenue and west of Bay 19th Street which is situated within a mixed-use neighborhood in the Bensonhurst neighborhood of Kings County in Brooklyn, NY. A copy of the Site Location Map is attached as **Figure 1**. The Site is approximately 7,798-square feet in size and is developed with a one-story commercial building with a full cellar which has a total area of approximately 4,680-square feet. The Site is currently vacant with no occupants or ongoing activities. The building is serviced by public potable water supply and municipal sanitary sewer system. A copy of the Site Boundary Map is attached as **Figure 2**.

2.2 Surrounding Property Use

DIRECTION	ADJOINING USE(S)	VICINITY USE(S)
North	Ultra-Auto Inc – Used Car Dealership • Along Cropsey Avenue (Victor V. Allegretti Way)	Commercial
South	Attached residential buildings • Along Bay 19th Street	Residential
East	High one-story industrial building • Corner of Cropsey Avenue & Bay 19th Street	Industrial
West	Semi-detached residential buildings • Along 18th Avenue	Residential

Surrounding properties are mainly used as mixed-use residential, commercial and a few industrial properties (**Figure 3**)

2.3 Site Use and History

The primary zoning for the Site is R-5 designated district, which are mapped for residential use, with a C1-2 commercial overlay. The surrounding properties to the Site consist mainly of mixed-use residential and commercial properties. The surrounding properties to the east of the Site consists mainly of commercial properties, to the west and south of the Site are residential properties, and to the North of the Site are detached commercial buildings utilized as car dealers (Ultra Auto Inc. and Bay Ridge Subaru Service). Review of the historical data from EDR City Directory and Sanborn Maps depicted that the historical use of a part of the Site (1812 Cropsey

Avenue) was a former dry cleaner, circa 1960 to at least 1976. A copy of the Surrounding Land Use Map is attached as **Figure 3**.

2.4 Geologic Setting

Based on a review of the United States Geological Survey (USGS) The Narrows, New York Quadrangle 7.5-minute series topographic map, the Site is situated at an elevation approximately 18.75-feet above mean sea level, and the local topography is sloping gently to the southeast. The Site is primarily flat with some slight sloping to the southwest. Borings advanced during this investigation determined the underlying subsurface consists of medium to coarse-grained, brown sand from grade surface to at least 28-feet below grade surface.

2.5 Hydrogeologic Setting

Groundwater was encountered at a depth ranging between 13.02 to 16.23 feet below ground surface (bgs). Groundwater flow direction has been determined to be south-southeast. Groundwater conditions may also vary due to seasonal changes, precipitation, well influences and variations in soil and bedrock geology. Groundwater in the area of the Site is not used for drinking purposes and residents are connected to the New York City Public Water Supply System

2.6 Wetlands

According to the National Wetlands Inventory and the NYSDEC regulated wetlands map, wetlands are not located on the Site. The nearest body of water is the Gravesend Bay, which is located approximately 1,020-feet south of the Site.

3.0 DESCRIPTION OF PREVIOUS INVESTIGATION

3.1 Records Search/Risk Assessment – August 2020

A RSRA was conducted for the Site by Bison Environmental LLC (BE) dated August 31, 2020, where the property was considered to be of a high environmental risk. BE concluded the presence of a dry cleaner at 1812 Cropsey Avenue from at least 1960 through 1983, and recommended a Phase-I investigation to determine any indications of a discharge onsite and if the dry-cleaner might have been a drop-off location only. A copy of previous environmental reports is attached in **Appendix A.**

3.2 Phase-I Environmental Site Assessment – September 2020

On-site Findings

A Phase-I Environmental Site Assessment was performed by RSK Environmental Group (RSK) for the Site dated September 14, 2020, to address the risk mentioned by BE in the RSRA. As part of the Site history research, two (2) Recognized Environmental Conditions (RECs) and four (4) Business Environmental Risks (BERs) were identified for the Site. The Sanborn Maps and City Directory search for the Site depicted the presence of a dry-cleaning facility on-site using the address as 1812 Cropsey Avenue from 1960 to at least 1976. The EDR Radius Map review depicted various spills that occurred on the north-northwest and northeast section of the property at a higher elevation. These offsite spills were suspected to have impacted the subsurface quality beneath the Site due to its proximity and elevation, and warranted a Phase-II subsurface investigation.

RSK performed a follow-up site inspection on January 25, 2022, to assess the current condition of the Site. The Site inspection did not result in any changes other than the drum previously identified on the first floor was no longer present at the Site. A copy of previous environmental reports is attached in **Appendix A.**

Off-site Findings

According to the EDR Radius Search, a NY SPILL site (1785 Cropsey Avenue, Brooklyn, NY) was identified at approximately 240-feet northwest of the Site, at a higher elevation. The spill site (Former Getty S/S #98768) was reported to the NYSDEC on January 6, 1999, and documented with spill number 9812361, due to gasoline impacted soil encountered during the removal of underground storage tanks (USTs). Per the EDR records, ten (10) 550-gallon gasoline USTs and three (3) 4,000-gallon gasoline USTs were removed, and soils were excavated down to 14-feet below grade surface (bgs) where 214.66 tons of soil was removed. Soil analytical results identified

significant exceedances in BTEX-related VOCs, and MTBE. Five (5) monitoring wells were installed on-site for monitoring groundwater concentrations, that resulted in significant spikes in BTEX-related compounds and MTBE. Groundwater depths ranged from 18-ft. to 20-ft. bgs, and flowed to the southeast. DEC required delineation of contamination across Cropsey Avenue, and 18th Avenue; groundwater remediation and submission of Quarterly Monitoring reports. An (SVE) system was installed on-site for vapor mitigation. Per the 2006 Remedial Action Plan submitted to the DEC, pump test and SVE test for conventional pump-and-treat system, Vapor Extraction/Groundwater Extraction (VE/GE) and Oxygen Releasing Compound (ORC) injection was proposed for off-site remediation. For the ORC barrier injection, a Tidal Influence Study (TIS) was conducted to define plume migration which depicted to influence the southeast direction flow. In 2015, under new ownership, the environmental consultant submitted a RegenOx Injection Work plan to the DEC that was approved for execution. In 2016, a review of the injection report and quarterly follow-up reports indicated a successful effort to remediate the property, and natural attenuation of the plume. The closure report was approved by the DEC and the spill was closed on August 26, 2016.

3.3 Phase-II Environmental Site Investigation – September 2020

A Phase-II Environmental Subsurface Investigation was conducted by RSK at the Site on September 21, 2020, to address the suspected subsurface impacts by the historic usage as a dry-cleaning facility on-site and offsite spills. Soil, soil vapors and groundwater were sampled to determine the presence and extent of the contamination from dry-cleaning solvents and offsite petroleum spills. As part of the Phase-II, a total of four (4) soil samples, four (4) groundwater samples and four (4) air samples were collected for laboratory analysis. Four (4) soil borings (SB-1 through SB-4) were installed in the corners of the cellar at a depth of 10-feet below cellar grade and retrieved every 2-feet. The four soil borings were converted into temporary groundwater wells for sampling (GW-1 through GW-4). High PID readings were observed for the retrieved groundwater samples. A total of four (4) air samples were taken from the Site; one (1) sub-slab sample (SI-1) from beneath the cellar; two (2) indoor air samples (the 1st floor (IA-1) and cellar (IA-2)), and one outdoor sample (OA-1). Analytical results did not identify contamination in the soil samples, or the results were well below the NYSDEC UUSCOs. Groundwater analysis depicted a consistency of petroleum-related contaminants in all four (4) samples (GW-1 through GW-4), predominately GW-1, GW-3, and GW-4 where eleven (11) VOCs, four (4) SVOCs and three (3) RCRA metals exceeded NYSDEC Groundwater Quality Standards. Soil Vapor Analytical results identified petroleum-related and chlorinated solvent contamination in the sub slab air samples for thirteen (13) VOCs, and consistent contamination in all four (4) air samples (SI-1, IA-1, IA-2, OA-1) for four (4) VOCs which exceed the NYSDOH Background Standards for Indoor Air. Based on these findings and results, a NYSDEC spill number (2007751) was generated for the Site and a

review of the Phase-I ESA and Phase-II SIR was conducted by the state. A copy of previous environmental reports is attached in **Appendix A**.

3.4 Site Characterization Report – August 2022

A Site Characterization Report (SCR) was prepared by RSK to document the site investigation activities that were conducted per the Site Characterization Work Plan, (SCWP) prepared by RSK, and dated January 24, 2022. The investigation was performed to delineate the full extent of the contamination from dry-cleaning solvents and an offsite petroleum spill to soil and groundwater beneath the Site. **Figures 10, 11, and 12** are the "Spider Maps" from the SCRs. The SCR can be found in **Appendix A**.

As part of the SCR, a total of thirty-four (34) soil samples were collected from thirteen (13) soil borings from the exterior and cellar of the building. BTEX contaminants were detected at concentrations above restricted residential SCOs, particularly in soil borings adjacent to Cropsey Avenue and Bay 19th Street (SC-5, SC-6, SC-7, SC-10, and SC-11). A hotspot for BTEX contaminants was also detected in the driveway easement (SC-2). Pesticides were detected at concentrations above unrestricted use SCOs. Metals, particularly nickel, were present in all samples above unrestricted use SCOs. The highest concentrations of contamination in the soil are generally in the 16-to-20-foot range below ground surface. PFAS compounds were detected in soil but were below the DEC cleanup values. The petrochemicals present in the soil beneath the Site is likely not from the result of on-site activity, but rather offsite from historical gasoline filling stations along Cropsey Avenue. Three (3) low-level detections of CVOCs, cis-1,2-Dichloroethene at a max. of 0.00045 mg/kg, Tetrachloroethene (PCE) at a max. of 0.110 mg/kg and Trichloroethene (TCE) at a max. of 0.00036 mg/kg were identified during the site characterization.

A total of eleven (11) groundwater samples were collected from seven (7) permanent wells on the exterior of the building and four (4) temporary wells on the interior of the building. BTEX contaminants were detected in all groundwater samples at concentrations above NYSDEC Groundwater Quality Standards. Based on the Phase-I ESA report prepared by RSK and dated September 14, 2020, RSK has identified two (2) potential sources which may contribute to the BTEX detected in groundwater, these sources are considered to be generating from either a spill site, a former Getty S/S #98768 located north of the Site at 1767-1777 (1785) Cropsey Avenue where BTEX-related VOCs and MTBE were identified in soil and groundwater (NYSDEC Spill #9812361), and a former gasoline filling station with auto repair located northeast of the Site at 1801-1817 Cropsey Avenue where ten (10) gasoline vent lines currently exists. Groundwater flow is determined to be in the south-southeast direction. Pesticides were detected at exceeding concentrations in GWMW-4 and GWMW-7. Metals, including iron, manganese, and sodium were detected at exceeding concentrations in all samples. PFAS compounds were detected in select

groundwater samples ranging in concentration from max. 68.2 ng/L on the exterior of the building and max. 116 ng/L on the interior of the building. The PFAS contamination beneath the Site is likely from the result of historical on-site activities as a dry-cleaner.

A total of eight (8) soil vapor/ambient air samples were collected at the Site. One (1) soil vapor sample collected from the northern corner of the Site, four (4) sub-slab vapor samples collected from within the cellar, two (2) indoor air samples, and one (1) outdoor air sample. BTEX contaminants and chlorinated solvents were present beneath the cellar slab and within the indoor air of the building at elevated concentrations. Based on the elevated concentrations of BTEX and two (2) CVOCs (cis-1,2-Dichloroethene and PCE) mitigation should be completed for the building onsite. The two (2) elevated CVOCs, when compared to applicable decision matrices, mitigation is required.

Sampling results collected from this Site have indicated that there is significant environmental impact that has occurred due to former dry-cleaning operations and from surrounding properties that have historically been used as gasoline filling stations. When comparing the analytical data obtained from RSK's Phase-II report dated September 21, 2020, it appears that BTEX contamination is attenuating across the Site from NNW to SSE.

4.0 INTERIM REMEDIAL MEASURES

This IRM will consist of the installation of a soil vapor extraction (SVE) system with a vapor barrier within the footprint of the existing cellar of the on-site building in accordance with the attached figures. A copy of the Proposed Vapor Barrier Diagram is attached as **Figure 5** and a copy of the Proposed SVE Layout and details are attached as **Figures 6 and 7**. The IRM will also include the startup testing and inspection to confirm that the installation of the systems components is in compliance with the industry standards and techniques appropriate for the intended application in mitigating potential sub-slab gases from impacting the indoor air of the subject building.

4.1 Implementation of IRM

The following provides the work-flow components associated with the implementation of the IRM:

- Development and execution of a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers and the nearby community during remediation and construction activities;
- Prior to conducting any intrusive field work, a geophysical survey will be conducted to mark out sub-grade utilities. The appropriate Dig Safe One Call center will also be notified; Site mobilization involving setup, equipment mobilization, utility mark outs and marking & staking work areas;
- Limited demolition of the existing cellar slab to install the SVE system only, and removal offsite of all broken concrete pieces as C&D. The remainder of the existing cellar slab will be left intact.
- Limited excavation, handling, transportation, and off-site disposal of material, as necessary to install the engineering control (i.e., excavate three (3) extraction pits for the SVE system within the existing 6-inch cellar slab).
- Continuous screening by an environmental scientist / geologist of the excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media which will be stockpiled on-site;

  In the event contaminated soil is observed by olfactory methods, elevated PID readings, or other observational or analytical data collected during the installation of the engineering controls, those impacted areas will be further excavated in a safe manner and all excavated materials will be stored onsite in 20-cubic yards roll off containers;
- If required for structural stability issues, the selected contractor may elect to utilize shoring boxes, sheet-piling systems, etc., to protect the integrity of the on-site building

infrastructure. Such activities are the responsibility of the contractor and are not incorporated into this IRMWP;

- If any USTs are encountered during soil/fill removal actions, registration of tank(s) and appropriate closure of these spills in compliance with applicable local, State, and Federal laws and regulations;
- Collection and analysis of all excavated soil for waste characterization sampling as required for off-site disposal as described in the SMMP provided as **Appendix E** and the QA/QC, which is provided in Section 6.0;
- All excavated soils stored in drums or roll off containers will be covered with a cover or double-layer of 6-mil plastic sheeting pending their eventual load out for transport and disposal;
- Upon acceptance of waste disposal from approved disposal facilities, approximately 7-cubic yards of soil/fill will be transported offsite for the proper disposal at an appropriately licensed and/or permitted facility;

Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.

The estimated IRM implementation schedule is provided as **Appendix B** and the site-specific HASP is provided as **Appendix C**. The site-specific CAMP is included as **Appendix D**. The NYSDEC will be promptly notified of any proposed changes, delays, and/or deviations from the IRMWP.

4.2 End-Point **Sampling**

In the event field evidence indicates that impacted materials exist onsite during construction and have been successfully removed, end-point, confirmatory soil samples will be collected and submitted to a NYSDOH/ELAP certified analytical laboratory for chemical analysis. Collection of an appropriate number of endpoint-samples will be analyzed using NYSDEC TCL VOCs plus ten tentatively-identified compounds (TICs) by EPA Method 8260C, NYSDEC TCL SVOCs plus 20 TICs by EPA Method 8270D, Pesticides by EPA Method 8081 and TAL Metals by EPA Methods 6010 and 7471, PFAS and 1,4-Dioxane.

The NYSDEC will be provided with preliminary draft analytical data tables / figures indicating the locations and results of the post-excavation, confirmatory soil samples for review, if required.

4.3 Import of Soils

Import of soils onto the property will be in conformance with the Soil/Materials Management Plan in **Appendix E**. The estimated quantity of certified clean ¾-inch crushed blue stone to be imported into the Site for backfilling the suction point locations and any trenches is

approximately 5 cubic yards. In the event excavation at the site exceeds what is planned; arrangements will be made to import certified clean fill in conformance with the Soil/Materials Management Plan.

4.4 Installation of Engineering Controls

Soil Vapor Migration Pathways

Typical soil vapor migration pathways include entrance into a building through cracks or perforations in the slab or walls, and through openings around sump pumps or where pipes and electrical wires go through the foundation. The vapor movement is primarily as result of a difference between interior and exterior pressures. As established in the NYSDOH Vapor Intrusion Guidance, as updated in May 2017, the basic requirements that must be established with respect to a soil vapor migration program are as follows:

- Methods of mitigation;
- Pilot Testing, Installation, and design of mitigation system;
- Post-mitigation testing;
- Operation, maintenance, and monitoring of mitigation systems;
- Termination of mitigation system operations; and
- Annual certification.

Methods of Mitigation

The most effective mitigation methods for soil vapor include a combination of limiting any infiltration points and actively manipulating the pressure differential between the buildings' interior and exterior. A pilot test was completed by OBAR Systems, Inc in April 2023 and can be found in **Appendix H**.

The pilot test was conducted by OBAR Systems on April 24, 2023 to determine the design parameters and recommendations for a mitigation system comprised of an active SSDS and SVE system. The pilot test involved the coring of two 2.5" suction holes and multiple 5/16" test holes at various measured distances from the suction points (**Figure 8**). Then a range of vacuum and flow rates were applied to the suction points to determine the potential flow and vacuum in the soil beneath the existing slab. The data from the test was then used to determine the radius of influence, the number of suction points required to depressurize the area of concern within the building, and the type of blowers that would be effective at achieving the mitigation goals (**Figure 9**).

OBAR Systems analyzed the soil (loose brown sandy soil) and test conditions and results from the pilot test and determined that there was good communication beneath the slab and the proposed SSDS/SVE scheme will provide a radius of influence in the majority of the building including the area of concern (former dry cleaner) (**Figure 9**). The pilot test and results determined that one SSDS/SVE blower paired with three (3) vertical suction points would be sufficient to depressurize the area of concern. The specified blow was chosen so that it would be able to be used in the SVE system and then reduce capacity for the SSDS in the future. In addition, the SVE/SSDS was designed to have a carbon vessel on the effluent from the blower.

The SVE design was modeled after the system discussed in the pilot test. It is our intention to run the SVE system and then the same equipment's operational parameters can be modified to become an SSDS in the future and with NYSDEC's written approval.

The proposed soil vapor extraction SVE systems can mitigate vapor intrusion into the building envelope from below the building floor slab by creating negative pressure below the floor. A copy of the Proposed SVE Layout is attached as **Figure 6**.

Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.

Proposed Remedial SVE System Design – Building Cellar

The SVE system is proposed to reduce the PCE contaminant mass in soil in the vicinity of the former drycleaner, which may be a source of soil and sub slab vapor contamination. The installation and operation of an active SVE will comprise three (3) 4-inch slotted scheduled-80 PVC extraction wells/points as shown on **Figure 5** to reduce contaminant mass, which may be acting as a source of chlorinated soil vapors beneath the cellar slab (**Figures 10, 11, & 12)**). The screened zone will start below the existing cellar slab and capped with concrete to prevent soil vapor intrusion into the Cellar. Each extraction well/point will be connected to a vertical 4-inch diameter Schedule-80 PVC or approved equivalent pipe. All three (3) vertical 4-inch diameter riser pipes (each with their own ball valves for system balancing) will be manifolded into a 6-inch horizontal header pipe strapped to the cellar ceiling and will exit the building foundation wall. The header pipe will connect into a 500-lbs charcoal carbon adsorber (General Carbon Corp., Model TV-500) on the exterior of the building. The riser pipe will exit the charcoal carbon adsorber filtration system with 6-inch Solid PVC piping which will run vertically along the building exterior wall and extend a minimum of 3-feet above the roof line which will be fitted with an extraction fan (OBAR GBR76 Compact Radial Blower). The final location of the extraction fan will be verified prior to installation in order to maintain appropriate discharge and comply with 10-

feet minimum away from any fresh air intake or windows. Sample ports and vacuum monitoring ports will be installed within the cellar floor and riser pipes to allow for monitoring/evaluating the effectiveness of the SVE components of the systems. Two types of monitoring points will be installed at each of the four (4) vacuum monitoring points (VMP-1 through VMP-4) to monitor the effectiveness of the SVE (and the SSDS in the future); the ~4 foot deep monitoring point, and the shallow ~6 inch deep vapor pin.

The installation of the SVE system will be overseen by a New York State Licensed Professional Engineer and certify that the SVE system was designed and properly installed to establish a vacuum in the gas permeable layer and a negative (decreasing outward) pressure gradient across the building slab to prevent vapor migration into the building. A copy of the Proposed SVE System Details Diagram is attached as **Figure 7.**

Installation of Vapor Barrier and Composite Cover System

The composite cover system and vapor barrier system will be a permanent engineering control. The system will be inspected, and its performance certified at specified intervals as required by this IRMWP and the Site Management Plan. Maintenance of this composite cover system will be described in the Site Management Plan.

Composite Cover System

The composite cover system within the building cellar will be comprised of an applied vapor barrier such as the AquaFin Vaportight SG3 on the existing cellar slab. The remainder of the lot (side yard and rear yard) will be capped with 6-inches of concrete up to each property line and the western yard is covered with asphalt. A copy of the Proposed Sitewide Cover System Plan is attached as **Figure 4**. The detail on **Figure 5** depicts the cover type detail for the entire cellar

Vapor Barrier System

The vapor barrier will consist of the AquaFin Vaportight SG3 applied vapor barrier system as manufactured by Aquafin or equivalent system. The vapor barrier will be installed upon the existing cellar concrete slab. The vapor barrier will extend throughout the area occupied by the footprint building and will be installed in accordance with manufacturer specifications. A copy of the Proposed Sitewide Cover System Plan is attached as **Figure 4**. A copy of the Proposed Vapor Barrier Diagram is attached as **Figure 5**. Product specification sheets are provided in **Appendix F.**

4.5 SVE System Startup & Monitoring – Building Cellar

Access/sampling and vacuum monitoring ports will be installed within the cellar floor and riser pipes to allow for monitoring/evaluating the effectiveness of the SVE components of the systems. Upon completion of systems installation, the existing cellar slab will be sealed to enhance system

effectiveness. The SVE system is a permanent engineering controls and will be inspected and monitored annually. The systems will be inspected, and its performance certified at specified intervals as required by this IRMWP and the Site Management Plan. Maintenance of the SVE system will be described in Section 5 of this IRM Workplan and within the Site Management Plan.

At the time of the systems startup, all components will be inspected to verify good working condition, correct installation and operation as designed. The finished concrete slab and seals will be inspected to verify no cracks or openings exists. Each vacuum monitoring point will also be inspected and then tested utilizing a portable micromanometer. Readings greater than -0.004 inches of water will be considered evidence of adequate negative pressure. The systems inspection and testing results will be documented on a mitigation system installation record with vacuum testing logs which will document the date, installer, system type, suction points, fan and gauge models, communication testing results, site sketch and photographs. A copy of the Proposed Active SVE Details Diagram is attached as **Figure 7**. During its operation, the system will be inspected, and its performance certified at specified intervals as required by this IRMWP and the Site Management Plan.

System Efficacy Testing After Startup

Following installation of the SVE system, a negative pressure field extension test will be completed using the four (4) vacuum monitoring points (VMP-1 through VMP-4) to test the effective pressure differential being imposed by the SVE system. The pressure differential readings will be collected from the Vapor Monitoring Points in the building Cellar slab using a digital manometer, to ensure pressure readings of at least -0.004 wci are achieved. A copy of the Proposed SVE System Layout depicting the Vacuum Monitoring Points attached as **Figure 6**. Once the recommended pressure readings are achieved, the blower will be deactivated for a minimum of 15-minutes and then the blower will be reactivated again for a minimum of 30 minutes before another round of pressure readings will be taken from across the entire Site. The pressure readings will be collected using a digital manometer, to ensure pressure readings of at least -0.004 wci are achieved in all sample Vapor Monitoring Points.

Initially, the SVE System fan will be activated and left to run for approximately 60-minutes, after which pressure differential readings will be collected from the Vapor Monitoring Points in the building Cellar slab using a digital manometer, to ensure pressure readings of at least -0.004 wci are achieved. Once the recommended pressure readings are achieved, the blower will be deactivated for a minimum of 15-minutes and then the blower will be reactivated again for a minimum of 30 minutes before another round of pressure readings will be taken from across the entire Site. The pressure readings will be collected using a digital manometer, to ensure pressure

readings of at least -0.004 wci are achieved in all sample Vapor Monitoring Points. The SVE will then remain active.

4.6 Pre-Occupancy Indoor Air Testing

Pre-occupancy indoor air testing will be performed once the SVE has been balanced, has been running for at least 30 days, after the negative pressure field extension testing has been completed (described in the previous section), and during the heating season in accordance with NYSDOH SVI Guidance, Section 4.3. Samples will be collected when construction activities are not occurring, and with the SVE operating and the building systems (i.e., HVAC) operating in manners consistent with typical conditions, and doors closed. Indoor air sampling will include collection of two indoor air samples (locations shown on **Figure 13**), and one outdoor air sample collected outside of the building at an upwind location for comparison purposes. Indoor and outdoor air samples will be collected in laboratory supplied, individually certified clean, 6- liter Summa canisters, fitted with laboratory supplied 8-hour calibrated flow controllers. Sampling canisters will be shipped under chain-of-custody documentation to a NY-ELAP certified analytical laboratory, analyzed for VOCs under a standard turnaround time for Site specific COCs, by USEPA method TO-15 SIM.

Following sample collection, results will be evaluated to verify the SVE has mitigated the potential VI pathway. In the event that the results of indoor air sampling indicates that the VI pathway is occurring, further modifications to the system (e.g., changes to in-line gate valves on riser pipes, or fan upsizing) will be evaluated and changes made. If changes are made, the indoor air sampling approach will be repeated until it is demonstrated that the SVE has appropriately mitigated the VI pathway into the building.

5.0 SVE OPERATION, MAINTENANCE AND MONITORING

O, M & M procedure for the SVE System is outlined below. Typically, OM&M is performed on an annual basis for or until such time that subsequent sub-slab soil vapor and indoor air sample results deem that SVE is no longer required by the NYSDEC/NYSDOH and written approval is issued to turn the system off permanently. Maintenance of this SVE system will be described below and in the Site Management Plan.

The SVE system will not be discontinued or changed to an SSDS without written approval by NYSDEC. A proposal to discontinue the SVE system or change the system to a SSDS will be submitted by the property owner or agent based on confirmatory data. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC.

5.1 SVE System: Routine Equipment Monitoring and Maintenance

OM&M of the SVE System will include a visual inspection of the complete system during the monitoring event. SVE system components to be monitored include, but are not limited to, the following:

- Vacuum blower;
- General system piping;
- Vacuum gauges;
- Control switches and system alarms;
- PID Readings from influent line, between carbon drums, and at the discharge stack.

The components of the SVE system will be inspected by a qualified environmental professional or technician on a quarterly basis for the first year of operation to assure that the system is functioning properly.

Unscheduled inspections and/or sampling may take place when a suspected failure of the SVE system has been reported or an emergency or weather event occurs that is deemed likely to affect the operation of the system. If any equipment is observed to be malfunctioning or the system is not performing within specifications, maintenance and repairs must be performed immediately. After the repairs are completed, the SVE system can be restarted.

5.2 SVE System Operation: Non-Routine Equipment Maintenance

Non-routine maintenance is expected if any component of the system is damaged or fails. During non-routine inspections, the system will be checked for structural integrity, differing sounds, visible cracks, and odors. Component damage or failure can include broken valve, damaged pipe, or blower malfunction. In any case of component damage or failure, the system should be shut

off and repairs/replacements should be made. The owner should contact Ted Yen or RSK Environmental with any issues.

The system will not be restarted until all repairs are made. When the repairs are completed, the system should be started up as per start-up procedures.

5.3 SVE Monitoring: Air Sampling Procedures

PID readings and air samples (before and after carbon) will be collected on a biannual basis (once every 6 months) during the first year of operation to evaluate the performance of the system and to estimate the carbon changeout timing. After the first year of operation, air samples will be collected annually after approval from the NYSDEC. Samples will be collected from the SVE system discharge (before and after carbon). Air grab samples will be collected using 6 Liter Summa Canisters submitted to a NYSDOH certified environmental laboratory for analysis of VOCs by USEPA TO-15.

5.4 SVE Carbon Vessels Replacement Procedure

The General Carbon TV-500 Adsorber canister will require that the carbon be replaced when breakthrough occurs. Breakthrough is identified as the time when elevated PID readings are detected post-carbon. PID readings will be taken quarterly for first year to determine if breakthrough has occurred. If the effluent stream produces an obvious odor, TEC or RSK should be called to determine if the carbon is spent. The adsorber will be taken out-or-service and the spent carbon will be removed and replaced with new carbon from the Manufacturer.

6.0 REPORTING

During remedial action activities, daily status reports will be prepared to include CAMP data where copies are maintained in the field and also submitted to the NYSDEC on a daily basis. The remedy will include long-term maintenance and monitoring of the cover system which will be included in the Site Management Plan (SMP). Preparation and submission of a Construction Completion Report (CCR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this IRMWP, and describes all Engineering and Institutional Controls to be implemented at the Site together with a Site Management Plan (SMP) for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency. The report and drawings will be certified by a Professional Engineer licensed in New York State.

6.1 Construction Completion Report/Site Management Plan

A Construction Completion Report (CCR)/Site Management Plan (SMP) will be prepared in accordance with DER-10 after the completion of the field work. The CCR/SMP will include the activities listed below that are necessary for the proper and effective management of the engineering/institutional controls and to monitor the effectiveness of the implemented interim remedial measures.

- A **Construction Completion Report** will be prepared upon completion of the work outlined in this IRMWP and to include all daily status reports with CAMP data, mitigation system installation records with vacuum testing logs, photographs, disposal manifests, soil/stone importation tickets, all analytical data, as-built drawings and inspection certificates.
- **Site Management Plan** will be prepared to manage remaining soil contamination and institutional and engineering controls at the Site as per DER-10 requirements. The SMP will include, at a minimum:
  - Institutional and engineering Control Plan: discussing the restrictions on site access and use will be described in detail in the IEC plan along with steps necessary for its implementation and periodic certification. The engineering controls will also be described in detail along with providing Figures and plans.
  - Inspections/monitoring: Discussing inspections which are to be conducted to assure the remedy remains in place and effective. Quarterly inspections for the first year by the QEP and/or a trained building superintendent to include the cover system and engineering controls. Annual inspection by a Professional Engineer will

be completed to ensure the remedy is effective and that the periodic inspections are taking place.

- Operation & Maintenance (O&M): The O&M plan will include information regarding the equipment and procedures for routine maintenance requirements to minimize damage to or failure of the implemented engineering controls.
- Corrective Measures: Procedures for corrective measures such as repairs to the engineering controls, fixing damages to the composite cover/asphalt/concrete surfaces across the building footprint and within the Site boundary.
- Reporting: The results of all inspections, corrective actions and monitoring will be reported in the Periodic Review Report (PRR) for the Site completed in a frequency determined by the NYSDEC.

7.0 QUALITY ASSURANCE PROJECT PLAN

The scope of the IRM Work Plan has been developed to support the excavation, transport and disposal of impacted soils from within the footprint of the on-site building. The majority of the field and analytical laboratory methodologies to support the IRM were included in the QACP prepared for the Site Characterization Work Plan. The only additional work-flow component required to support the IRM, which was not included in the existing QACP, was the collection of soil samples for waste-characterization purposes prior to the conduct of the excavation activities. The following discusses the assurance procedures that will be followed during sample collection and analysis:

7.1 QA/QC Procedure

QA/QC procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and compatibility associated with the sampling and analysis for this investigation. Field QA/QC procedures will be used (1) to document that samples are representative of actual conditions at the Site and (2) identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or by laboratory techniques that may have introduced systematic or random errors to the analytical process. QA/QC samples will also include field duplicates, matrix spikes, matrix spike duplicates, field blanks and trip blanks, appropriately at a frequency of 1 per 20 samples.

7.2 Field QA/QC

Field QA/QC will include the following procedures:

- Calibration of field equipment, including PID, on a daily basis.
- Use of dedicated and/or disposable field sampling equipment.
- Proper ample handling and preservation.
- Proper sample chain of custody documentation; and
- Completion of report logs.

The above procedures will be executed as follows:

- Disposable sampling equipment, including acetate sleeves, latex gloves, and disposable bailers (or sample tubing), will be used to minimize cross-contamination between samples.

- For each of the parameters analyzed, a sufficient sample volume will be collected to adhere to the specific analytical protocol, and provide sufficient sample for reanalysis of necessary.
- Because plasticizers and other organic compounds inherent in plastic containers may contaminate samples requiring organic analysis, samples will be collected in glass containers, with the exception of the nitrate-preserved groundwater sample for metals analysis.
- Appropriate sample preservation techniques, including cold temperature storage at 4° C, will be utilized to ensure that the analytical parameters concentrations do not change between the time of sample collection and analysis: and
- Samples will be analyzed prior to the expiration of the respective holding time for each analytical parameter to ensure the integrity of the analytical results.

7.3 Sample Custody

Sample handling in the field will conform to appropriate sample custody procedures. Field custody procedures include proper sample identification, chain-of-custody forms, and packaging and shipping procedures. Sample labels will be attached to all sampling bottles before field activities begin to ensure proper sample identification. Each label will identify the site and sample location. Styrofoam or bubble wrap will be used to absorb shock and prevent breakage of sample containers. Ice or ice packs will be placed in between the plastic bags for sample preservation purposes.

After each sample is collected and appropriately identified, the following information will be entered into the chain-of-custody form:

- Site name and address.
- Sampler(s)' name(s) and signature(s).
- Names and signatures of persons involved in the chain of possession of samples.
- Sample number.
- Number of containers.
- Sample location.
- Date and time of collection.
- Type of sample, sample matrix and analyses requested.
- Preservation used (if any); and
- Any pertinent field data collected (pH, temperature, conductivity, Dissolved Oxygen [DO])

The sampler will sign and date the "Relinquished" blank space prior to removing one copy of the custody form and sealing the remaining copies of the form, in a Ziploc plastic bag taped to the

underside of the sample cooler lid. The sample will be sealed with tape prior to delivery or shipment to laboratory.

7.4 Report Logs

Field logs and boring logs will be completed during the course of this investigation. A field log will be completed on a daily basis which will describe all field activities including:

- Project number, name, manager, and address.
- The date and time.
- The weather conditions.
- On-site personnel and associated affiliations.
- Description of field activities; and
- Pertinent sample collection information including sample identification numbers, description of samples, location of sampling points, number of samples taken, method of sample collection, and any factors that may affect its quality, time of sample collection, name of collector, and field screening results.

7.5 Laboratory QA/QC

An ELAP-certified laboratory will be used for all sample analyses. All samples will be delivered to the laboratory within 24 hours of sample collection. Samples will be received by laboratory personnel, who will inspect the sample cooler(s) to check the integrity of the custody seals. The cooler(s) will then be opened, the samples unpackaged, and the information on the chain-of-custody form examined. If the shipped samples match those described on the chain-of-custody form, the laboratory custodian will sign the form and record problems in the “Remarks” box. The custodian will then immediately notify the Project Manager so appropriate follow-up steps can be implemented on a timely basis.

A record of the information detailing the handling of a particular sample through each stage of analysis will be maintained by the laboratory. The record will include:

- Job reference, sample matrix, sample number, and date sampled.
- Date and time received by laboratory, holding conditions, and analytical parameters.
- Extraction date, time, and extractor’s initials (if applicable), analysis date, time, and analyst’s initials; and
- QA batch number, date reviewed, and reviewer’s initials.

8.0 STANDARDS, CRITERIA AND GUIDANCE (SCGS)

The Site is remediated under Order on Consent Index # CO2-20210315-158, and is subject to requirements under NYCRR Part 375 and DER-10 guidelines. The following SCGs are considered for implementation of the selected interim remedial measure for the Site:

- **Soil Vapor SCGs:** Mitigation of soil vapor will be mitigated with the operation of a soil vapor extraction (SVE) system. Mitigation is required due to the presence of impacted soil vapor and impacted soils beneath the building floor. This assessment takes into consideration the reasonably anticipated use of the Site. The SVE will pull the potentially contaminated vapor out form beneath the building floor slab to mitigate vapor intruding into the cellar and first floor of the building. The soil vapor will be vented through a riser to the roof of the building. While VOC contamination at the Site is below the commercial SCOs, the presence of VOCs in soil may be acting as a source of soil vapor impacts. Therefore, the SVE system will be installed in the vicinity south of the former drycleaner to reduce the contaminant mass.

9.0 HEALTH AND SAFETY PLAN

A Site-specific Health and Safety Plan (HASP) has been prepared and is included as **Appendix C.** All on-site personnel and visitors involved in the IRMWP will be required to read and sign the HASP prior to entry of the Site.

10.0 COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Plan (CAMP) is provided as **Appendix D**, in accordance with DER-10 requirements for remedial investigation. The CAMP sets forth air monitoring procedures that will be utilized to measure airborne emissions during the IRMWP, in order to minimize the release of contaminants to off-Site areas.

11.0 REFERENCES

NYSDEC DER-10 / Technical Guidance for Site Investigation and Remediation;

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006;

NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006, Updated in May 2017

Figures

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PROJECT NAME:

1810 CROPSEY AVENUE BROOKLYN, NY 11214 (BLOCK: 6463, LOT: 137)

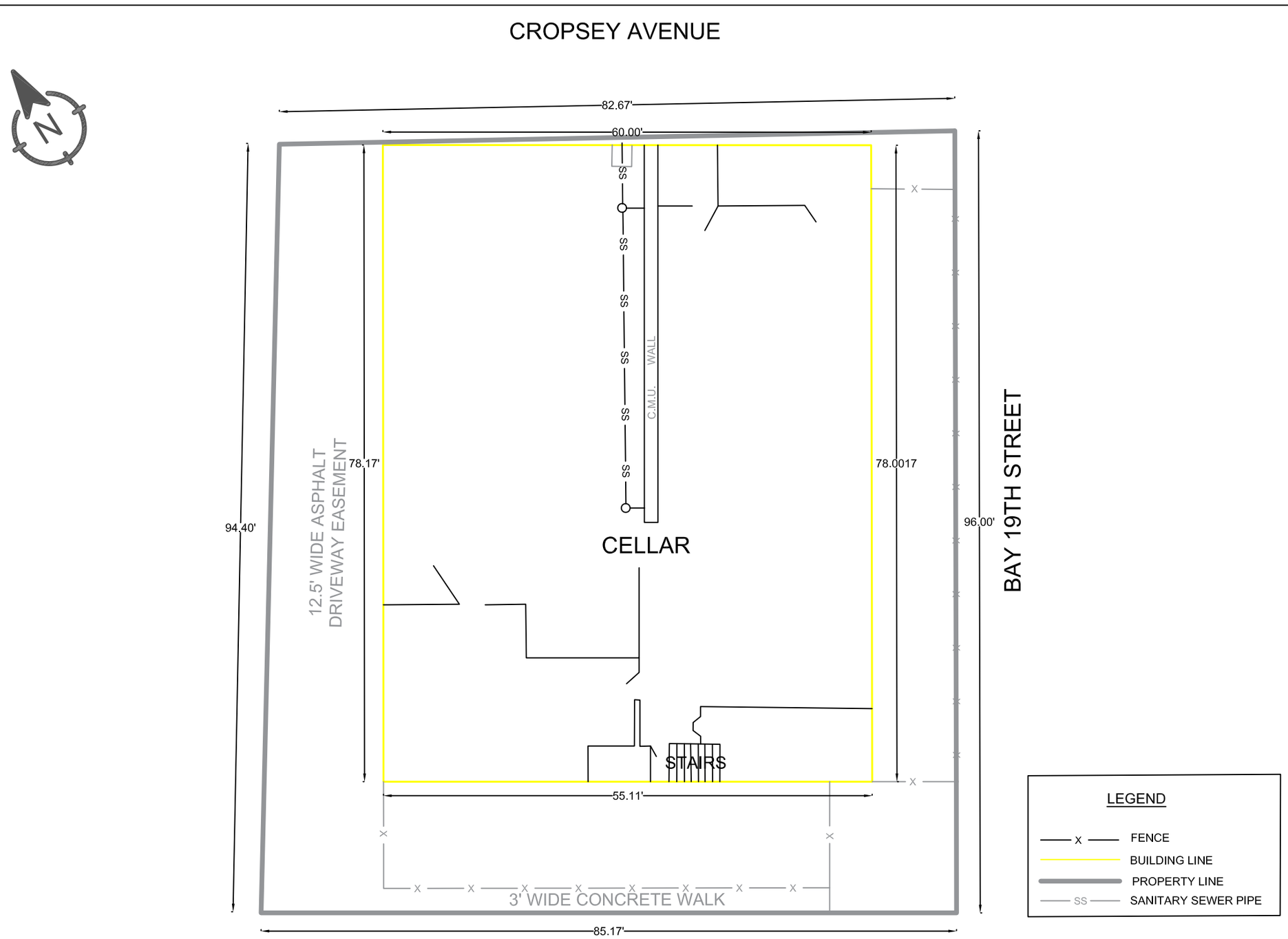
DRAWING TITLE:

FIGURE 1:
SITE LOCATION MAP

SEAL & SIGNATURE:

DRAWING DATA:

DATE: 02/06/2023



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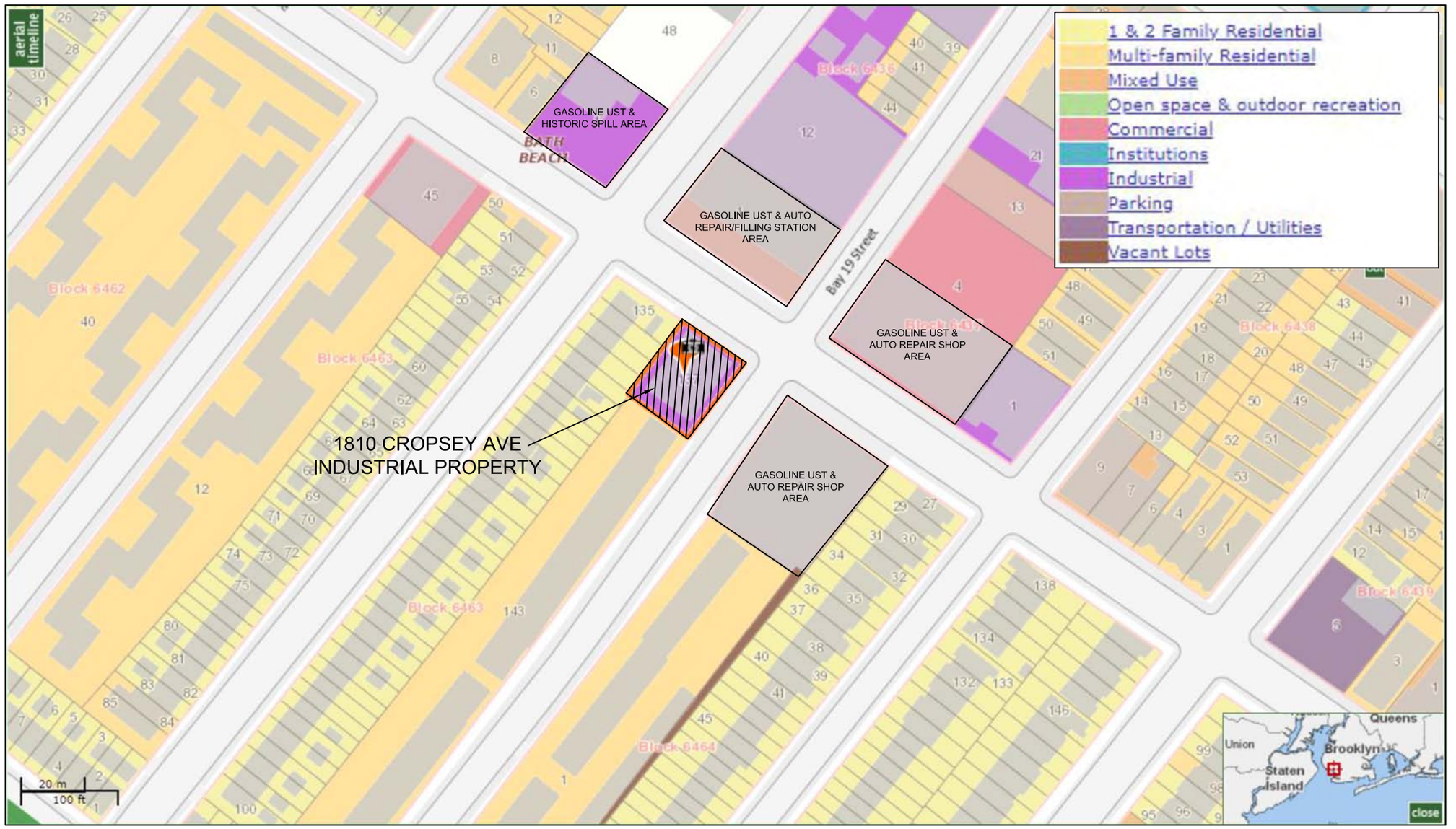
PROJECT NAME:
1810 CROPSEY AVENUE
BROOKLYN, NY 11214
BLOCK:6463,LOT:137

DRAWING TITLE:
FIGURE 2:
SITE BOUNDARY MAP

SEAL & SIGNATURE:

DRAWING DATA:
DATE: 6/02/2023



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PROJECT NAME:

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(BLOCK: 6463, LOT: 137)

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FIGURE 3:
SURROUNDING LAND USE

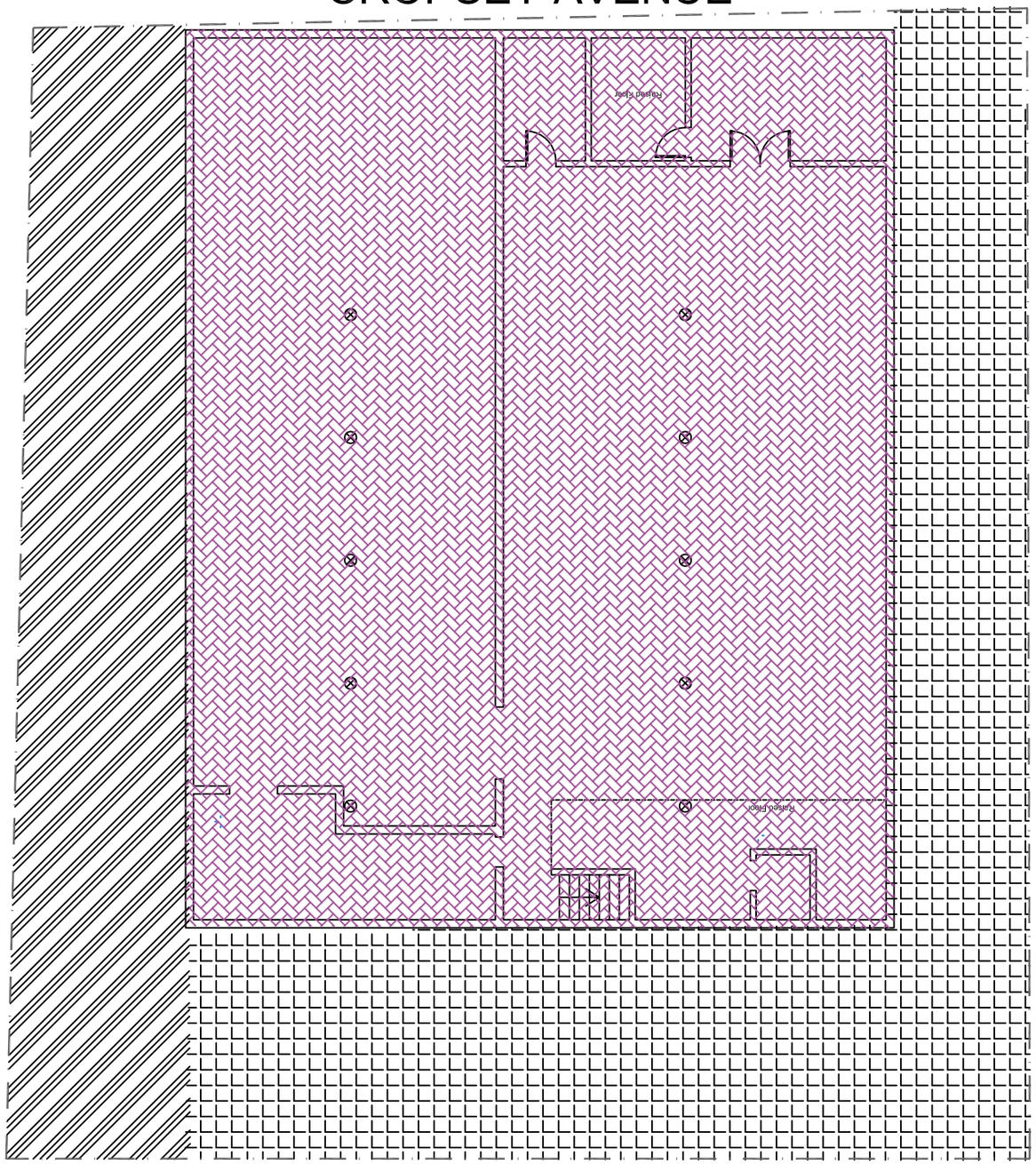
SEAL & SIGNATURE:

DRAWING DATA:

DATE: 06/02/2023

CROPSEY AVENUE

BAY 19TH STREET



LEGEND

- PROPOSED LIQUID APPLIED AQUAFIN VAPORTIGHT SG3 VAPOR BARRIER WITH TWO(2) PART EPOXY FLOOR COATING AQUAFIN EPOXY-MULTIUSE OR SIMILAR
- PROPOSED 6" CONCRETE SLAB INSTALLED IN THE DRIVEWAY AND REAR YARD
- ASPHALT-PAVED MAINTAINED DRIVEWAY EASEMENT
- EXISTING STEEL COLUMN
- PROPERTY LINE

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PROJECT NAME:

1810 CROPSEY AVENUE
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FIGURE 4:
SITE WIDE COVER SYSTEM
& VAPOR BARRIER DETAILS

SEAL & SIGNATURE:

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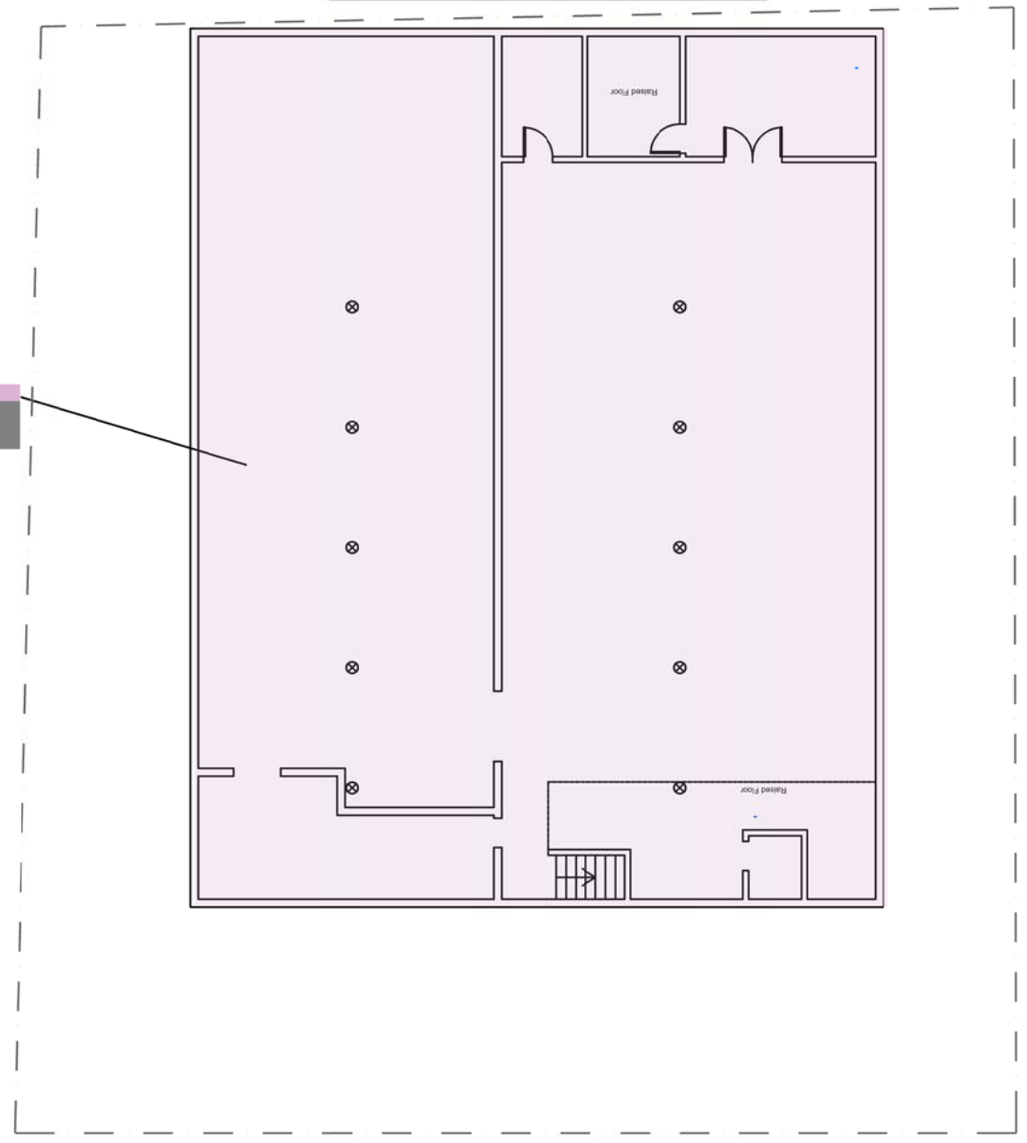
DATE: 06/02/2023

CROPSEY AVENUE



DETAIL A - CELLAR AREA

PROPOSED LIQUID APPLIED AQUAFIN VAPORTIGHT SG3 VAPOR BARRIER WITH TWO(2) PART EPOXY FLOOR COATING AQUAFIN EPOXY-MULTIUSE OR SIMILAR

EXISTING 6" CONCRETE SLAB

LEGEND

- PROPOSED LIQUID APPLIED AQUAFIN VAPORTIGHT SG3 VAPOR BARRIER WITH TWO(2) PART EPOXY FLOOR COATING AQUAFIN EPOXY-MULTIUSE OR SIMILAR
- EXISTING STEEL COLUMN
- BOUNDARY LINE

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1810 CROPSEY AVENUE
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(BLOCK: 6463, LOT: 137)

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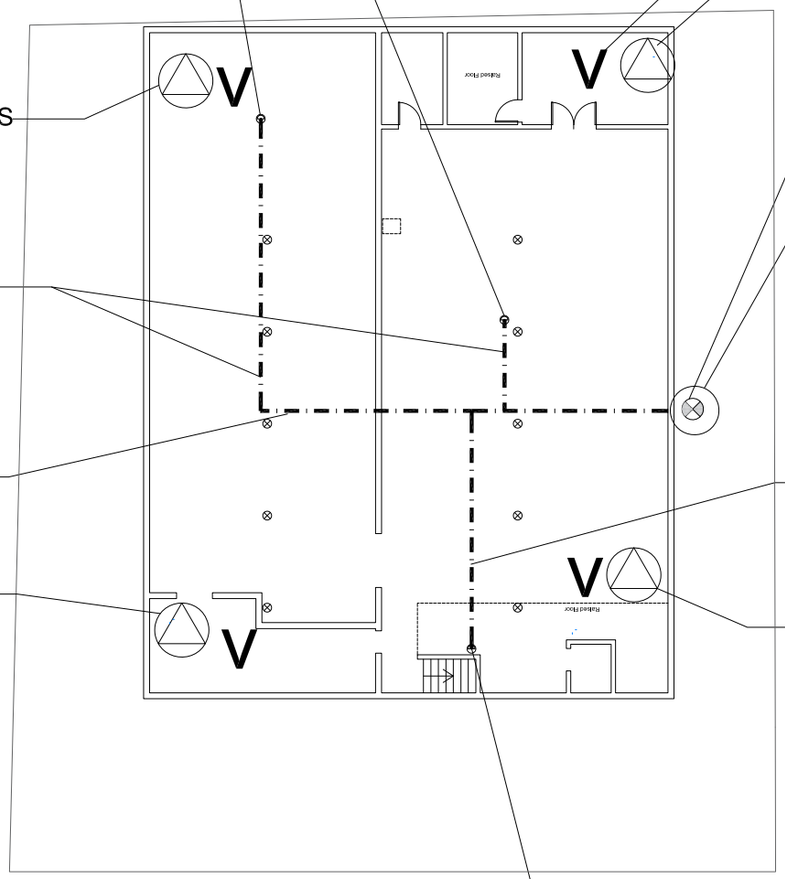
FIGURE 5:
VAPOR BARRIER LAYOUT

SEAL & SIGNATURE:

DRAWING DATA:
DATE: 05/25/2023

CROPSEY AVENUE



SVE-2
6" CORING &
4" SOLID PVC RISER TO CELLAR CEILING
[FIG. 12, DETAIL B]

VACUUM VAPOR PIN (TYPICAL)
[FIG. 12, DETAIL E]

VACUUM MONITORING POINTS (TYPICAL)
[FIG. 12, DETAIL D]

SVE RISER TO ROOF
[FIG. 12, DETAIL A]

ADSORBER (TV 500 OR SIMILAR) (FIG 12 DETAIL C)

SVE-3
6" CORING &
4" SOLID PVC RISER TO CELLAR CEILING
[FIG. 12, DETAIL B]

VACUUM MONITORING POINTS (TYPICAL) [FIG. 12, DETAIL E]

4" SOLID PVC PIPE TO BE STRAPPED TO CELLAR CEILING AT 6 FOOT SPACING

6" SOLID PVC MANIFOLD PIPE TO BE STRAPPED TO CELLAR CEILING AT 6 FOOT SPACING

VACUUM MONITORING POINTS (TYPICAL) [FIG. 12, DETAIL D]

4" SOLID PVC PIPE TO BE STRAPPED TO CELLAR CEILING AT 6 FOOT SPACING

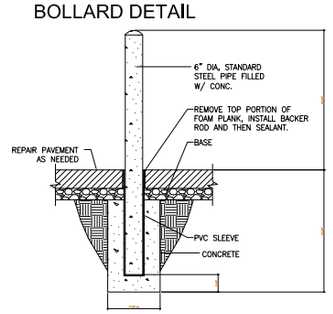
VACUUM MONITORING POINTS (TYPICAL FOR 4) [FIG. 12, DETAIL E]

SVE-1
6" CORING &
4" SOLID PVC RISER TO CELLAR CEILING
[FIG. 12, DETAIL B]

LEGEND

- PROPOSED 6" DI. SVE WELL LOCATION
- PROPOSED 30" CARBON ADSORBER
- PROPOSED RISER TO ROOF
- VAPOR MONITORING POINT
- V — PROPOSED VAPOR PIN SSDS MONITORING POINT
- PROPOSED SVE PVC PIPE
- EXISTING STEEL COLUMN

BOLLARD DETAIL



NOTES:
1. STEEL PIPE SHALL BE STANDARD-WEIGHT STEEL PIPE COMPLYING WITH ASTM A53/A53M OR STAINLESS STEEL SCHEDULE 40 COMPLYING WITH ASTM A312/A312M.
2. CONCRETE SHALL BE 3,000 PSI
3. ISOLATION JOINTS AROUND CONCRETE FOOTER.

PREPARED BY:

Tyll Engineering and Consulting PC
169 Commack Road, Suite H173
Commack, New York 11725
Office: (631) 629-5373

PREPARED FOR:

1810 CROPSEY AVE LLC
1762 BENSON AVENUE
BROOKLYN, NY 11214

REVISION DATA:

REV	DATE	COMMENT	BY

SCALE: N.T.S.

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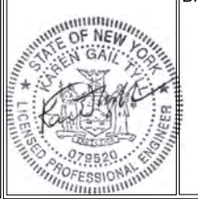
PROJECT NAME:

1810 CROPSEY AVENUE
BROOKLYN, NY 11214
BLOCK: 6463, LOT: 137

DRAWING TITLE:

FIGURE 6:
SOIL VAPOR EXTRACTION LAYOUT

SEAL & SIGNATURE:

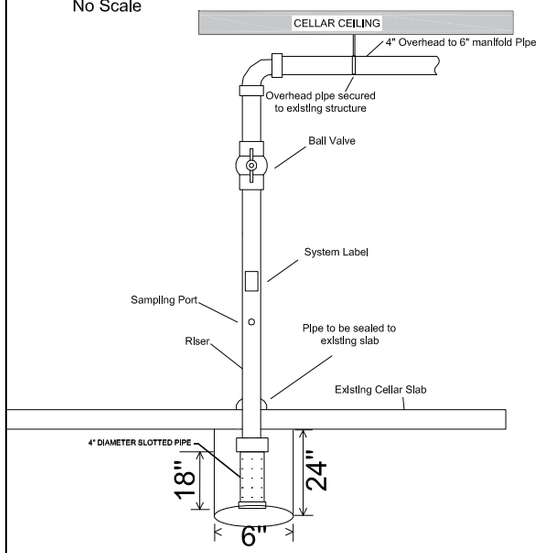


DRAWING DATA:

DATE: 06/02/2023

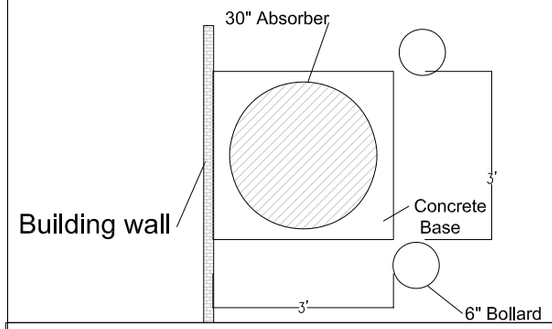
DETAIL B: Suction Point and Riser

No Scale



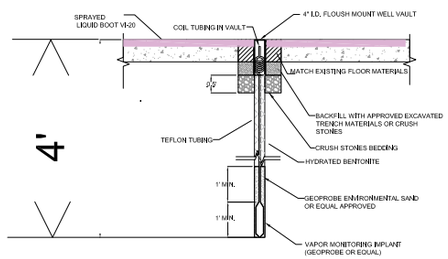
DETAIL C: ON GRADE ABSORBER LAYOUT

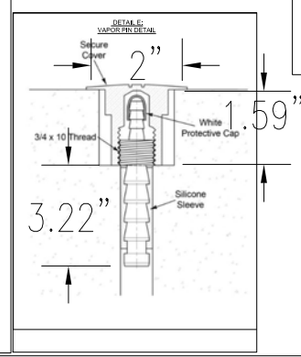
No Scale



DETAIL D: Vapor monitoring port details

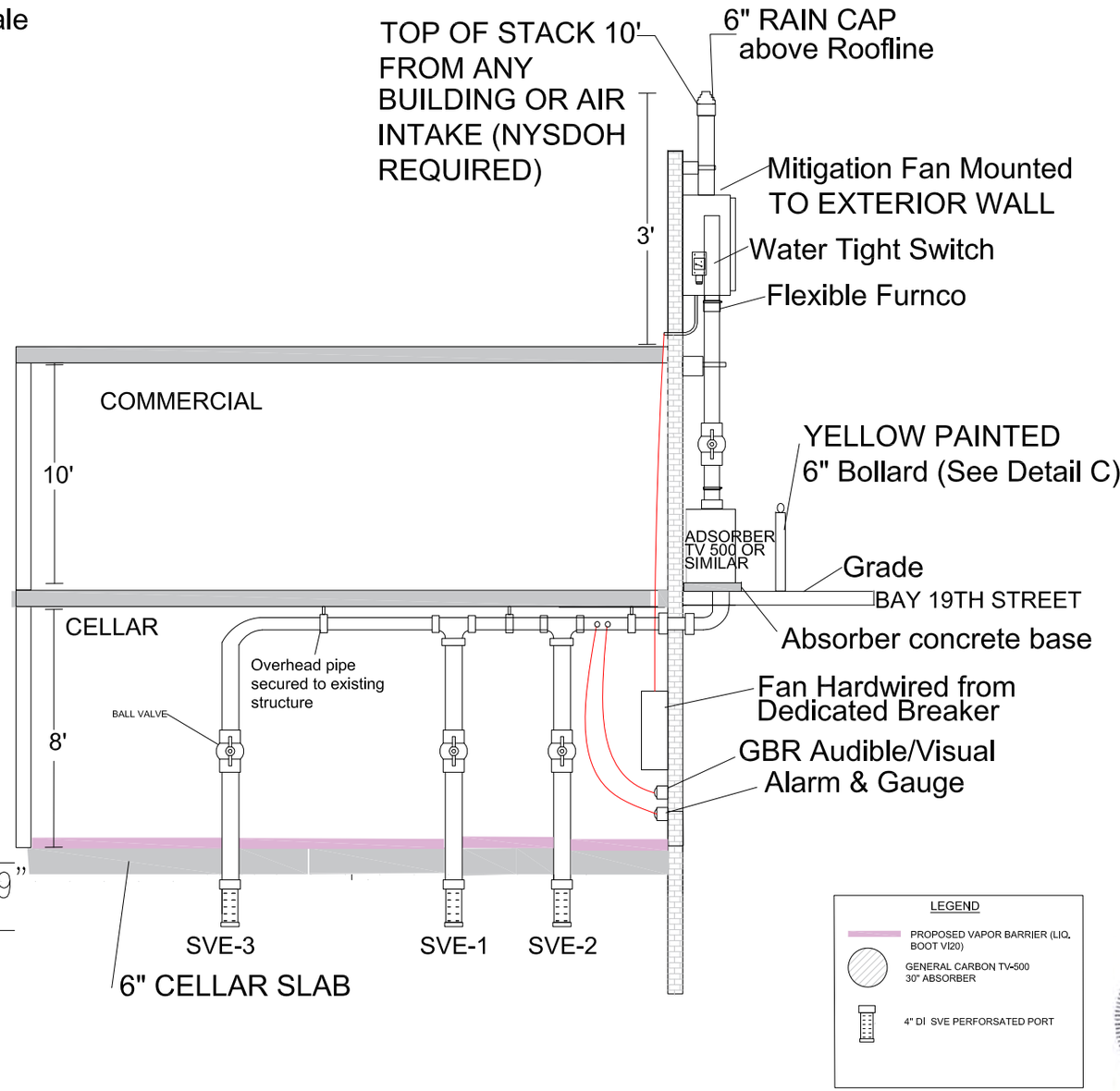
No Scale





DETAIL A: SVE SYSTEM SECTION VIEW

No Scale



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REVISION DATA:

REV	DATE	COMMENT	BY

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PROJECT NAME:

1810 CROPSEY AVENUE
BROOKLYN, NY 11214
(BLOCK: 6463, LOT: 137)

DRAWING TITLE:

FIGURE 7 :
SVE DETAILS

SEAL & SIGNATURE:

DRAWING DATA:

DATE: 6/2/2023

LEGEND:

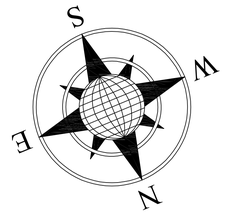
DIAGNOSTICS

- SUCTION POINT
- TEST POINT
- INTERIOR COLUMN

Scale: 1" = 4'

0 4' 16'

2' 8'



Notes:

NOTES

FIGURE 8

REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

OBAR SYSTEMS, INC.
2969 NJ 23, Newfoundland, NJ, 07435

OBAR SYSTEMS, INC.

SITE: 1810 Cropsey Avenue, Brooklyn, NY 11214

DATE:	DRAWN:
4/24/23	TN

SHEET #:	SHEET NAME:	SHEET SIZE:
SSD-1	Diagnostic Map	ARCH E1

LEGEND:

INSTALLATION

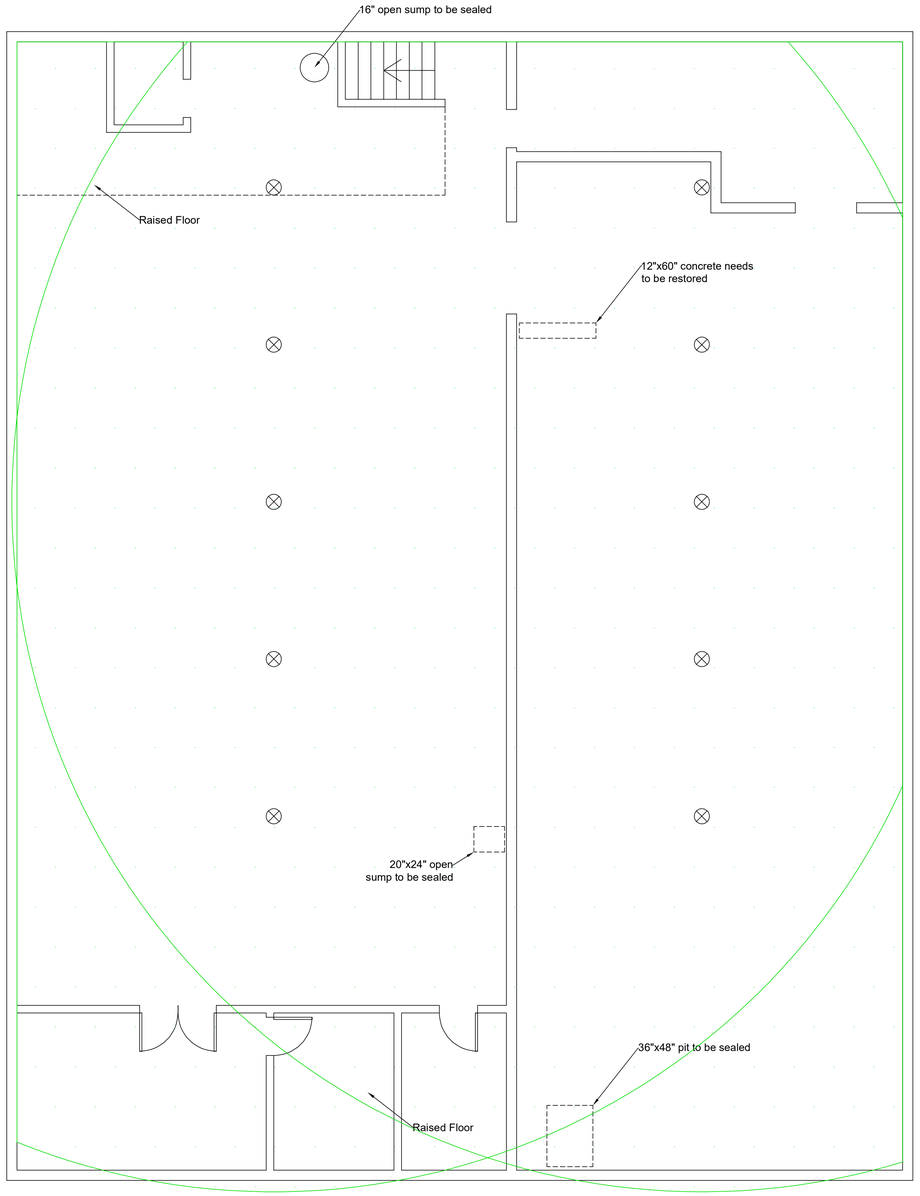
RADIUS OF INFLUENCE

INTERIOR COLUMN

Scale: 1" = 4'

0 4' 16'

2' 8'



Notes:

NOTES

FIGURE 9

REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

OBAR SYSTEMS, INC.
2989 NJ 23, Newfoundland, NJ, 07435

OBAR SYSTEMS, INC.

SITE: 1810 Cropsey Avenue, Brooklyn, NY 11214

DATE:	DRAWN:
4/24/23	TN

SHEET #:	SHEET NAME:	SHEET SIZE:
SSD-1	Mapped ROIs	ARCH E1

NYCRR PART 375 SCOs			
Compound	**CSCO**	**RRSCO**	**UUSCO**
VOCs (mg/kg)			
1,2,4-Trimethylbenzene	190	52	3.6
1,3,5-Trimethylbenzene	190	52	8.4
Ethylbenzene	390	41	1
Methylene chloride	500	100	0.05
n-Butylbenzene	500	100	12
n-Propylbenzene	500	100	3.9
SVOCs (mg/kg)			
Naphthalene	500	100	12
Pesticides (mg/kg)			
4,4' -DDD	92	13	0.0033
Dieldrin	1.4	0.2	0.005
4,4' -DDE	62	8.9	0.0033
4,4' -DDT	47	7.9	0.0033
TAL Metals (mg/kg)			
Chromium	-	-	30
Nickel	310	310	30
Lead	1000	400	63

Compound	SC-1 S5 (16'-20')
SVOCs (mg/kg)	
2-Methylnaphthalene	22
Naphthalene	8.4
TAL Metals (mg/kg)	
Nickel	42.3
Compound	**SC-1 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.009
1,3,5-Trimethylbenzene	0.01
2-Isopropyltoluene	0.00043
Acetone	0.011
Carbon Disulfide	0.0008
Ethylbenzene	0.042
Isopropylbenzene	0.011
m&p-Xylene	0.015
Naphthalene	0.13
n-Butylbenzene	0.006
n-Propylbenzene	0.036
p-Isopropyltoluene	0.001
sec-Butylbenzene	0.003
TAL Metals (mg/kg)	
Nickel	33

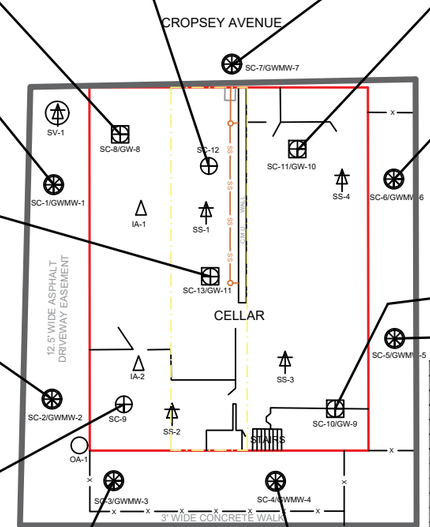
Compound	SC-8 S1 (0'-4')
TAL Metals (mg/kg)	
Nickel	53.3
Compound	**SC-8 S3 (8'-12')**
TAL Metals (mg/kg)	
Nickel	55.1
Compound	**SC-8 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.003
1,3,5-Trimethylbenzene	0.031
2-Isopropyltoluene	0.001
Carbon Disulfide	0.0007
Ethylbenzene	0.017
Isopropylbenzene	0.016
Naphthalene	0.022
n-Butylbenzene	0.016
n-Propylbenzene	0.11
p-Isopropyltoluene	0.0024
sec-Butylbenzene	0.0061
TAL Metals (mg/kg)	
Nickel	36

Compound	SC-12 S1 (0'-4')
VOCs (mg/kg)	
Tetrachloroethene	0.001
TAL Metals (mg/kg)	
Nickel	35.3

Compound	SC-13 S1 (0'-4')
VOCs (mg/kg)	
Tetrachloroethene	0.001
TAL Metals (mg/kg)	
Nickel	40.9

Compound	SC-2 S5 (16'-20')
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	110
1,3,5-Trimethylbenzene	36
Ethylbenzene	6.9
Isopropylbenzene	4.2
m&p-Xylene	3.1
Naphthalene	10
n-Butylbenzene	9.5
n-Propylbenzene	19
p-Isopropyltoluene	2.1
sec-Butylbenzene	3
SVOCs (mg/kg)	
2-Methylnaphthalene	21
Naphthalene	9.3
Pesticides (mg/kg)	
4,4' -DDD	0.006
TAL Metals (mg/kg)	
Nickel	47
Compound	**SC-2 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.006
1,3,5-Trimethylbenzene	0.003
Ethylbenzene	0.002
m&p-Xylene	0.005
Naphthalene	0.006
n-Propylbenzene	0.001
SVOCs (mg/kg)	
2-Methylnaphthalene	0.14
TAL Metals (mg/kg)	
Nickel	53.4

Compound	SC-9 S1 (0'-4')
VOCs (mg/kg)	
Tetrachloroethene	0.0009
TAL Metals (mg/kg)	
Nickel	47.8
Compound	**SC-9 S3 (8'-12')**
TAL Metals (mg/kg)	
Nickel	30.2
Compound	**SC-9 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.0051
1,3,5-Trimethylbenzene	0.15
2-Isopropyltoluene	0.001
Ethylbenzene	0.13
Isopropylbenzene	0.022
m&p-Xylene	0.0034
Naphthalene	0.13
n-Butylbenzene	0.016
n-Propylbenzene	0.18
p-Isopropyltoluene	0.0025
sec-Butylbenzene	0.0061
SVOCs (mg/kg)	
2-Methylnaphthalene	0.18
Naphthalene	0.12
TAL Metals (mg/kg)	
Nickel	49.5



Compound	SC-3 S5 (16'-20')
VOCs (mg/kg)	
Isopropylbenzene	0.004
n-Butylbenzene	0.0014
n-Propylbenzene	0.0077
sec-Butylbenzene	0.00083
Pesticides (mg/kg)	
4,4' -DDT	0.018
TAL Metals (mg/kg)	
Nickel	35.5
Compound	**SC-3 S6 (20'-24')**
SVOCs (mg/kg)	
Acetone	0.0049
Tetrachloroethene	0.0028
Pesticides (mg/kg)	
4,4' -DDD	0.0057
4,4' -DDE	0.061
4,4' -DDT	0.19
TAL Metals (mg/kg)	
Nickel	39.7

Compound	SC-4 S5 (16'-20')
VOCs (mg/kg)	
Tetrachloroethene	0.0014
TAL Metals (mg/kg)	
Nickel	39.6
Compound	**SC-4 S6 (20'-24')**
VOCs (mg/kg)	
Tetrachloroethene	0.0015
SVOCs (mg/kg)	
Benz(a)anthracene	0.44
Benzo(a)pyrene	0.49
Benzo(b)fluoranthene	0.48
Benzo(ghi)perylene	0.39
Benzo(k)fluoranthene	0.4
Chrysene	0.54
Fluoranthene	0.75
Indeno(1,2,3-cd)pyrene	0.41
Phenanthrene	0.38
Pyrene	0.6
TAL Metals (mg/kg)	
Nickel	47.2

Compound	SC-5 S5 (16'-20')
VOCs (mg/kg)	
Ethylbenzene	0.2
Isopropylbenzene	0.94
Naphthalene	1.8
n-Butylbenzene	3
n-Propylbenzene	4.1
p-Isopropyltoluene	0.57
sec-Butylbenzene	0.94
SVOCs (mg/kg)	
2-Methylnaphthalene	41
Bis(2-ethylhexyl)phthalate	0.29
Naphthalene	29
Pesticides (mg/kg)	
4,4' -DDD	0.049
TAL Metals (mg/kg)	
Nickel	34.3
Compound	**SC-5 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	1.9
2-Isopropyltoluene	0.21
Ethylbenzene	0.83
isopropylbenzene	2.1
Methylene chloride	0.78
Naphthalene	9.5
n-Butylbenzene	4.5
n-Propylbenzene	9.2
p-Isopropyltoluene	0.62
sec-Butylbenzene	1.3
SVOCs (mg/kg)	
2-Methylnaphthalene	5.2
Naphthalene	3.2
Pesticides (mg/kg)	
4,4' -DDD	0.009
TAL Metals (mg/kg)	
Nickel	30.1

Compound	SC-6 S5 (16'-20')
VOCs (mg/kg)	
2-Isopropyltoluene	0.13
Ethylbenzene	0.21
Isopropylbenzene	0.99
n-Butylbenzene	2
n-Propylbenzene	4.2
p-Isopropyltoluene	0.2
sec-Butylbenzene	0.61
SVOCs (mg/kg)	
2-Methylnaphthalene	22
Bis(2-ethylhexyl)phthalate	0.22
Naphthalene	15
Pesticides (mg/kg)	
4,4' -DDD	0.037
TAL Metals (mg/kg)	
Nickel	34
Compound	**SC-6 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.3
2-Isopropyltoluene	0.041
Ethylbenzene	0.11
Isopropylbenzene	0.4
Naphthalene	1.3
n-Butylbenzene	0.69
n-Propylbenzene	1.6
p-Isopropyltoluene	0.13
sec-Butylbenzene	0.24
SVOCs (mg/kg)	
2-Methylnaphthalene	2.7
Naphthalene	1.4
Pesticides (mg/kg)	
4,4' -DDD	0.012
TAL Metals (mg/kg)	
Nickel	42.1
Compound	**SC-6 S7 (24'-28')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.007
2-Isopropyltoluene	0.00082
Acetone	0.008
Carbon Disulfide	0.001
Ethylbenzene	0.002
Isopropylbenzene	0.008
Naphthalene	0.015
n-Butylbenzene	0.014
n-Propylbenzene	0.031
p-Isopropyltoluene	0.002
sec-Butylbenzene	0.005
TAL Metals (mg/kg)	
Chromium	40.9
Nickel	119

Compound	SC-11 S1 (0'-4')
VOCs (mg/kg)	
cis-1,2-Dichloroethene	0.0003
m&p-Xylene	0.001
o-Xylene	0.0009
Tetrachloroethene	0.0009
TAL Metals (mg/kg)	
Nickel	67.3
Compound	**SC-11 S3 (8'-12')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.27
1,3,5-Trimethylbenzene	0.2
2-Isopropyltoluene	0.0023
Carbon Disulfide	0.0016
Ethylbenzene	0.086
Isopropylbenzene	0.026
m&p-Xylene	0.25
Naphthalene	0.11
n-Butylbenzene	0.033
n-Propylbenzene	0.099
o-Xylene	0.06
p-Isopropyltoluene	0.0088
sec-Butylbenzene	0.014
Tetrachloroethene	0.0019
Toluene	0.0005
SVOCs (mg/kg)	
2-Methylnaphthalene	3.8
Naphthalene	2.3
Pesticides (mg/kg)	
4,4' -DDD	0.015
TAL Metals (mg/kg)	
Nickel	53.9
Compound	**SC-11 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	3.7
1,3,5-Trimethylbenzene	1.1
Ethylbenzene	0.99
Isopropylbenzene	0.14
m&p-Xylene	3.6
Naphthalene	1.1
n-Butylbenzene	0.21
n-Propylbenzene	0.54
o-Xylene	0.9
p-Isopropyltoluene	0.039
sec-Butylbenzene	0.062
Toluene	0.039
SVOCs (mg/kg)	
2-Methylnaphthalene	5.4
Naphthalene	6.4
Pesticides (mg/kg)	
4,4' -DDD	0.01
TAL Metals (mg/kg)	
Nickel	45.1

Compound	SC-10 S1 (0'-4')
VOCs (mg/kg)	
cis-1,2-Dichloroethene	0.0005
Tetrachloroethene	0.11
Trichloroethene	0.0004
SVOCs (mg/kg)	
Benz(a)anthracene	0.21
Benzo(a)pyrene	0.22
Benzo(b)fluoranthene	0.19
Benzo(ghi)perylene	0.15
Benzo(k)fluoranthene	0.18
Chrysene	0.22
Fluoranthene	0.41
Indeno(1,2,3-cd)pyrene	0.18
Phenanthrene	0.21
Pyrene	0.39
Pesticides (mg/kg)	
4,4' -DDE	0.0047
4,4' -DDT	0.007
TAL Metals (mg/kg)	
Lead	91.7
Nickel	41.6
Compound	**SC-10 S3 (8'-12')**
VOCs (mg/kg)	
Acetone	0.0046
TAL Metals (mg/kg)	
Nickel	41.4
Compound	**SC-10 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	10
1,3,5-Trimethylbenzene	12
2-Isopropyltoluene	0.13
Ethylbenzene	9.2
Isopropylbenzene	2
m&p-Xylene	5.9
Naphthalene	7.5
n-Butylbenzene	2.9
n-Propylbenzene	7.6
p-Isopropyltoluene	0.52
sec-Butylbenzene	0.9
SVOCs (mg/kg)	
2-Methylnaphthalene	3.9
Naphthalene	3.3
TAL Metals (mg/kg)	
Chromium	115
Nickel	73.9

Compound	SC-7 S1 (0'-4')
PFAS (21) (ng/g)	
PFOS	0.87
PFOA	0.33
Compound	**SC-7 S5 (16'-20')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	69
1,3,5-Trimethylbenzene	24
2-Isopropyltoluene	0.87
Isopropylbenzene	1.8
n-Butylbenzene	15
n-Propylbenzene	14
p-Isopropyltoluene	2.8
sec-Butylbenzene	6
SVOCs (mg/kg)	
2-Methylnaphthalene	0.9
Naphthalene	0.42
Pesticides (mg/kg)	
4,4' -DDD	0.026
Dieldrin	0.017
TAL Metals (mg/kg)	
Nickel	30.7
Compound	**SC-7 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	91
1,3,5-Trimethylbenzene	29
2-Isopropyltoluene	1
Isopropylbenzene	2.7
n-Butylbenzene	15
n-Propylbenzene	17
p-Isopropyltoluene	2.8
sec-Butylbenzene	5.6
SVOCs (mg/kg)	
2-Methylnaphthalene	16
Naphthalene	3.3
TAL Metals (mg/kg)	
Nickel	46.7
Compound	**SC-7 S7 (24'-28')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.61
1,3,5-Trimethylbenzene	0.18
2-Isopropyltoluene	0.00072
Carbon Disulfide	0.001
Ethylbenzene	0.002
Isopropylbenzene	0.009
m&p-Xylene	0.017
Naphthalene	0.027
n-Butylbenzene	0.011
n-Propylbenzene	0.098
o-Xylene	0.00064
p-Isopropyltoluene	0.002
sec-Butylbenzene	0.005
TAL Metals (mg/kg)	
Nickel	55.7

LEGEND

- SOIL BORING LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SANITARY SEWER PIPE

PREPARED BY:

RSK ENVIRONMENTAL LLC
132-02 89TH AVE, SUITE #222
RICHMOND HILL, NY 11418
(T) 718-438-2200

PREPARED FOR:

1810 CROPSEY AVE LLC
1762 BENSON AVENUE
BROOKLYN, NY 11214

REVISION DATA:

REV	DATE	COMMENT	BY

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SCALE:

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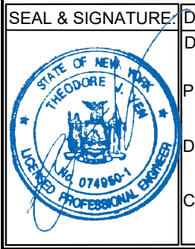
PROJECT NAME:

1810 CROPSEY AVENUE
BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 4A:
SOIL EXCEEDANCES SPIDER MAP

SEAL & SIGNATURE:



DRAWING DATA:

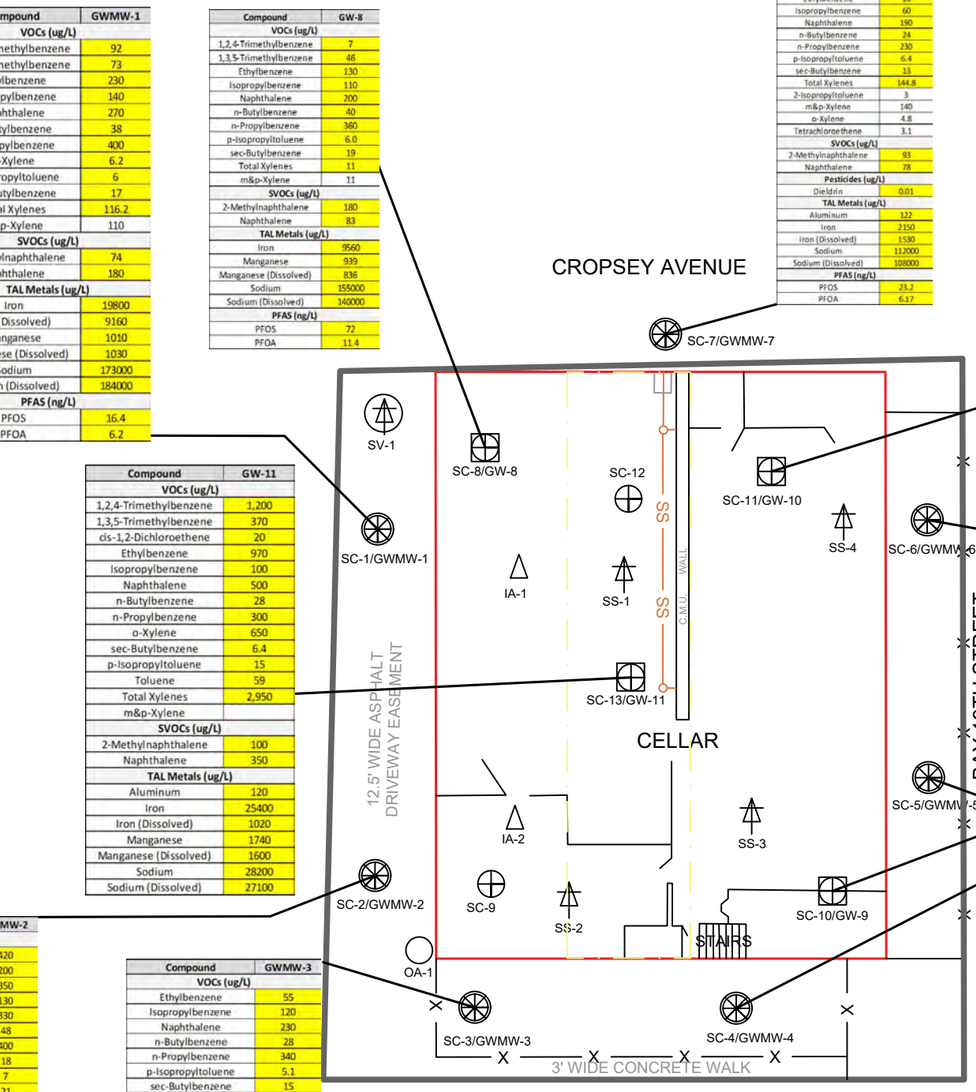
DATE: 5/17/2022

PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

FIGURE 10



Compound	GWMW-1
VOCs (ug/L)	
1,2,4-Trimethylbenzene	92
1,3,5-Trimethylbenzene	73
Ethylbenzene	230
Isopropylbenzene	140
Naphthalene	270
n-Butylbenzene	38
n-Propylbenzene	400
o-Xylene	6.2
p-Isopropyltoluene	6
sec-Butylbenzene	17
Total Xylenes	116.2
m&p-Xylene	110
SVOCs (ug/L)	
2-Methylnaphthalene	74
Naphthalene	180
TAL Metals (ug/L)	
Iron	19800
Iron (Dissolved)	9160
Manganese	1010
Manganese (Dissolved)	1030
Sodium	173000
Sodium (Dissolved)	184000
PFAS (ng/L)	
PFOS	16.4
PFOA	6.2

Compound	GW-8
VOCs (ug/L)	
1,2,4-Trimethylbenzene	7
1,3,5-Trimethylbenzene	46
Ethylbenzene	130
Isopropylbenzene	110
Naphthalene	200
n-Butylbenzene	40
n-Propylbenzene	360
p-Isopropyltoluene	6.0
sec-Butylbenzene	19
Total Xylenes	11
m&p-Xylene	11
SVOCs (ug/L)	
2-Methylnaphthalene	180
Naphthalene	83
TAL Metals (ug/L)	
Iron	9560
Manganese	939
Manganese (Dissolved)	836
Sodium	155000
Sodium (Dissolved)	140000
PFAS (ng/L)	
PFOS	72
PFOA	11.4

Compound	GWMW-7
VOCs (ug/L)	
1,2,4-Trimethylbenzene	1,300
1,3,5-Trimethylbenzene	380
Ethylbenzene	16
Isopropylbenzene	60
Naphthalene	190
n-Butylbenzene	24
n-Propylbenzene	230
p-Isopropyltoluene	6.4
sec-Butylbenzene	13
Total Xylenes	144.8
2-Isopropyltoluene	3
m&p-Xylene	140
o-Xylene	4.8
Tetrachloroethane	3.1
SVOCs (ug/L)	
2-Methylnaphthalene	93
Naphthalene	78
Pesticides (ug/L)	
Dieldrin	0.01
TAL Metals (ug/L)	
Aluminum	122
Iron	2150
Iron (Dissolved)	1530
Sodium	112000
Sodium (Dissolved)	108000
PFAS (ng/L)	
PFOS	23.2
PFOA	6.17

Compound	GW-10
VOCs (ug/L)	
1,2,4-Trimethylbenzene	3,100
1,3,5-Trimethylbenzene	710
Ethylbenzene	2,000
Isopropylbenzene	120
Naphthalene	1,300
n-Butylbenzene	23
n-Propylbenzene	350
o-Xylene	1,900
p-Isopropyltoluene	8.5
Tetrachloroethene	16
Toluene	190
Total Xylenes	9,600
m&p-Xylene	7,700
SVOCs (ug/L)	
2-Methylnaphthalene	180
Naphthalene	690
TAL Metals (ug/L)	
Iron	12600
Lead	30
Lead (Dissolved)	27
Manganese	603
Manganese (Dissolved)	594
Sodium	102000
Sodium (Dissolved)	102000

Compound	GWMW-5
VOCs (ug/L)	
1,2,4-Trimethylbenzene	53
1,3,5-Trimethylbenzene	11
Ethylbenzene	34
Isopropylbenzene	60
Naphthalene	150
n-Butylbenzene	27
n-Propylbenzene	180
sec-Butylbenzene	12
Total Xylenes	5
m&p-Xylene	5
SVOCs (ug/L)	
2-Methylnaphthalene	93
Naphthalene	78
TAL Metals (ug/L)	
Aluminum	235
Iron	16000
Iron (Dissolved)	5020
Manganese	1270
Manganese (Dissolved)	1180
Sodium	99200
Sodium (Dissolved)	102000
PFAS (ng/L)	
PFOS	13.5
PFOA	23

Compound	GW-11
VOCs (ug/L)	
1,2,4-Trimethylbenzene	1,200
1,3,5-Trimethylbenzene	370
cis-1,2-Dichloroethene	20
Ethylbenzene	970
Isopropylbenzene	100
Naphthalene	500
n-Butylbenzene	28
n-Propylbenzene	300
o-Xylene	650
sec-Butylbenzene	6.4
p-Isopropyltoluene	15
Toluene	59
Total Xylenes	2,950
m&p-Xylene	
SVOCs (ug/L)	
2-Methylnaphthalene	100
Naphthalene	350
TAL Metals (ug/L)	
Aluminum	120
Iron	25400
Iron (Dissolved)	1020
Manganese	1740
Manganese (Dissolved)	1600
Sodium	28200
Sodium (Dissolved)	27100

Compound	GWMW-6
VOCs (ug/L)	
1,2,4-Trimethylbenzene	43
Ethylbenzene	5.3
Isopropylbenzene	9
Naphthalene	47
n-Butylbenzene	6.1
n-Propylbenzene	25
1,3,5-Trimethylbenzene	2.6
p-Isopropyltoluene	1.3
sec-Butylbenzene	2.3
TAL Metals (ug/L)	
Aluminum	235
Iron	4460
Iron (Dissolved)	2230
Manganese	324
Sodium	51900
Sodium (Dissolved)	47100

Compound	GWMW-2
VOCs (ug/L)	
1,2,4-Trimethylbenzene	420
1,3,5-Trimethylbenzene	200
Ethylbenzene	350
Isopropylbenzene	130
Naphthalene	330
n-Butylbenzene	48
n-Propylbenzene	400
o-Xylene	18
p-Isopropyltoluene	7
sec-Butylbenzene	21
Total Xylenes	628
m&p-Xylene	610
SVOCs (ug/L)	
2-Methylnaphthalene	74
Naphthalene	200
TAL Metals (ug/L)	
Aluminum	174
Iron	44400
Iron (Dissolved)	5270
Manganese	3690
Manganese (Dissolved)	3150
Sodium	142000
Sodium (Dissolved)	131000

Compound	GWMW-3
VOCs (ug/L)	
Ethylbenzene	55
Isopropylbenzene	120
Naphthalene	230
n-Butylbenzene	28
n-Propylbenzene	340
p-Isopropyltoluene	5.1
sec-Butylbenzene	15
Total Xylenes	19
m&p-Xylene	19
SVOCs (ug/L)	
2-Methylnaphthalene	57
Naphthalene	160
TAL Metals (ug/L)	
Aluminum	143
Iron	62400
Iron (Dissolved)	5060
Manganese	6390
Manganese (Dissolved)	4670
Sodium	126000
Sodium (Dissolved)	103000

Compound	GWMW-4
VOCs (ug/L)	
1,2,4-Trimethylbenzene	87
1,3,5-Trimethylbenzene	43
Ethylbenzene	14
Isopropylbenzene	73
Naphthalene	60
n-Butylbenzene	23
n-Propylbenzene	250
o-Xylene	6.8
sec-Butylbenzene	11
Total Xylenes	89.8
2-Isopropyltoluene	2.8
m&p-Xylene	83.0
Toluene	4.2
SVOCs (ug/L)	
2-Methylnaphthalene	6
Naphthalene	46
Pesticides (ug/L)	
Heptachlor epoxide	0.035
TAL Metals (ug/L)	
Iron	23200
Iron (Dissolved)	386
Manganese	3260
Manganese (Dissolved)	2820
Sodium	50600
Sodium (Dissolved)	51900
PFAS (ng/L)	
PFOS	56.5
PFOA	68.2

Compound	GW-9
VOCs (ug/L)	
1,2,4-Trimethylbenzene	110
1,3,5-Trimethylbenzene	150
Ethylbenzene	550
Isopropylbenzene	110
Naphthalene	540
n-Butylbenzene	39
n-Propylbenzene	320
p-Isopropyltoluene	9.1
sec-Butylbenzene	16
Touene	21
Total Xylenes	180
m&p-Xylene	180
SVOCs (ug/L)	
2-Methylnaphthalene	220
Naphthalene	93
TAL Metals (ug/L)	
Iron	61600
Iron (Dissolved)	3710
Manganese	7650
Manganese (Dissolved)	877
Sodium	47000
Sodium (Dissolved)	144000
PFAS (ng/L)	
PFOS	92
PFOA	116

AWQS FOR ANALYTES WITH EXCCEDANCES	
Compound	**AWQS**
VOCs (ug/L)	
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
cis-1,2-Dichloroethene	5
Ethylbenzene	5
Isopropylbenzene	5
Naphthalene	10
n-Butylbenzene	5
n-Propylbenzene	5
o-Xylene	5
p-Isopropyltoluene	5
sec-Butylbenzene	5
Tetrachloroethene	5
Toluene	5
Total Xylenes	5
SVOCs (ug/L)	
2-Methylnaphthalene	50
Naphthalene	10
Pesticides (ug/L)	
Dieldrin	0.004
Heptachlor epoxide	0.03
PFAS (ng/L)	
PFOS	0.01
PFOA	0.01
TAL Metals (ug/L)	
Iron	300
Lead	25
Manganese	300
Sodium	20000

LEGEND

- SOIL BORING LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- X — FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SS / SS — SANITARY SEWER PIPE

PREPARED BY:

RSK ENVIRONMENTAL LLC
132-02 89TH AVE, SUITE #222
RICHMOND HILL, NY 11418
(T) 718-438-2200

PREPARED FOR:

1810 CROPSEY AVE LLC
1762 BENSON AVENUE
BROOKLYN, NY 11214

REVISION DATA:

REV	DATE	COMMENT	BY

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PROJECT NAME:

1810 CROPSEY AVENUE
BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 4B:
GW EXCEEDANCES SPIDER MAP

SEAL & SIGNATURE:

STATE OF NEW YORK THEODORE VALENTINE 074050-1 LICENSED PROFESSIONAL ENGINEER

DRAWING DATA:

DATE: 5/17/2022

PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

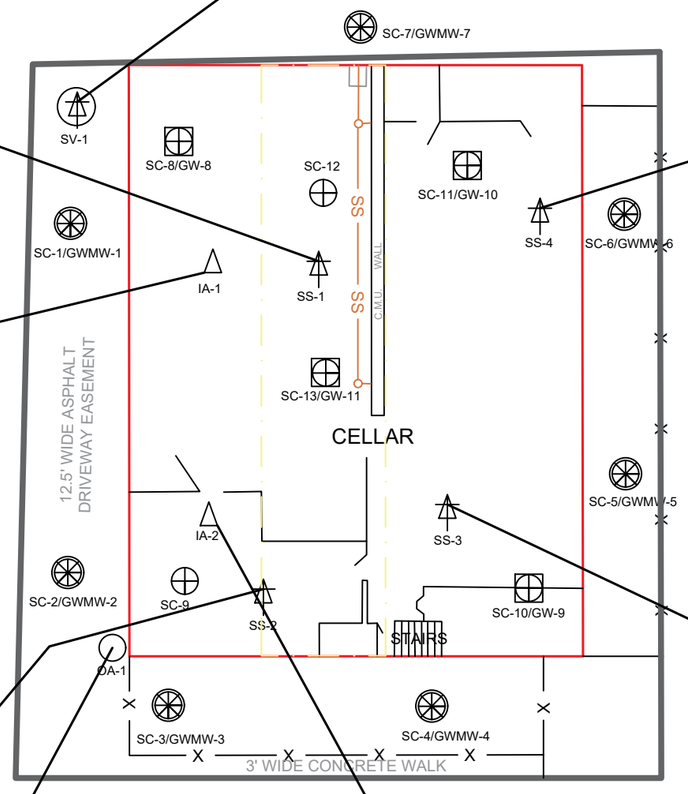
FIGURE 11

Compound	SV-1
VOCs (ug/m3)	
Cyclohexane	7,640
Ethanol	139
Ethylbenzene	529
Heptane	56,500
Hexane	93,700
Tetrachloroethene	75.9
Toluene	133

Compound	SS-1
VOCs (ug/m3)	
Cis-1,2-Dichloroethene	70.9
Ethanol	11.8
Ethylbenzene	5.25
Hexane	12.5
m,p-Xylene	24.2
Tetrachloroethene	1,320
Toluene	79.8
Trichloroethene	29

Compound	IA-1
VOCs (ug/m3)	
Carbon Tetrachloride	0.43
Chloromethane	1.28
Dichlorodifluoromethane	1.46
Ethanol	20.7
Hexane	1.84
m,p-Xylene	4.28
Methylene Chloride	6.28
o-Xylene	1.31
Tetrachloroethene	0.52
Trichlorofluoromethane	1.49

Compound	SS-2
VOCs (ug/m3)	
Cis-1,2-Dichloroethene	29.6
Ethanol	10.9
Hexane	7.4
m,p-Xylene	18.7
Tetrachloroethene	1,780
Toluene	27.9
Trichloroethene	22



Compound	OA-1
VOCs (ug/m3)	
Carbon Tetrachloride	0.41
Chloromethane	1.25
Dichlorodifluoromethane	1.23
Ethanol	6.89
Hexane	1.4
m,p-Xylene	3.72
o-Xylene	1.02
Trichlorofluoromethane	1.52

Compound	IA-2
VOCs (ug/m3)	
Carbon Tetrachloride	0.4
Chloromethane	1.36
Dichlorodifluoromethane	1.35
Ethanol	11.2
m,p-Xylene	4.2
o-Xylene	1.31
Tetrachloroethene	0.49
Trichlorofluoromethane	1.51

Compound	SS-4
VOCs (ug/m3)	
1,2,4-Trimethylbenzene	6.93
1,3,5-Trimethylbenzene	1.59
Benzene	6.03
Cis-1,2-Dichloroethene	38
Cyclohexane	2.64
Ethanol	9.42
Ethylbenzene	7.51
Heptane	6.23
Hexane	14.9
m,p-Xylene	35
o-Xylene	8.94
Tetrachloroethene	712
Toluene	94.5
Trichloroethene	25.1
Trichlorofluoromethane	1.46

Compound	SS-3
VOCs (ug/m3)	
1,2,4-Trimethylbenzene	6.58
Benzene	6.48
Cis-1,2-Dichloroethene	79.2
Ethanol	14.2
Ethylbenzene	8.55
Heptane	8.36
Hexane	15.1
m,p-Xylene	35.1
o-Xylene	8.68
Tetrachloroethene	1,290
Toluene	118
Trichloroethene	35.9

LEGEND

- SOIL BORING LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SANITARY SEWER PIPE

PREPARED BY:

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PREPARED FOR:

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1762 BENSON AVENUE
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REVISION DATA:

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PROJECT NAME:

1810 CROPSEY AVENUE
BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 4C:
SOIL GAS & INDOOR/AMBIENT AIR AIR EXCEEDANCES SPIDER MAP

SEAL & SIGNATURE:

STATE OF NEW YORK THEODORE L. KEM No. 074960-1 LICENSED PROFESSIONAL ENGINEER

DRAWING DATA:

DATE: 8/10/2022

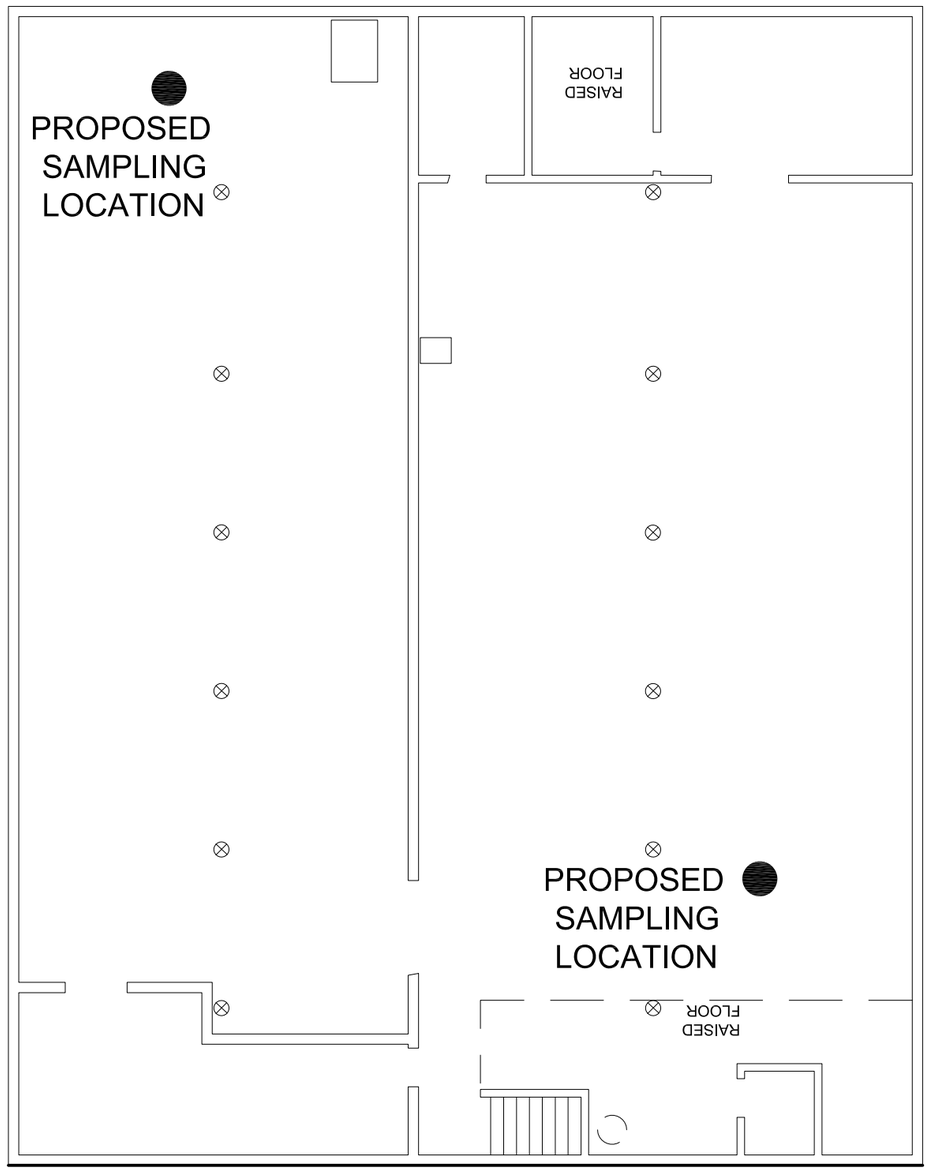
PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

FIGURE 12

CROPSEY AVENUE



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PROJECT NAME:

1810 CROPSEY AVENUE
BROOKLYN, NY 11214
BLOCK:6463,LOT:137

DRAWING TITLE:

FIGURE 13
PRE-OCCUPANCY INDOOR AIR TESTING

SEAL & SIGNATURE:

DRAWING DATA:

DATE: 7/11/2023

PROJECT NO:
20200901-1810

DRAWING BY: KT

CHECK BY: DS

Appendix A – Previous Environmental Reports

Site Characterization Report

for

1810 Cropsey Ave LLC

1810-1818 Cropsey Avenue,
Brooklyn, NY 11214
Block: 6463, Lot:137
NYSDEC Site No.: 224320
NYSDEC Spill No.: 2007751

Prepared For:

New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway,
Albany, NY 12233

Prepared By:

RSK Environmental Group, LLC
132-02 89th Avenue, Ste. 222
Richmond Hill, NY 11418
(718) 438-2200

September 28, 2022
Rev.2

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Figure 2 – Site Survey

Figure 3 – Surrounding Land Use

Figure 4 – Sampling Location Plan

Figure 4A – Soil Exceedances Map

Figure 4B – Groundwater Exceedances Map

Figure 4C – Soil Vapor & Indoor/Ambient Air Exceedances Map

Figure 5A – September 2020 Groundwater Exceedances Map

Figure 5B – September 2020 Soil Vapor & Indoor Air Exceedances Map

Appendices

Appendix A – Site Characterization Work Plan Approval Letter

Appendix B – Previous Environmental Reports

Appendix C – Geophysical Investigation Report

Appendix D – Soil Boring Logs

Appendix E – Well Construction Logs and Well Sampling Log

Appendix F – Analytical Data Reports

Appendix G – CAMP Logs

Appendix H – Equipment Calibration Certificates

Appendix I – Data Usability Summary Report

Certification

I, Theodore Yen, P.E., am a Qualified Environmental Professional, as defined in 6 NYCRR Part 375 and that this Site Characterization Report 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) and that all activities were performed in accordance with the DER-approved work plan and any DER-approved modifications.

Theodore Yen, P.E.		09/28/2022
Qualified Environmental Professional	Signature	Date

1.0 Introduction:

RSK Environmental Group, LLC (RSK) has prepared this *Site Characterization Report* (SCR) to document the site investigation activities that were conducted per the Site Characterization Work Plan, (SCWP) prepared by RSK Environmental Group (RSK), and dated January 24, 2022 (A copy of the SCWP approval letter is included as **Appendix A**). The investigation was performed at 1810-1818 Cropsey Avenue, Brooklyn, NY (hereafter referred to as the Site) to delineate the full extent of the contamination from dry-cleaning solvents and an offsite petroleum spill to soil and groundwater beneath the Site. The contamination was originally identified by RSK during investigations that are documented in a Phase-II Site Investigation Report dated September 21, 2020.

An Administrative Consent Order was executed between the potential purchaser, 1810 Cropsey Ave LLC, and the New York State Department of Environmental Conservation ("NYSDEC") to address contamination beneath the Site (Order on Consent Index # CO2-20210315-158).

The investigation described in this SCR is consistent with the procedures defined in the NYSDEC's *Technical Guidance for Site Investigation and Remediation* (DER-10) and complies with all applicable standards, criteria, and guidance. This project has been assigned Spill No. 2007751 by the NYSDEC Region 2 office which was a result of the findings from a Phase-II Environmental Site Investigation (Phase-II) as part of a real estate transaction. Results of the Phase-II identified impacted groundwater and sub-slab vapors beneath the building. Review of the Phase-II report by the NYSDEC confirmed that further delineation of groundwater, and vapor mitigation are required.

1.1 Site Location and Description:

The Site is also identified as Block: 6463, Lot: 137, and is located south of Cropsey Avenue (a.k.a. Victor V. Allegretti Way), north of Shore Parkway, east of 18th Avenue and west of Bay 19th Street which is situated within a mixed-use neighborhood in the Bensonhurst neighborhood of Kings County in Brooklyn, NY. A Site Location Map is provided as **Figure 1**. The Site is approximately 7,798-square feet in size and is developed with a one-story commercial building with a full cellar which has a total area of approximately 4,680-square feet. The Site is currently vacant with no occupants or ongoing activities. The building is supplied by public potable water supply and municipal sanitary sewer system. A Site survey is provided as **Figure 2**.

1.2 Site Use and History:

The primary zoning for the Site is R-5 designated district, which are mapped for residential use, with a C1-2 commercial overlay. The surrounding properties to the Site consist mainly of mixed-use residential and commercial properties. The surrounding properties to the east of the Site consists mainly of commercial properties, to the west and south of the Site are residential properties, and to the North of the Site are detached commercial buildings utilized as car dealers (Ultra Auto Inc. and Bay Ridge Subaru Service). Review of the historical data from EDR City Directory and Sanborn Maps, depicted the historical use of a part of the Site (1812 Cropsey Avenue) was a former dry cleaner, circa 1960 to at least 1976. The Site is currently vacant with no activities. A surrounding land use map is provided as **Figure 3**.

The Site is currently in a real estate contract for sale and the potential purchaser is planning to renovate the existing building utilizing the cellar for storage of merchandise and the first floor for offices.

1.3 Geological Conditions:

Based on a review of the United States Geological Survey (USGS) *The Narrows, New York* Quadrangle 7.5-minute series topographic map, the Site is situated at an elevation approximately 18.75-feet above mean sea level, and the local topography is sloping gently to the southeast.

The Site is primarily flat with some slight sloping to the southwest. Borings advanced during this investigation determined the underlying subsurface consists of medium to coarse-grained, brown sand from grade surface to at least 28-feet below grade surface.

Groundwater in the area of the Site is not used for drinking purposes and residents are connected to the New York City Public Water Supply System. The nearest body of water is the Gravesend Bay, which is located approximately 1,020-feet south of the Site. Groundwater flow is generally east.

2.0 Description of Previous Investigations:

2.1 Records Search/Risk Assessment (RSRA):

A Records Search/ Risk Assessment (RSRA) was conducted for the Site by Bison Environmental LLC (BE) dated August 31, 2020, where the property was considered to be of a high environmental risk. BE concluded the presence of a dry cleaner at 1812 Cropsey Avenue from at least 1960 through 1983, and recommended a Phase-I investigation to determine any indications of a discharge onsite and if the dry-cleaner might have been a drop-off location only. A copy of previous environmental reports is attached in **Appendix B**.

2.2 Phase-I Environmental Site Assessment:

On-site Findings

A Phase-I Environmental Site Assessment was performed by RSK Environmental Group for the Site dated September 14, 2020, to address the risk mentioned by BE in the RSRA. As part of the Site history research, two (2) Recognized Environmental Conditions (RECs) and four (4) Business Environmental Risks (BERs) were identified for the Site. The Sanborn Maps and City Directory search for the Site depicted the presence of a dry-cleaning facility on-site using the address as 1812 Cropsey Avenue from 1960 to at least 1976. The EDR Radius Map review depicted various spills that occurred on the north-northwest and northeast section of the property at a higher elevation. These offsite spills were suspected to have impacted the subsurface quality beneath the Site due to its proximity and elevation, and warranted a Phase-II subsurface investigation.

RSK performed a follow-up site inspection on January 25, 2022, to assess the current condition of the Site. The Site did not depict any changes other than the drum previously identified on the first floor was no longer present at the Site. A copy of previous environmental reports is attached in **Appendix B**.

Off-site Findings

According to the EDR Radius Search, a NY SPILL site (1785 Cropsey Avenue, Brooklyn, NY) was identified at approximately 240-feet northwest of the Site, at a higher elevation. The spill site (Former Getty S/S #98768) was reported to the NYSDEC on January 6, 1999 and documented with spill number 9812361, due to gasoline impacted soil encountered during the removal of underground storage tanks (USTs). Per the EDR records, ten (10) 550-gallon gasoline USTs and three (3) 4,000-gallon gasoline USTs were removed, and soils were excavated down to 14-feet below grade surface (bgs) where 214.66 tons of soil was removed. Soil analytical results identified significant exceedances in BTEX-related VOCs, and MTBE. Five (5) monitoring wells were installed on-site for monitoring groundwater concentrations, that

resulted in significant spikes in BTEX-related compounds and MTBE. Groundwater depths ranged from 18-ft. to 20-ft. bgs, and flowed to the southeast. DEC required delineation of contamination across Cropsey Avenue, and 18th Avenue; groundwater remediation and submission of Quarterly Monitoring reports. A Soil Vapor Extraction (SVE) system was installed on-site for vapor mitigation. Per the 2006 Remedial Action Plan submitted to the DEC, pump test and SVE test for conventional pump-and-treat system, Vapor Extraction/Groundwater Extraction (VE/GE) and Oxygen Releasing Compound (ORC) injection for off-site remediation was proposed. For the ORC barrier injection, a Tidal Influence Study (TIS) was conducted to define plume migration which depicted to influence the southeast direction flow. In 2015, under new ownership, the environmental consultant submitted a RegenOx Injection Work plan to the DEC that was approved for execution. In 2016, a review of the injection report and quarterly follow-up reports indicated a successful effort to remediate the property, and natural attenuation of the plume. The closure report was approved by the DEC and the spill was closed on August 26, 2016.

2.3 Phase-II Environmental Site Investigation:

A Phase-II Environmental Subsurface Investigation was conducted by RSK Environmental Group at the Site on September 21, 2020, to address the suspected subsurface impacts by the historic usage as a dry-cleaning facility on-site and offsite spills. Soil, soil vapors and groundwater were sampled to determine the presence and extent of the contamination from dry-cleaning solvents and offsite petroleum spills. As part of the Phase-II, a total of four (4) soil samples, four (4) groundwater samples and four (4) air samples were collected for laboratory analysis. Four (4) soil borings (SB-1 through SB-4) were installed in the corners of the cellar at a depth of 10-feet below cellar grade and retrieved every 2-feet. The four soil borings were converted into temporary groundwater wells for sampling (GW-1 through GW-4). High PID readings were observed for the retrieved groundwater samples. A total of four (4) air samples were taken from the Site; one (1) sub-slab sample (SI-1) from beneath the cellar; two (2) indoor air samples (the 1st floor (IA-1) and cellar (IA-2)), and one outdoor sample (OA-1). Analytical results did not identify contamination in the soil samples, or the results were well below the NYSDEC UUSCOs. Groundwater analysis depicted a consistency of petroleum-related contaminants in all four (4) samples (GW-1 through GW-4), predominately GW-1, GW-3, and GW-4 where eleven (11) VOCs, four (4) SVOCs and three (3) RCRA metals exceeded NYSDEC Groundwater Quality Standards. Soil Vapor Analytical results identified petroleum-related and chlorinated solvent contamination in the sub slab air samples for thirteen (13) VOCs, and consistent contamination in all four (4) air samples (SI-1, IA-1, IA-2, OA-1) for four (4) VOCs which exceed the NYSDOH Background standards for Indoor Air. Based on these findings and

results, a NYSDEC spill number (2007751) was generated for the Site and a review of the Phase-I ESA and Phase-II SIR was conducted by the state. A copy of previous environmental reports is attached in **Appendix B**.

3.0 Technical Overview

3.1 Objective

On January 24, 2022, a revised SCWP was submitted and later approved by the NYSDEC on February 25, 2022. A copy of the revised SCWP approval are included in **Appendix A**. From March 14-22, 2022, and March 29, 2022, the fieldwork outlined in the revised SCWP was conducted at the Site. A geophysical survey was completed on March 14, 2022 to determine if any buried anomalies exist and to clear proposed boring locations. Onsite soil vapor and indoor/ambient air sampling was completed on March 15, 2022. Onsite drilling activities (soil and groundwater wells installation) were completed March 16-22, 2022. On March 29, 2022, RSK conducted the groundwater sampling on all the wells.

The procedures listed below were used as appropriate for the site characterization activities;

- Oversight of soil borings to evaluate soil conditions across the Site;
- Oversight of the installation of permanent monitoring wells to assess groundwater conditions and investigate the extent and migration of compounds of concern at the Site;
- Oversight of the installation of a temporary soil vapor sampling point, temporary sub-slab soil vapor sampling points, and collection of indoor/ambient air samples to assess soil vapor and indoor/outdoor air conditions at the Site;
- Soil and groundwater samples collected for analysis were placed in laboratory prepared sample jars capped with lids. The soil and groundwater samples were placed in a chilled cooler (4°C) and submitted to Phoenix Environmental Laboratories, Inc. (PEL) a state-certified laboratory in the City of Manchester, CT;
- Vapor samples collected for analysis were collected in laboratory prepared sample canisters. The vapor samples were submitted Phoenix Environmental Laboratories, Inc. (PEL) a state-certified laboratory in the City of Manchester, CT;
- Standard Chain-of-Custody procedures were implemented to track the samples;
- Review of the associated laboratory chronicles and Quality Assurance/Quality Control (QA/QC) reports indicates no issues concerning the validity of the analytical results. The reliability of laboratory analytical data as indicated by compliance with sample holding times, ability to achieve method detection limits and precision and accuracy criteria for the analytical method;
- There were no significant events or seasonal variation which may have influenced sampling procedures or analytical results; and
- To evaluate compliance with the existing remediation standards, RSK utilized the NYSDEC Part 375-6.8(a) NY-UNRES SCOs, appropriate Part 375-6.8(b) NY-RES SCOs (Residential,

Commercial &/or Protection of Groundwater) and NYSDEC Part 703 Groundwater Quality Standards (GQS) (class GA) or Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS). Air sampling analytical results were compared to the New York State Department of Health (NYSDOH) guidance document, guideline values, and Decision Matrices.

The following section describes all of the fieldwork that was conducted at the Site in March 2022 per the approved SCWP dated January 24, 2022.

3.2 Geophysical Survey

Prior to conducting the subsurface activities, a one-call utility mark-out was completed in accordance with local laws to locate buried utility lines. On March 14, 2022, a geophysical survey was performed by RSK throughout the entirety of the Site to investigate for the presence of underground utilities and anomalies prior to performing the work. All proposed locations were cleared with ground penetrating radar. A copy of the GPR report is included in **Appendix C**.

3.3 Soil Investigation

In order to further delineate soil contamination, thirteen (13) soil borings were advanced at the Site. On March 16-22, RSK mobilized on-Site with the necessary drilling equipment to advance to the thirteen soil borings (SC-1 to SC-13). The soil borings were advanced with a direct-push, track-mounted Geoprobe Model 54LT drill rig. Drilling rods and sampling equipment were decontaminated between samples and borings to prevent cross-contamination. Each soil boring location was overlain with either 4 to 5 inches of concrete or asphalt. Boring locations on the exterior of the property were saw cut to create an 8-inch by 8-inch square for installation of permanent groundwater monitoring wells. Boring locations on the interior of the property were core drilled. On the exterior borings, soil cores were collected using a 4-foot long MacroCore sampler with a 4-foot-long acetate liner, which was advanced by the direct-push drill rig using 4-foot-long rods. On the interior borings, soil cores were collected using a hand auger to the soil-groundwater interface, then a 4-foot long MacroCore sampler with 4-foot-long acetate liners were used to termination depth, which were advanced manually using a Geoprobe manual slide hammer. A lengthwise section of each acetate liner was removed with a splitting tool to expose the soil. The soil column was visually inspected for discoloration, monitored for odors, and classified in soil boring logs. Additionally, the soil column was field-screened with a PID calibrated to isobutylene. Drill cuttings were containerized and appropriately labeled in DOT-approved 55-gallon drums. Approximately two (2) 55-

gallon drums of petroleum contaminated soil and two (2) 55-gallon drums of petroleum contaminated debris were generated at the Site.

Soil borings SC-1 through SC-7 were advanced on the exterior of the building, within the property boundaries. Soil borings SC-1 and SC-2 were advanced in the driveway easement along the western wall of the building, SC-3 and SC-4 were advanced within the fenced in area along the southern wall of the building, SC-5 and SC-6 were advanced within the fenced in area on the eastern side of the building, and SC-7 was advanced along the northern wall of the building, adjacent to Cropsey Avenue. At each boring location, two samples were collected from the soil-groundwater interface (16-20 feet) and from beyond the interface (20-24 feet). One deeper sample (24-28 feet) was collected at SC-6 and SC-7 due to high PID readings of 735 ppm and 750 ppm, respectively, at the 16-20 feet depth range. Additionally, a shallow sample (0-4 feet) was collected from SC-1, SC-4, SC-5, and SC-7 for PFAS and 1,4 dioxane analysis. Soil borings SC-8 through SC-13 were advanced on the interior of the building. Soil borings SC-8 and SC-9 were advanced within the cellar adjacent to the western wall of the building, SC-10 and SC-11 were advanced within the cellar adjacent to the eastern wall of the building, and SC-12 and SC-13 were advanced within the cellar in the area of the former dry-cleaners adjacent to the sanitary sewer line. At each boring location within the cellar, three samples were collected from shallow (0-4 feet), from soil-groundwater interface (8-12 feet), and from beyond the interface (12-16 feet).

In total, thirty-four (34) soil samples including appropriate duplicate samples were collected at the Site. Per the SCWP, all soil samples collected, excluding SC-1 S1, SC-4 S1, SC-5 S-1, and SC-7 S1, were analyzed for VOCs, SVOC, PCBs, Pesticides, and TAL Metals. Additionally, fourteen (14) selective soil samples, SC-1 S1 and S5, SC-4 S1 and S5, SC-5 S1 and S5, SC-7 S1 and S5, SC-8 S1 and S3, SC-10 S1 and S3, SC-12 S1 and SC-13 S1, were analyzed for PFAS and 1,4 Dioxane. No exceedances above NYSDEC SCOs for PFAS and 1,4 Dioxane were detected in any of the selective samples.

Laboratory analysis of the soil samples collected did not depict any exceedances in PCBs, PFAS, or 1,4 Dioxane. However, the results identified a consistency of VOC exceedances: 1,2,4-Trimethylbenzene ranging from 3.7 mg/kg to 110 mg/kg in SC-2, SC-7, SC-10, and SC-11; 1,3,5-Trimethylbenzene ranging from 12.9 mg/kg to 36 mg/kg in SC-2, SC-7, and SC-10; Ethylbenzene ranging from 6.9 mg/kg to 9.2 mg/kg in SC-2 and SC-10; Methylene Chloride at 0.78 mg/kg in SC-5, n-Butylbenzene at 15 mg/kg in SC-7; and n-Propylbenzene ranging from 4.1 mg/kg to 19 mg/kg in SC-2, SC-5, SC-6, and SC-7. The following three (3) CVOCs were detected (cis-1,2-Dichloroethene at 0.00045 mg/kg in sample SC-10 S1, 0.00034 mg/kg in sample SC-11 S1, Tetrachloroethene at 0.0028 mg/kg in sample SC-3 S6, 0.0014 mg/kg in sample SC-4 S5, 0.0015 mg/kg in sample SC-4 S6, 0.00089 mg/kg in

sample SC-9 S1, 0.110 mg/kg in sample SC-10 S1, 0.00093 mg/kg in sample SC-11 S1, 0.0019 mg/kg in sample SC-11 S3, 0.00096 mg/kg in sample SC-12 S1, 0.001 mg/kg in sample SC-13 S1, 0.0009 mg/kg in sample Field Duplicate-2, and Trichloroethene at 0.00036 mg/kg in sample SC-10 S1).

Analytical results of SVOCs identified an exceedance of Naphthalene at 29 mg/kg and 15 mg/kg in SC-5 and SC-6, respectively. Analytical results of pesticides identified a consistency of contaminants: 4,4'-DDD ranging from 0.0057 mg/kg to 0.049 mg/kg in SC-2, SC-3, SC-5, SC-6, SC-7, and SC-11; 4,4' DDE ranging from 0.0047 mg/kg to 0.061 mg/kg in SC-10 and SC-3, respectively; 4,4'-DDT ranging from 0.018 mg/kg to 0.190 mg/kg in SC-3; and Dieldrin at 0.017 mg/kg in SC-7. Analytical results of TAL Metals identified an exceedance of Nickel ranging from 30.1 mg/kg to 119 mg/kg in all samples; Chromium at 40.9 mg/kg and 115 mg/kg in SC-6 and SC-10, respectively; and Lead at 91.7 mg/kg in SC-10. A summary table of data for chemical analyses performed on soil samples is included in **Table 3 through Table 9**. A sampling location plan is attached as **Figure 4**. Soil boring logs are attached as **Appendix D**. A soil exceedances spider map is attached as **Figure 4A**.

3.4 Groundwater Investigation

Monitoring Well Installation and Groundwater Sampling

Monitoring Well Installation

Per the approved SCWP, seven (7) permanent groundwater monitoring wells (GWMW-1 through GWMW-7), and four (4) temporary groundwater test wells (GW-8 through GW-11) were required to be installed at the Site to assess groundwater quality.

On March 18, 2022, RSK subcontracted with Clean Globe Environmental LLC to provide and operate drilling equipment to install the seven (7) permanent groundwater wells on the exterior of the site. A RSK representative was onsite to oversee the drilling activities. The monitoring wells were installed using direct push drilling methods. The permanent monitoring wells were constructed of 2-inch diameter schedule 40 PVC solid riser and machine slotted screen (0.020-inch slot size). The permanent monitoring wells were installed to a depth of approximately 25-feet with 10-feet of slotted screen and 15-feet of solid riser. Approximately 2-inches of silica sand was placed at the bottom of each boring as a base for the well screen and as part of the sand pack. The well screen and attached riser was placed within the borehole on top of the 2-inch sand layer and the remainder of the sand pack was installed within the borehole annulus to a level of about 3-feet below ground surface. A bentonite seal was installed immediately above the sand layer along with a lockable J-plug and an 8-inch flush-mount well cover. RSK installed the four (4) temporary monitoring wells in the cellar (SC-8/GW-8, SC-10/GW-9, SC-11/GW-10, and SC-13/GW-11)

on March 18 and March 21, 2022. The temporary monitoring wells were constructed of 1-inch diameter Schedule 40 PVC solid riser and machine slotted screen (0.020-inch slot size). The wells were installed to a depth of approximately 15-feet with 10-feet of slotted screen and 5-feet of solid riser. Temporary well GW-10, in the cellar, could only be installed to a depth of 12-feet due to borehole collapse. Approximately 2-inches of silica sand was placed at the bottom of each boring as a base for the well screen and as part of the sand pack. The well screen and attached riser was placed within the borehole on top of the 2-inch sand layer and the remainder of the sand pack was installed within the borehole annulus to a level of about 3-feet below cellar surface. A bentonite seal was installed immediately above the sand layer along with a lockable J-plug. The four (4) temporary groundwater test wells protrude the cellar slab making it accessible for sampling. Following installation, all the monitoring wells were developed on March 22, 2022, using a submersible pump. Approximately seven 55-gallon drums of development water were purged from the monitoring wells. The monitoring wells were then surveyed using a benchmark.

Well construction logs are included as **Appendix E**. **Table 2** shows the water level data table.

Monitoring Well Sampling

On March 29, 2022, RSK returned to the Site to conduct groundwater sampling on all the wells. Sampling procedures conformed to the requirements of the NYSDEC and the USEPA. Groundwater samples were collected from the monitoring wells using the following methodology:

- A headspace reading was collected using a PID;
- Depth to water was measured using a Solinst water level indicator;
- Water-column was purged using a Solinst Peristaltic Pump Model 410;
- Field parameters including pH, oxidation-reduction potential, dissolved oxygen, temperature, and turbidity were collected utilizing a Horiba U-52 until field parameters stabilized;
- Upon stabilization of field parameters, dedicated tubing was used to obtain each groundwater sample; and,
- Sample containers were placed into a chilled cooler and maintained at low temperature (below 4-degrees Celsius) for transport to the laboratory.

Upon arrival to the Site, all eleven (11) groundwater wells were gauged. The groundwater elevation from the benchmark ranged from 18.93-feet to 19.41-feet. Groundwater flow has been determined to be to the east. Groundwater flow direction is likely influenced by the tide due to the Site's proximity to Gravesend Bay.

Per the approved SCWP, all monitoring wells were analyzed for VOCs, SVOCs, Pesticides, PCBs, and TAL Metals (filtered and unfiltered). Additionally, monitoring wells GWMW-1, GWMW-4, GWMW-5, GWMW-7, GW-8, and GW-9 were analyzed for PFAS and 1,4 Dioxane. PFAS was sampled in accordance with the *NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substance (PFAS), dated October 2020.*

Laboratory analytical results did not depict any exceedances of PCBs or 1,4 Dioxane. However, laboratory analytical results identified a consistency of VOC exceedances: 1,2,4-Trimethylbenzene ranging from 7 ug/L to 3,100 ug/L in all samples, excluding GWMW-3; 1,3,5-Trimethylbenzene ranging from 2.6 ug/L to 710 ug/L in all samples, excluding GWMW-3; Ethylbenzene ranging from 5.3 ug/L to 2,000 ug/L in all samples; Isopropylbenzene ranging from 9 ug/L to 140 ug/L in all samples; Naphthalene ranging from 47 ug/L to 1,300 ug/L in all samples; n-Butylbenzene ranging from 6.1 ug/L to 48 ug/L in all samples; n-Propylbenzene ranging from 25 ug/L to 400 ug/L; p-Isopropyltoluene ranging from 5.1 ug/L to 9.1 ug/L; sec-Butylbenzene ranging from 11 ug/L to 21 ug/L; and total Xylenes ranging from 5 ug/L to 9,600 ug/L in all samples excluding GWMW-6. The following two (2) CVOCs were detected (Tetrachloroethene at 16 ug/L in sample GW-10 and cis-1,2-Dichloroethene at 20 ug/L in sample GW-11). Laboratory analytical results of SVOCs identified an exceedance of 2-Methylnapthalene ranging from 57 ug/L to 220 ug/L, and Naphthalene ranging from 46 ug/L to 690 ug/L. Laboratory analytical results of pesticides identified an exceedance of Heptachlor epoxide at 0.035 ug/L in GWMW-4 and Dieldrin at 0.01 ug/L in GWMW-7. Laboratory analytical results of TAL Metals identified the following exceedances: Aluminum ranging from 120 ug/L to 235 ug/L; Iron ranging from 1,020 ug/L to 62,400 ug/L; Manganese ranging from 594 ug/L to 6,390 ug/L; Lead at 30 ug/L in GW-10; and Sodium ranging from 27,100 ug/L to 184,000 ug/L. PFAS contaminants were present in all samples analyzed for the compounds ranging from 2 ng/L to 116 ng/L.

Please see **Figure 4** for the Sample Location Map and **Figure 4B** for the groundwater exceedances spider map. All groundwater analytical results can be found in **Tables 10 through 16**. All groundwater low flow sampling sheets are included as **Appendix E**. Historic groundwater spider maps from RSK's Phase-II is attached as **Figure 5A**. Due to an irregular and multiple site elevation, a single benchmark was created at the eastern boundary (GPS coordinates 40.60227, -74.00696) 36.25-inches above the site grade. This benchmark level was used to survey the groundwater elevation at each wellpoint location which ranged from 18.93-feet to 19.41-feet and the groundwater flow to the east. Groundwater flow direction is

likely influenced by the tide due to the Site's proximity to Gravesend Bay. A groundwater elevation and direction maps are attached as **Figure 6.**

Below is a table of a PID readings from the sampling event.

Boring No.	Groundwater	Soil	
	PID Reading (ppm)	Depth (ft. bgs)	PID Reading (ppm)
SC-1/GWMW-1	27.1	16-20	304.2
		20-24	374.2 at 21-feet 17.0 at 24-feet
SC-2/GWMW-2	387.5	16-20	1,095.0
		20-24	900.6 at 21-feet 20.0 at 24-feet
SC-3/GWMW-3	62.6	16-20	45.4
		20-24	7.1
SC-4/GWMW-4	15.3	16-20	23.5
		20-24	10.9
SC-5/GWMW-5	403.2	16-20	414.5
		20-24	173.8 at 21-feet 17.0 at 24-feet
SC-6/GWMW-6	-	16-20	729.5
		20-24	735.0
		24-28	10.9
SC-7/GWMW-7	380.2	16-20	414.5
		20-24	750.0
		24-28	20.0
SC-8/GW-8	62.9	8-12	2.7
		12-16	50.6
SC-9	-	8-12	1.5
		12-16	698.6 at 13-feet 30.0 at 16-feet
SC-10/GW-9	4.2	8-12	770.0
		12-16	412.0 at 16-feet 20.0 at 16-feet
SC-11/GW-10	400.2	8-12	8.0
		12-16	681.0
SC-12	-	0-4	0.4
SC-13/GW-11	62.9	0-4	0.7

3.5 Soil Vapor and Indoor/Ambient Air Investigation

Soil vapor, sub-slab soil vapor, indoor, and outdoor air sampling was conducted at the Site on March 15, 2022. Per the approved SCWP, one (1) soil vapor sample (SV-1), four (4) sub-slab soil vapor samples (SS-1 through SS-4), two (2) indoor air samples (IA-1 and IA-2), and one (1) outdoor air sample (OA-1) were collected at the Site.

Methodology

- All soil vapor, sub-slab soil vapor, indoor, and outdoor air sampling was conducted in accordance with protocols outlined in the approved SCWP;
- The soil vapor location was overlain by concrete, which was core-drilled. To facilitate the collection of the soil vapor sample from beneath the Site, a soil vapor sample point was advanced beneath the surface to a depth of approximately 14-feet below grade (approximately 2-feet above groundwater) with a track-mounted Geoprobe using a 2-inch steel expendable point, 6-inch soil vapor implants, and polyethylene tubing. A new section of ¼-inch diameter polyethylene tubing was inserted into the borehole to the desired sampling depth. Sand was poured into the boring annulus to form a sand pack around the tubing. Granular bentonite was placed atop the sand pack and the remainder of the borehole was backfilled with hydrated bentonite to the ground surface to form a seal. Prior to sampling, a tracer gas was used in accordance with NYSDOH protocols to serve as a QA/QC device to verify the integrity of the soil vapor probe seal. Helium was used as the tracer gas and a shroud was used to keep it in contact with the probe during testing. A portable monitoring device (Dielectric MGD-2002 Helium Leak Detector) was used to analyze a sample of soil vapor for the tracer prior to sampling. If the tracer sample results showed a significant presence of the tracer, the probe seals were adjusted to prevent infiltration.
- All sub-slab vapor implants were overlain by concrete, which was penetrated using a handheld hammer drill to create a ½-inch diameter hole. To facilitate the collection of sub-slab soil vapor samples from beneath the subject property, sub-slab soil vapor sample points were advanced beneath the surface to a depth of 18-inches below the cellar floor slab. A new section of ¼-inch diameter polyethylene tubing was inserted into the borehole to the desired sampling depth. The tubing was sealed with a hydrated granular bentonite to the surface. Prior to sampling, a tracer gas

was used in accordance with NYSDOH protocols to serve as a QA/QC device to verify the integrity of the soil vapor probe seal. Helium was used as the tracer gas and a shroud was used to keep it in contact with the probe during testing. A portable monitoring device (Dielectric MGD-2002 Helium Leak Detector) was used to analyze a sample of soil vapor for the tracer prior to sampling. If the tracer sample results showed a significant presence of the tracer, the probe seals were adjusted to prevent infiltration.

All air samples were collected using 6-liter, stainless-steel, cylindrical SUMMA canisters equipped with 2-hour flow controllers. The sampling containers were provided by Phoenix Environmental Laboratories (PEL), of Manchester, CT. Following completion, the sampling points were backfilled and restored with concrete or asphalt. A sample log sheet was maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, and chain of custody protocols.

Sampling

On March 15, 2022, two (2) indoor air cannisters (IA-1 and IA-2) were set in the basement in the area of the former dry-cleaners and one (1) outdoor air cannister (OA-1) was set adjacent to the western corner of the building. Four (4) sub-slab soil vapor samples (SS-1 through SS-4) were set throughout the basement. SS-1 and SS-2 were situated within the former dry-cleaner space and SS-3 and SS-4 were situated in the adjacent room. All samples were set with 2-hour flow controllers and analyzed for TO-15.

Results

The soil vapor and indoor/ambient air data was evaluated against the decision matrices provided by the NYSDOH October 2006 “Guidance for Evaluating Soil Vapor Intrusion in the State of New York” and the May 2017 “Updates to Soil Vapor/Indoor Air Decision Matrices”.

Tetrachloroethene (PCE) was detected in all air samples, excluding the outdoor air sample, at concentration ranging from 75.9 ug/m3 to 1,780 ug/m3 in the sub-slab samples and 0.49 ug/m3 to 0.52 ug/m3 in the indoor air samples. When comparing these values to Matrix B, mitigation is required. Cis-1,2-Dichloroethene was detected in all sub-slab samples ranging from 29.6 ug/m3 to 79.2 ug/m3. When comparing these values to Matrix A, mitigation is required. Trichloroethene was detected in all sub-slab samples ranging from 22.1 ug/m3 to 35.9 ug/m3. When comparing these values to Matrix A, monitoring is required. No additional exceedances were detected when compared to the matrices. Additional compounds were detected; however, there are no NYSDOH matrices for these compounds. The presence

of chlorinated- and petroleum- related VOCs suggests that an on-Site and-or nearby source(s) of these compounds are present.

Please see **Figure 4** for the Sample Location Map and **Figure 4C** for the soil vapor & indoor air/ambient air exceedances spider map. All analytical results can be found in **Table 17**. Soil vapor & indoor air/ambient air exceedances spider map from RSK's Phase-II is attached as **Figure 5B**.

3.6 Sample Analysis

Soil, groundwater, and soil vapor samples were submitted to Phoenix Environmental Laboratories, a NYSDOH Environmental Laboratory Accreditation Program (ELAP)-certified laboratory, in Manchester, CT, for full analysis.

Soil and groundwater samples were analyzed using:

- Volatile Organic Compounds by EPA Method 8260;
- Semi-volatile Organic Compounds by EPA method 8270;
- Pesticides/PCBs by EPA Method 8081/8082; and
- Target Analyte List metals by EPA Method 6010 and 7471 (All Groundwater samples were analyzed for both filtered (dissolved) and unfiltered (total) metals).

The fourteen (14) selective soil samples and six (6) selective groundwater samples were analyzed for PFAS (NYSDC Analyte List) by LC-MS/MS via EPA 537.1 and 1,4-Dioxane via EPA Method 8270 SIM.

Air samples were analyzed using:

- Volatile Organic Compounds by USEPA Method TO-15.

All laboratory analytical data reports for the soil, groundwater, and air samples collected since the SCWP approval are included as **Appendix F.**

3.7 Community Air Monitoring Plan

In accordance with DER-10, a Community Air Monitoring Plan was implemented at the Site during all ground-intrusive activities, such as, but not limited to drilling of boreholes and installation of monitoring wells. A record of all CAMP logs is included as **Appendix G**.

4.0 Quality Assurance/ Quality Control

4.1 Quality Assurance/Quality Control Procedures

QA/QC procedures were used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and compatibility associated with the sampling and analysis for this investigation. Field QA/QC procedures were used (1) to document that samples are representative of actual conditions at the Site and (2) identify possible cross-contamination from field activities or sample transit. Laboratory QA/QC procedures and analyses were used to demonstrate whether analytical results have been biased either by interfering compounds in the sample matrix, or by laboratory techniques that may have introduced systematic or random errors to the analytical process. QA/QC samples included field duplicates, matrix spikes, matrix spike duplicates, field blanks and trip blanks, appropriately at a frequency of 1 per 20 samples. Calibration certificates for all equipment used in the field is attached as **Appendix H**. A summary of the field and laboratory QA/QC procedures is provided below.

4.2 Field QA/QC

Field QA/QC included the following procedures:

- Calibration of field equipment, including PID, on a daily basis.
- Use of dedicated and/or disposable field sampling equipment.
- Proper ample handling and preservation.
- Proper sample chain of custody documentation; and
- Completion of report logs.

The above procedures were executed as follows:

- Disposable sampling equipment, including acetate sleeves, latex gloves, and disposable bailers (or sample tubing), were used to minimize cross-contamination between samples.
- For each of the parameters analyzed, a sufficient sample volume was collected to adhere to the specific analytical protocol, and provide sufficient sample for reanalysis if necessary.
- Because plasticizers and other organic compounds inherent in plastic containers may contaminate samples requiring organic analysis, samples were collected in glass containers, with the exception of the nitrate-preserved groundwater sample for metals analysis.
- Appropriate sample preservation techniques, including cold temperature storage at 4° C, were utilized to ensure that the analytical parameters concentrations do not change between the time of sample collection and analysis: and

- Samples were analyzed prior to the expiration of the respective holding time for each analytical parameter to ensure the integrity of the analytical results.

4.3 Sample Custody

Sample handling in the field conformed to appropriate sample custody procedures. Field custody procedures include proper sample identification, chain-of-custody forms, and packaging and shipping procedures. Sample labels were attached to all sampling bottles before field activities begin to ensure proper sample identification. Each label identified the site and sample location. Styrofoam or bubble wrap was used to absorb shock and prevent breakage of sample containers. Ice or ice packs were placed in between the plastic bags for sample preservation purposes.

After each sample was collected and appropriately identified, the following information were entered into the chain-of-custody form:

- Site name and address.
- Sampler(s)' name(s) and signature(s).
- Names and signatures of persons involved in the chain of possession of samples.
- Sample number.
- Number of containers.
- Sample location.
- Date and time of collection.
- Type of sample, sample matrix and analyses requested.
- Preservation used (if any); and
- Any pertinent field data collected (pH, temperature, conductivity, Dissolved Oxygen [DO])

The sampler signed and dated the "Relinquished" blank space prior to removing one copy of the custody form and sealing the remaining copies of the form, in a Ziploc plastic bag taped to the underside of the sample cooler lid. The sample cooler was sealed with tape prior to delivery or shipment to laboratory.

4.4 Report Logs

Field logs and boring logs were completed during the course of this investigation. A field log was completed on a daily basis which describes all field activities including:

- Project number, name, manager, and address.
- The date and time.
- The weather conditions.

- On-site personnel and associated affiliations.
- Description of field activities; and
- Pertinent sample collection information including sample identification numbers, description of samples, location of sampling points, number of samples taken, method of sample collection, and any factors that may affect its quality, time of sample collection, name of collector, and field screening results.

A boring/monitoring well log was completed for each boring/monitoring well and included the following information:

- Project number, name, manager, and location.
- The date and time.
- Drilling company and method used.
- Boring number.
- Total boring depth and water table depths; and
- Pertinent soil sample information including sample number, interval, depth, amount recovered, color, composition, percent moisture, visual and olfactory observations of contamination, and PID readings.

4.5 Laboratory QA/QC

An ELAP-certified laboratory was used for all sample analyses. All samples were delivered to the laboratory within 24 hours of sample collection. Samples were received by laboratory personnel, who inspected the sample cooler(s) to check the integrity of the custody seals. The cooler(s) were then opened, the samples unpackaged, and the information on the chain-of-custody form examined. If the shipped samples match those described on the chain-of-custody form, the laboratory custodian signed the form and recorded problems in the "Remarks" box. The custodian then immediately notified the Project Manager so appropriate follow-up steps can be implemented on a timely basis.

A record of the information detailing the handling of a particular sample through each stage of analysis was maintained by the laboratory. The record includes:

- Job reference, sample matrix, sample number, and date sampled.
- Date and time received by laboratory, holding conditions, and analytical parameters.
- Extraction date, time, and extractor's initials (if applicable), analysis date, time, and analyst's initials; and
- QA batch number, date reviewed, and reviewer's initials.

Analytical data obtained during the SC were validated to evaluate the usability of the data. Data Usability Summary Reports (DUSRs) are provided in Appendix F. The DUSRs indicate which data are subject to limitations and identify certain data that are flagged as rejected and should not be used.
All data was qualified as usable with the following exceptions:

- An MS/MSD was performed on SC-7 S6 and SC-10 S3. Benzoic Acid has been deemed unreliable "R" in these samples because it was recovered below 10% in the LCS and LCSD samples. RPD (%) was reported above QC limit.
- The MS performed on sample SC-10 S1 The recovery of Potassium and Sodium were recovered above QC limit. Potassium has been deemed unreliable "R" (>200%) qualified in the field samples.

All data that are not qualified rejected, unusable (R) are considered usable, with estimated (J, J-, or UJ) data associated with a higher level of quantitative uncertainty. Detailed information on data quality is included in the DUSRs and included as **Appendix I**.

5.0 Conclusions & Recommendations

Regarding soil, BTEX contaminants were detected at concentrations above restricted residential SCOs, particularly in soil borings adjacent to Cropsey Avenue and Bay 19th Street (SC-5, SC-6, SC-7, SC-10, and SC-11). A hotspot for BTEX contaminants was also detected in the driveway easement (SC-2). Pesticides were detected at concentrations above unrestricted use SCOs. Metals, particularly nickel, were present in all samples above unrestricted use SCOs. The highest concentrations of contamination in the soil are generally in the 16-to-20-foot range below ground surface. PFAS compounds were detected in soil but were below the DEC cleanup values. The petrochemicals present in the soil beneath the Site is likely not from the result of on-site activity, but rather offsite from historical gasoline filling stations along Cropsey Avenue. Three (3) low-level detections of CVOCs, cis-1,2-Dichloroethene at a max. of 0.00045 mg/kg, Tetrachloroethene (PCE) at a max. of 0.110 mg/kg and Trichloroethene (TCE) at a max. of 0.00036 mg/kg were identified during the site characterization.

Regarding groundwater, BTEX contaminants were detected in all groundwater samples at concentrations above NYSDEC Groundwater Quality Standards. Based on the Phase-I ESA report prepared by RSK and dated September 14, 2020, RSK has identified two (2) potential sources which may contribute to the BTEX detected in groundwater, these sources are considered to be generating from either a spill site, a former Getty S/S #98768 located north of the Site at 1767-1777 (1785) Cropsey Avenue where BTEX-related VOCs and MTBE were identified in soil and groundwater (NYSDEC Spill #9812361), and a former gasoline filling station with auto repair located northeast of the Site at 1801-

1817 Cropsey Avenue where ten (10) gasoline vent lines currently exists. Groundwater flow is determined to be in the east direction. Pesticides were detected at exceeding concentrations in GWMW-4 and GWMW-7. Metals, including iron, manganese, and sodium were detected at exceeding concentrations in all samples. PFAS compounds were detected in select groundwater samples ranging in concentration from max. 68.2 ng/L on the exterior of the building and max. 116 ng/L on the interior of the building. The PFAS contamination beneath the Site is likely from the result of historical on-site activities as a dry-cleaner.

Regarding soil vapor and indoor air, all concentrations were compared to the applicable NYSDOH guidelines. BTEX contaminants and chlorinated solvents were present beneath the cellar slab and within the indoor air of the building at elevated concentrations. Based on the elevated concentrations of BTEX and two (2) CVOCs (cis-1,2-Dichloroethene and PCE) mitigation should be completed for the building onsite. The two (2) elevated CVOCs, when compared to applicable decision matrices, mitigation is required.

Sampling results collected from this Site have indicated that there is significant environmental impact that has occurred due to former dry-cleaning operations and from surrounding properties that have historically been used as gasoline filling stations. When comparing the analytical data obtained from RSK's Phase-II report dated September 21, 2020, BTEX contamination is attenuating across the Site from NNW to SSE.

The site is currently being remediated under Order on Consent Index # CO2-20210315-158 which requires submittal of an Interim Remedial Measure (IRM) work plan within 60-days of NYSDEC approval of the SCR. Based on the above conclusions, RSK recommends that an Interim Remedial Measure (IRM) work plan be submitted to the NYSDEC to address soil vapor contamination at the Site in accordance with DER-10 Technical Guidance for Site Investigation and Remediation and all applicable standards, criteria, and guidance.

REFERENCES

- RSK Environmental Group, *Site Characterization Work Plan* – January 2022.
- 6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1, 375-3 and 375-6.
- NYSDEC, Division of Environmental Remediation, May 2004, *Draft Brownfield Program Cleanup Guide.*
- NYSDEC, Division of Environmental Remediation, December 2002, *DER-10, Technical Guidance for Site Investigation and Remediation.*
- NYSDEC, Division of Environmental Remediation, December 14, 2006, *6 NYCRR Part 375, Environmental Remediation Programs, subparts 375-1 to 375-4 & 375-6.*
- NYSDEC, Division of Water, June 1998, Addendum April 2000*, Technical and Administrative Guidance Series 1:1:1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.*
- NYSDEC, January 2021, *Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS)*.
- NYSDOH, Center for Environmental Health, October 2006, *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York.*

TABLES

Table 1

Sample Information
1810-1818 Cropsey Avenue, Brooklyn, NY

SAMPLE ID	Date	Total Depth (Feet)	Equipment	Construction Materials
SC-1 S1	03/16/2022	4	Geoprobe track-mounted drill rig	-
SC-1 S5	03/16/2022	20	Geoprobe track-mounted drill rig	-
SC-1 S6	03/16/2022	24	Geoprobe track-mounted drill rig	-
SC-2 S5	03/16/2022	20	Geoprobe track-mounted drill rig	-
SC-2 S6	03/16/2022	24	Geoprobe track-mounted drill rig	-
SC-3 S5	03/18/2022	20	Geoprobe track-mounted drill rig	-
SC-3 S6	03/18/2022	24	Geoprobe track-mounted drill rig	-
SC-4 S1	03/18/2022	4	Geoprobe track-mounted drill rig	-
SC-4 S5	03/18/2022	20	Geoprobe track-mounted drill rig	-
SC-4 S6	03/18/2022	24	Geoprobe track-mounted drill rig	-
SC-5 S1	03/16/2022	4	Geoprobe track-mounted drill rig	-
SC-5 S5	03/16/2022	20	Geoprobe track-mounted drill rig	-
SC-5 S6	03/16/2022	24	Geoprobe track-mounted drill rig	-
SC-6 S5	03/16/2022	20	Geoprobe track-mounted drill rig	-
SC-6 S6	03/16/2022	24	Geoprobe track-mounted drill rig	-
SC-6 S7	03/16/2022	28	Geoprobe track-mounted drill rig	-
SC-7 S1	03/16/2022	4	Geoprobe track-mounted drill rig	-
SC-7 S5	03/16/2022	20	Geoprobe track-mounted drill rig	-
SC-7 S6	03/16/2022	24	Geoprobe track-mounted drill rig	-
SC-7 S7	03/16/2022	28	Geoprobe track-mounted drill rig	-
SC-8 S1 (Cellar)	03/21/2022	4	Hand auger and Geoprobe manual slide hammer	-
SC-8 S3 (Cellar)	03/21/2022	12	Hand auger and Geoprobe manual slide hammer	-
SC-8 S4 (Cellar)	03/21/2022	16	Hand auger and Geoprobe manual slide hammer	-
SC-9 S1 (Cellar)	03/21/2022	4	Hand auger and Geoprobe manual slide hammer	-
SC-9 S3 (Cellar)	03/21/2022	12	Hand auger and Geoprobe manual slide hammer	-
SC-9 S4 (Cellar)	03/21/2022	16	Hand auger and Geoprobe manual slide hammer	-
SC-10 S1 (Cellar)	03/17/2022	4	Hand auger and Geoprobe manual slide hammer	-
SC-10 S3 (Cellar)	03/17/2022	12	Hand auger and Geoprobe manual slide hammer	-
SC-10 S4 (Cellar)	03/17/2022	16	Hand auger and Geoprobe manual slide hammer	-
SC-11 S1 (Cellar)	03/17/2022	4	Hand auger and Geoprobe manual slide hammer	-
SC-11 S3 (Cellar)	03/17/2022	12	Hand auger and Geoprobe manual slide hammer	-
SC-11 S4 (Cellar)	03/17/2022	16	Hand auger and Geoprobe manual slide hammer	-
SC-12 S1 (Cellar)	03/21/2022	4	Hand auger and Geoprobe manual slide hammer	-
SC-13 S1 (Cellar)	03/22/2022	4	Hand auger and Geoprobe manual slide hammer	-

Table 2

Water Level Data Table

1810-1818 Cropsey Avenue, Brooklyn, NY

Monitoring Well ID	Installation Date	Well Depth (Feet)	Depth to Groundwater from Manhole Cover (Feet bgs)	Height of Water Column (Feet)	Distance to top of Manhole Cover using Benchmark (Feet)	Groundwater Elevation from Benchmark (Feet)
GWMW-1	3/18/22	25.1	16.3	8.8	3.042	19.34
GWMW-2	3/18/22	25.5	15.3	10.2	3.625	18.93
GWMW-3	3/18/22	25.9	15.6	10.3	3.625	19.23
GWMW-4	3/18/22	24.1	15.2	8.9	4.089	19.29
GWMW-5	3/18/22	25	16.2	8.8	3.073	19.27
GWMW-6	3/18/22	24.6	16.2	8.4	3.198	19.40
GWMW-7	3/18/22	25.3	17.2	8.1	2.208	19.41
GW-8 (Cellar)	3/21/22	13.8	8.3	5.5	10.875	19.18
GW-9 (Cellar)	3/18/22	13.9	8.1	5.9	11.063	19.16
GW-10 (Cellar)	3/18/22	12.1	8.1	4	11.104	19.20
GW-11 (Cellar)	3/22/22	13.5	8.4	5.1	10.854	19.25

Table 3

Soil Analytical Results
Volatile Organic Compounds
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-1 S6 (20'-24') 03/16/2022 (mg/kg)	SC-2 S5 (16'-20') 03/16/2022 (mg/kg)	SC-2 S6 (20'-24') 03/16/2022 (mg/kg)	SC-3 S5 (16'-20') 03/18/2022 (mg/kg)	SC-3 S6 (20'-24') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-4 S6 (20'-24') 03/18/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-5 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S5 (16'-20') 03/16/2022 (mg/kg)
1,1,1,2-Tetrachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.68	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.27	26	240	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.6	52	190	ND	0.0088	**110**	0.0062	ND	ND	ND	ND	ND	1.9	ND
1,2-Dibromo-3-chloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.02	3.1	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8.4	52	190	ND	0.0095	**36**	0.0026	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2.4	49	280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1.8	13	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene	NS	NS	NS	ND	0.00043	ND	ND	ND	ND	ND	ND	ND	0.21	0.13
4-Chlorotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.05	100	500	ND	0.011	ND	ND	ND	0.0049	ND	ND	ND	ND	ND
Acrylonitrile	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.06	4.8	44	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NS	NS	NS	ND	0.0008	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	0.76	2.4	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.37	49	350	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.25	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-1 S6 (20'-24') 03/16/2022 (mg/kg)	SC-2 S5 (16'-20') 03/16/2022 (mg/kg)	SC-2 S6 (20'-24') 03/16/2022 (mg/kg)	SC-3 S5 (16'-20') 03/18/2022 (mg/kg)	SC-3 S6 (20'-24') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-4 S6 (20'-24') 03/18/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-5 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S5 (16'-20') 03/16/2022 (mg/kg)
cis-1,3-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1	41	390	ND	0.042	**6.9**	0.0023	ND	ND	ND	ND	0.2	0.83	0.21
Hexachlorobutadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NS	NS	NS	ND	0.011	4.2	ND	0.004	ND	ND	ND	0.94	2.1	0.99
m&p-Xylene	NS	NS	NS	ND	0.015	3.1	0.0048	ND	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	0.12	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	0.93	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	0.05	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	**0.78**	ND
Naphthalene	12	100	500	ND	0.13	10	0.0063	ND	ND	ND	ND	1.8	9.5	ND
n-Butylbenzene	12	100	500	ND	0.0062	9.5	ND	0.0014	ND	ND	ND	3	4.5	2
n-Propylbenzene	3.9	100	500	ND	0.036	**19**	0.0012	0.0077	ND	ND	ND	**4.1**	**9.2**	**4.2**
o-Xylene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	NS	NS	NS	ND	0.001	2.1	ND	ND	ND	ND	ND	0.57	0.62	0.2
sec-Butylbenzene	11	100	500	ND	0.0027	3	ND	0.00083	ND	ND	ND	0.94	1.3	0.61
Styrene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5.9	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.3	19	150	ND	ND	ND	ND	ND	0.0028	0.0014	0.0015	ND	ND	ND
Tetrahydrofuran (THF)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.7	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	0.19	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,4-dichloro-2-butene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.47	21	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	0.02	0.9	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
1,1,1,2-Tetrachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.68	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.27	26	240	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
1,2,4-Trimethylbenzene	3.6	52	190	0.3	0.0073	**69**	**91**	0.61	ND	ND	0.003	ND	ND	0.0051
1,2-Dibromo-3-chloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.02	3.1	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8.4	52	190	ND	ND	**24**	**29**	0.18	ND	ND	0.031	ND	ND	0.15
1,3-Dichlorobenzene	2.4	49	280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1.8	13	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene	NS	NS	NS	0.041	0.00082	0.87	1	0.00072	ND	ND	0.001	ND	ND	0.00097
4-Chlorotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.05	100	500	ND	0.008	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.06	4.8	44	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NS	NS	NS	ND	0.0012	ND	ND	0.0013	ND	ND	0.00068	ND	ND	ND
Carbon tetrachloride	0.76	2.4	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.37	49	350	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.25	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1	41	390	0.11	0.002	ND	ND	0.0016	ND	ND	0.017	ND	ND	0.13
Hexachlorobutadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NS	NS	NS	0.4	0.0082	1.8	2.7	0.0085	ND	ND	0.016	ND	ND	0.022
m&p-Xylene	NS	NS	NS	ND	ND	ND	ND	0.017	ND	ND	ND	ND	ND	0.0034
Methyl Ethyl Ketone	0.12	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	0.93	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	0.05	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12	100	500	1.3	0.015	ND	ND	0.027	ND	ND	0.022	ND	ND	0.13
n-Butylbenzene	12	100	500	0.69	0.014	**15**	**15**	0.011	ND	ND	0.016	ND	ND	0.016
n-Propylbenzene	3.9	100	500	1.6	0.031	**14**	**17**	0.098	ND	ND	0.11	ND	ND	0.18
o-Xylene	NS	NS	NS	ND	ND	ND	ND	0.00064	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
p-Isopropyltoluene	NS	NS	NS	0.13	0.0023	2.8	2.8	0.0024	ND	ND	0.0024	ND	ND	0.0025
sec-Butylbenzene	11	100	500	0.24	0.005	6	5.6	0.0045	ND	ND	0.0061	ND	ND	0.0061
Styrene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5.9	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.3	19	150	ND	ND	ND	ND	ND	ND	ND	ND	0.0009	ND	ND
Tetrahydrofuran (THF)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.7	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	0.19	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,4-dichloro-2-butene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.47	21	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	0.02	0.9	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
1,1,1,2-Tetrachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.68	100	500	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.27	26	240	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3.6	52	190	ND	ND	**10**	ND	0.27	**3.7**	ND	ND
1,2-Dibromo-3-chloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.02	3.1	30	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8.4	52	190	ND	ND	**12**	ND	0.2	1.1	ND	ND
1,3-Dichlorobenzene	2.4	49	280	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1.8	13	130	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
2-Isopropyltoluene	NS	NS	NS	ND	ND	0.13	ND	0.0023	ND	ND	ND
4-Chlorotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.05	100	500	ND	0.0046	ND	ND	ND	ND	ND	ND
Acrylonitrile	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.06	4.8	44	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NS	NS	NS	ND	ND	ND	ND	0.0016	ND	ND	ND
Carbon tetrachloride	0.76	2.4	22	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.37	49	350	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.25	100	500	0.00045	ND	ND	0.00034	ND	ND	ND	ND
cis-1,3-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1	41	390	ND	ND	**9.2**	ND	0.086	0.99	ND	ND
Hexachlorobutadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NS	NS	NS	ND	ND	2	ND	0.026	0.14	ND	ND
m&p-Xylene	NS	NS	NS	ND	ND	5.9	0.00099	0.25	3.6	ND	ND
Methyl Ethyl Ketone	0.12	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	0.93	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	0.05	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12	100	500	ND	ND	7.5	ND	0.11	1.1	ND	ND
n-Butylbenzene	12	100	500	ND	ND	2.9	ND	0.033	0.21	ND	ND
n-Propylbenzene	3.9	100	500	ND	ND	**7.6**	ND	0.099	0.54	ND	ND
o-Xylene	NS	NS	NS	ND	ND	ND	0.00088	0.06	0.9	ND	ND
p-Isopropyltoluene	NS	NS	NS	ND	ND	0.52	ND	0.0088	0.039	ND	ND
sec-Butylbenzene	11	100	500	ND	ND	0.9	ND	0.014	0.062	ND	ND
Styrene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5.9	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.3	19	150	0.11	ND	ND	0.00093	0.0019	ND	0.001	0.0009
Tetrahydrofuran (THF)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.7	100	500	ND	ND	ND	ND	0.00054	0.039	ND	ND
trans-1,2-Dichloroethene	0.19	100	500	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,4-dichloro-2-butene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.47	21	200	0.00036	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
Vinyl chloride	0.02	0.9	13	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- UUSCO - Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006
- RRSCO - Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- CSCO - Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- All units are in mg/kg or ppm
- Bold text indicates UUSCO exceedances
- Shaded cell indicates RRSCO exceedances
- Underlined text indicates CSCO exceedances
- ND – Not Detected
- NS (Blank) – No Standard

Table 4

Soil Analytical Results
Semi-Volatile Organic Compounds
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-1 S6 (20'-24') 03/16/2022 (mg/kg)	SC-2 S5 (16'-20') 03/16/2022 (mg/kg)	SC-2 S6 (20'-24') 03/16/2022 (mg/kg)	SC-3 S5 (16'-20') 03/18/2022 (mg/kg)	SC-3 S6 (20'-24') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-4 S6 (20'-24') 03/18/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-5 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S5 (16'-20') 03/16/2022 (mg/kg)
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2.4	49	280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1.8	13	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2'-Oxybis(1-Chloropropane)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	NS	NS	NS	22	ND	21	0.14	ND	ND	ND	ND	41	5.2	22
2-Methylphenol (o-cresol)	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benz(a)anthracene	1	1	5.6	ND	ND	ND	ND	ND	ND	ND	0.44	ND	ND	ND
Benzidine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1	1	1	ND	ND	ND	ND	ND	ND	ND	0.49	ND	ND	ND
Benzo(b)fluoranthene	1	1	5.6	ND	ND	ND	ND	ND	ND	ND	0.48	ND	ND	ND
Benzo(ghi)perylene	100	100	500	ND	ND	ND	ND	ND	ND	ND	0.39	ND	ND	ND
Benzo(k)fluoranthene	0.8	3.9	56	ND	ND	ND	ND	ND	ND	ND	0.4	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-1 S6 (20'-24') 03/16/2022 (mg/kg)	SC-2 S5 (16'-20') 03/16/2022 (mg/kg)	SC-2 S6 (20'-24') 03/16/2022 (mg/kg)	SC-3 S5 (16'-20') 03/18/2022 (mg/kg)	SC-3 S6 (20'-24') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-4 S6 (20'-24') 03/18/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-5 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S5 (16'-20') 03/16/2022 (mg/kg)
Benzoic acid	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl butyl phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	0.29	ND	0.22
Carbazole	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1	3.9	56	ND	ND	ND	ND	ND	ND	ND	0.54	ND	ND	ND
Dibenz(a,h)anthracene	0.33	0.33	0.56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	7	59	350	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100	100	500	ND	ND	ND	ND	ND	ND	ND	0.75	ND	ND	ND
Fluorene	30	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.33	1.2	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.5	0.5	5.6	ND	ND	ND	ND	ND	ND	ND	0.41	ND	ND	ND
Isophorone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12	100	500	ND	ND	9.3	ND	ND	ND	ND	ND	**29**	3.2	**15**
Nitrobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	0.8	6.7	6.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100	100	500	ND	ND	ND	ND	ND	ND	ND	0.38	ND	ND	ND
Phenol	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100	100	500	ND	ND	ND	ND	ND	ND	ND	0.6	ND	ND	ND
Pyridine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Totals														

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
1,2,4,5-Tetrachlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2.4	49	280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
1,4-Dichlorobenzene	1.8	13	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2'-Oxybis(1-Chloropropane)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	NS	NS	NS	2.7	ND	0.9	16	ND	ND	ND	ND	0.18	ND	ND
2-Methylphenol (o-cresol)	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benz(a)anthracene	1	1	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzidine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1	1	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	1	1	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.8	3.9	56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl butyl phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1	3.9	56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	0.33	0.33	0.56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	7	59	350	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
Di-n-butylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	30	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.33	1.2	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.5	0.5	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12	100	500	1.4	ND	0.42	3.3	ND	ND	ND	ND	0.12	ND	ND
Nitrobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	0.8	6.7	6.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyridine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Totals														

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
ND1,2,4,5-Tetrachlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	1.1	100	500	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	2.4	49	280	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	1.8	13	130	ND	ND	ND	ND	ND	ND	ND	ND
2,2'-Oxybis(1-Chloropropane)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	NS	NS	NS	ND	ND	3.9	ND	3.8	5.4	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
2-Methylphenol (o-cresol)	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Benz(a)anthracene	1	1	5.6	0.21	ND	ND	ND	ND	ND	ND	ND
Benzidine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1	1	1	0.22	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	1	1	5.6	0.19	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	100	100	500	0.15	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.8	3.9	56	0.18	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl butyl phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1	3.9	56	0.22	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	0.33	0.33	0.56	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	7	59	350	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Dimethylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100	100	500	0.41	ND	ND	ND	ND	ND	ND	ND
Fluorene	30	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.33	1.2	6	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.5	0.5	5.6	0.18	ND	ND	ND	ND	ND	ND	ND
Isophorone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12	100	500	ND	ND	3.3	ND	2.3	6.4	ND	ND
Nitrobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
N-Nitrosodimethylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	0.8	6.7	6.7	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100	100	500	0.21	ND	ND	ND	ND	ND	ND	ND
Phenol	0.33	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100	100	500	0.39	ND	ND	ND	ND	ND	ND	ND
Pyridine	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Totals											

Notes:

- UUSCO - Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006
- RRSCO - Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- CSCO - Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- All units are in mg/kg or ppm
- Bold text indicates UUSCO exceedances
- Shaded cell indicates RRSCO exceedances
- Underlined text indicates CSCO exceedances
- ND – Not Detected
- NS (Blank) – No Standard

Table 5
Soil Analytical Results
Pesticides
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-1 S6 (20'-24') 03/16/2022 (mg/kg)	SC-2 S5 (16'-20') 03/16/2022 (mg/kg)	SC-2 S6 (20'-24') 03/16/2022 (mg/kg)	SC-3 S5 (16'-20') 03/18/2022 (mg/kg)	SC-3 S6 (20'-24') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-4 S6 (20'-24') 03/18/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-5 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S5 (16'-20') 03/16/2022 (mg/kg)
4,4' -DDD	0.0033	13	92	ND	ND	**0.0059**	ND	ND	**0.0057**	ND	ND	**0.049**	**0.0088**	**0.037**
4,4' -DDE	0.0033	8.9	62	ND	ND	ND	ND	ND	**0.0061**	ND	ND	ND	ND	ND
4,4' -DDT	0.0033	7.9	47	ND	ND	ND	ND	**0.018**	**0.19**	ND	ND	ND	ND	ND
a-BHC	0.02	0.48	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
a-Chlordane	0.094	4.2	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	0.005	0.097	0.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
b-BHC	0.036	0.36	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
d-BHC	0.04	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	0.2	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	0.014	11	89	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
g-BHC	0.1	1.3	9.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
g-Chlordane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	0.042	2.1	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	0.0033	13	92	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
4,4' -DDD	0.0033	13	92	**0.012**	ND	**0.026**	ND	ND	ND	ND	ND	ND	ND	ND
4,4' -DDE	0.0033	8.9	62	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4' -DDT	0.0033	7.9	47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
a-BHC	0.02	0.48	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
a-Chlordane	0.094	4.2	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	0.005	0.097	0.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
b-BHC	0.036	0.36	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
d-BHC	0.04	100	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	0.2	1.4	ND	ND	**0.017**	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	0.014	11	89	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
g-BHC	0.1	1.3	9.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
g-Chlordane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	0.042	2.1	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	0.0033	13	92	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
4,4' -DDD	0.0033	13	92	ND	ND	0.0028	ND	**0.015**	**0.01**	ND	ND
4,4' -DDE	0.0033	8.9	62	**0.0047**	ND	0.003	ND	ND	ND	ND	ND
4,4' -DDT	0.0033	7.9	47	**0.007**	ND	0.0032	ND	ND	ND	ND	ND
a-BHC	0.02	0.48	3.4	ND	ND	ND	ND	ND	ND	ND	ND
a-Chlordane	0.094	4.2	24	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	0.005	0.097	0.68	ND	ND	ND	ND	ND	ND	ND	ND
b-BHC	0.036	0.36	3	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
d-BHC	0.04	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	0.2	1.4	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
Endosulfan I	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	2.4	24	200	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	0.014	11	89	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
g-BHC	0.1	1.3	9.2	ND	ND	ND	ND	ND	ND	ND	ND
g-Chlordane	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	0.042	2.1	15	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	0.0033	13	92	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- UUSCO - Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006
- RRSCO - Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- CSCO - Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- All units are in mg/kg or ppb
- Bold text indicates UUSCO exceedances
- Shaded cell indicates RRSCO exceedances
- Underlined text indicates CSCO exceedances
- ND – Not Detected
- NS (Blank) – No Standard

Table 6

Soil Analytical Results
Polychlorinated Biphenyls Compounds
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-1 S6 (20'-24') 03/16/2022 (mg/kg)	SC-2 S5 (16'-20') 03/16/2022 (mg/kg)	SC-2 S6 (20'-24') 03/16/2022 (mg/kg)	SC-3 S5 (16'-20') 03/18/2022 (mg/kg)	SC-3 S6 (20'-24') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-4 S6 (20'-24') 03/18/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-5 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S5 (16'-20') 03/16/2022 (mg/kg)
PCB-1016	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	0.1	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	0.1	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Total Polychlorinated Biphenyls (PCBS)	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
PCB-1016	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1221	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	0.1	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	0.1	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Total Polychlorinated Biphenyls (PCBS)	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
PCB-1016	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND

PCB-1221	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1232	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1242	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1248	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1254	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1260	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1262	0.1	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
PCB-1268	0.1	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
*Total Polychlorinated Biphenyls (PCBS)	0.1	NS	1	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- UUSCO - Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006
- RRSCO - Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- CSCO - Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- All units are in mg/kg or ppm
- Bold text indicates UUSCO exceedances
- Shaded cell indicates RRSCO exceedances
- Underlined text indicates CSCO exceedances
- ND – Not Detected
- NS (Blank) – No Standard

Table 7

Soil Analytical Results
Target Analyte List – Metals
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-1 S6 (20'-24') 03/16/2022 (mg/kg)	SC-2 S5 (16'-20') 03/16/2022 (mg/kg)	SC-2 S6 (20'-24') 03/16/2022 (mg/kg)	SC-3 S5 (16'-20') 03/18/2022 (mg/kg)	SC-3 S6 (20'-24') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-4 S6 (20'-24') 03/18/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-5 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S5 (16'-20') 03/16/2022 (mg/kg)
Aluminum	NS	NS	NS	3,960	2,970	4,180	5,500	3,770	4,320	4,660	4,930	3,650	3,030	3,520
Antimony	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	13	16	16	ND	ND	2.87	1.29	0.81	1.42	1.02	1.36	0.85	0.7	ND
Barium	350	400	400	19.1	16.1	21.5	30.5	18.8	29	22.3	28.5	23	15.8	18.6
Beryllium	7.2	72	590	0.33	0.19	0.46	0.35	0.23	0.24	0.27	0.28	0.3	0.25	0.28
Cadmium	2.5	4.3	9.3	ND	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND
Calcium	NS	NS	NS	720	584	731	967	737	2,560	756	1,250	781	789	511
Chromium	30	NS	NS	18.3	8.97	13.3	19.1	12	15.1	19.9	16.7	12.5	11.4	9.47
Cobalt	NS	NS	NS	6.26	4.65	5.94	7.89	4.48	5.63	5.28	7.73	5.52	4.35	4.49
Copper	50	270	270	10.4	7.7	12.5	11.9	8.2	15.6	9.5	10.9	8	8.3	8.5
Iron	NS	NS	NS	10,200	7,070	11,100	13,400	8,860	10,300	11,200	11,500	9,830	7,070	7,830
Lead	63	400	1,000	7.6	4.2	29.7	8.8	5.1	14.6	6.3	11.8	8.9	12.6	10.1
Magnesium	NS	NS	NS	2,160	1,540	1,540	2,610	1,720	2,140	2,050	2,180	1,940	1,600	1,550
Manganese	1,600	2,000	10,000	96.8	77.7	89.3	295	168	234	188	376	248	80.8	74.2
Mercury	0.18	0.81	2.8	ND	ND	ND	ND	0.03	0.16	ND	ND	ND	ND	ND
Nickel	30	310	310	**42.3**	**33**	**47**	**53.4**	**35.5**	**39.7**	**39.6**	**47.2**	**34.3**	**30.1**	**34**
Potassium	NS	NS	NS	777	525	721	860	800	784	853	848	877	655	632
Selenium	3.9	180	1,500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	2	180	1,500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	NS	NS	NS	158	110	105	109	88	75	69	79	201	130	128
Thallium	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	NS	NS	21.3	10.7	17.2	19.9	13.3	14.5	16.3	17.5	16.6	12.8	12.1
Zinc	109	10,000	10,000	20.8	18.6	26	28.9	19.7	66.4	23.6	28.4	21	16.7	17.4

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
Aluminum	NS	NS	NS	3,740	3,210	4,010	3,810	4,700	5,370	4,090	2,870	4,440	3,460	4,980
Antimony	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	13	16	16	1.22	2.2	ND	ND	1.31	1.42	1.33	1.66	1.15	0.98	1.16

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-6 S6 (20'-24') 03/16/2022 (mg/kg)	SC-6 S7 (24'-28') 03/16/2022 (mg/kg)	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S6 (20'-24') 03/16/2022 (mg/kg)	SC-7 S7 (24'-28') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-8 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)	SC-9 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-9 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-9 S4 (12'-16') (Cellar) 03/21/2022 (mg/kg)
Barium	350	400	400	21.8	22.4	16.9	25.1	25	30.5	29.5	20.6	27.7	19.2	28.9
Beryllium	7.2	72	590	0.27	0.44	0.35	0.25	ND	0.36	0.39	0.22	0.31	0.29	0.36
Cadmium	2.5	4.3	9.3	ND	ND	ND	ND	ND	0.71	0.65	0.46	0.59	0.55	0.6
Calcium	NS	NS	NS	631	652	745	758	1,060	753	1,250	570	787	815	731
Chromium	30	NS	NS	16.2	**40.9**	12.1	11.4	17.4	16.2	19.2	8.86	14.3	11	15.6
Cobalt	NS	NS	NS	5.31	6.21	3.7	5.83	7.59	8.39	7.37	4.9	6.64	4.96	7.07
Copper	50	270	270	9.3	9.2	10.2	9.3	9.8	11.2	12.9	8.6	9.7	6.8	15.9
Iron	NS	NS	NS	9,820	16,000	7,980	8,950	9,730	14,000	10,200	7,570	10,500	9,590	10,600
Lead	63	400	1,000	12.8	4.8	9.9	7	6.4	5.8	7.7	4.5	12.9	7.9	5.6
Magnesium	NS	NS	NS	1,940	2,000	1,990	2,190	2,640	2,630	2,550	1,580	2,290	1,660	2,260
Manganese	1,600	2,000	10,000	97.1	153	79.1	71.7	80.4	296	256	141	230	156	145
Mercury	0.18	0.81	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	30	310	310	**42.1**	**119**	**30.7**	**46.7**	**55.7**	**53.3**	**55.1**	**36**	**47.8**	**30.2**	**49.5**
Potassium	NS	NS	NS	703	602	729	625	1,100	1,240	998	519	788	689	1,030
Selenium	3.9	180	1,500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	2	180	1,500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	NS	NS	NS	125	109	111	154	252	124	173	146	84	105	667
Thallium	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	NS	NS	14.8	20	19.7	17.1	16.4	19.5	20.2	10.3	14.4	10.5	17
Zinc	109	10,000	10,000	22.1	29	28.7	23.4	29.1	25.5	23.4	17.1	19.8	16.9	29.2

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
Aluminum	NS	NS	NS	8,250	3,660	4,210	4,640	4,250	3,620	4,270	4,220
Antimony	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	13	16	16	2.81	0.96	1.91	1.47	1.22	1.18	0.95	1.35
Barium	350	400	400	65.2	21	23.1	33.1	21.7	17.1	24.1	26.5
Beryllium	7.2	72	590	0.38	0.24	0.28	0.3	0.52	0.23	0.27	0.28
Cadmium	2.5	4.3	9.3	0.37	ND	ND	ND	ND	ND	0.52	0.6
Calcium	NS	NS	NS	2,420	709	689	802	827	455	694	583
Chromium	30	NS	NS	17.5	13.5	**115**	23.8	14.6	11.9	11.1	12.7
Cobalt	NS	NS	NS	7.3	5.05	13.2	8.03	7.4	5.88	5.04	6.29
Copper	50	270	270	19.5	8.9	9.7	13.7	10.1	8.5	8.3	10.1
Iron	NS	NS	NS	15,500	8,930	12,400	13,300	10,500	7,430	8,840	10,300
Lead	63	400	1,000	**91.7**	4.9	6.6	4.6	14.3	8.1	3.4	4

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-10 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-11 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-11 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-11 S4 (12'-16') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
Magnesium	NS	NS	NS	2,110	2,140	1,960	2,100	2,170	1,670	1,660	1,860
Manganese	1,600	2,000	10,000	269	177	228	304	167	82.7	108	245
Mercury	0.18	0.81	2.8	0.03	ND	ND	ND	ND	ND	ND	ND
Nickel	30	310	310	**41.6**	**41.4**	**73.9**	**67.3**	**53.9**	**45.1**	**35.3**	**40.9**
Potassium	NS	NS	NS	805	704	854	1,000	970	620	717	771
Selenium	3.9	180	1,500	ND	ND	ND	ND	ND	ND	ND	ND
Silver	2	180	1,500	ND	ND	ND	ND	ND	ND	ND	0.54
Sodium	NS	NS	NS	71	79	80	146	95	83	66	57
Thallium	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	NS	NS	20.1	15.1	16.9	16.4	17.5	11.4	14.8	15.9
Zinc	109	10000	10000	75.6	26	27.4	21	26	21.1	17.4	19.3

Notes:

- UUSCO - Unrestricted Use Soil Cleanup Objectives, Table 375-6.8(a), 6 NYCRR 375, NYSDEC 2006
- RRSCO - Restricted Residential Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- CSCO - Commercial Soil Cleanup Objectives, Table 375-6.8(b), 6 NYCRR 375, NYSDEC 2006
- All units are in mg/kg or ppm
- Bold text indicates UUSCO exceedances
- Shaded cell indicates RRSCO exceedances
- Underlined text indicates CSCO exceedances
- ND – Not Detected
- NS (Blank) – No Standard

Table 8

Soil Analytical Results
PFAS, NYSDEC Target List
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-1 S1 (0'-4') 03/16/2022 (ng/g)	SC-1 S5 (16'-20') 03/16/2022 (ng/g)	SC-4 S1 (0'-4') 03/18/2022 (ng/g)	SC-4 S5 (16'-20') 03/18/2022 (ng/g)	SC-5 S1 (0'-4') 03/16/2022 (ng/g)	SC-5 S5 (16'-20') 03/16/2022 (ng/g)	SC-7 S1 (0'-4') 03/16/2022 (ng/g)
1H,1H,2H,2H-Perfluorodecanesulfonic acid	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
1H,1H,2H,2H-Perfluorooctanesulfonic acid	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
NEtFOSAA	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
NMeFOSAA	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoro-1-decanesulfonic acid (PFDS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoro-1-heptanesulfonic acid (PFHpS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoro-1-octanesulfonamide (FOSA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorobutanesulfonic acid (PFBS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorodecanoic acid (PFDA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorododecanoic acid (PFDoA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoroheptanoic acid (PFHpA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorohexanesulfonic Acid (PFHxS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorohexanoic acid (PFHxA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoro-n-butanoic acid (PFBA)	NS	NS	NS	0.428	ND	ND	ND	ND	ND	ND
Perfluorononanoic acid (PFNA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorooctanesulfonic Acid (PFOS)	0.88	44	440	ND	ND	0.532	ND	ND	ND	0.874
Perfluorooctanoic acid (PFOA)	0.66	33	500	ND	ND	ND	ND	ND	ND	0.327
Perfluoropentanoic acid (PFPeA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorotetradecanoic acid (PFTA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorotridecanoic acid (PFTrDA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoroundecanoic acid (PFUnA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-7 S5 (16'-20') 03/16/2022 (ng/g)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (ng/g)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (ng/g)	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (ng/g)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (ng/g)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (ng/g)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (ng/g)
1H,1H,2H,2H-Perfluorodecanesulfonic acid	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
1H,1H,2H,2H-Perfluorooctanesulfonic acid	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
NEtFOSAA	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
NMeFOSAA	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoro-1-decanesulfonic acid (PFDS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC UUSCO	NYDEC RRSCO	NYSDEC CSCO	SC-7 S5 (16'-20') 03/16/2022 (ng/g)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (ng/g)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (ng/g)	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (ng/g)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (ng/g)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (ng/g)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (ng/g)
Perfluoro-1-heptanesulfonic acid (PFHpS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoro-1-octanesulfonamide (FOSA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorobutanesulfonic acid (PFBS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorodecanoic acid (PFDA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorododecanoic acid (PFDoA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoroheptanoic acid (PFHpA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorohexanesulfonic Acid (PFHxS)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorohexanoic acid (PFHxA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoro-n-butanoic acid (PFBA)	NS	NS	NS	ND	ND	ND	0.413	ND	ND	ND
Perfluorononanoic acid (PFNA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorooctanesulfonic Acid (PFOS)	0.88	44	440	ND	ND	0.328	0.409	ND	0.297	ND
Perfluorooctanoic acid (PFOA)	0.66	33	500	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorotetradecanoic acid (PFTA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluorotridecanoic acid (PFTrDA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND
Perfluoroundecanoic acid (PFUnA)	NS	NS	NS	ND	ND	ND	ND	ND	ND	ND

Notes:

- UUSCO - Unrestricted Use Soil Cleanup Objectives
- RRSCO - Restricted Residential Soil Cleanup Objectives
- CSCO - Commercial Soil Cleanup Objectives
- All units are in mg/kg or ppm
- Bold text indicates UUSCO exceedances
- Shaded cell indicates RRSCO exceedances
- Underlined text indicates CSCO exceedances
- ND – Not Detected
- NS (Blank) – No Standard

Table 9

Soil Analytical Results
Semi Volatiles, 1,4, -Dioxane 8270 SIM
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC Standards	SC-1 S1 (0'-4') 03/16/2022 (mg/kg)	SC-1 S5 (16'-20') 03/16/2022 (mg/kg)	SC-4 S1 (0'-4') 03/18/2022 (mg/kg)	SC-4 S5 (16'-20') 03/18/2022 (mg/kg)	SC-5 S1 (0'-4') 03/16/2022 (mg/kg)	SC-5 S5 (16'-20') 03/16/2022 (mg/kg)	SC-7 S1 (0'-4') 03/16/2022 (mg/kg)
1,4 - Dioxane	0.1	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC Standards	SC-7 S5 (16'-20') 03/16/2022 (mg/kg)	SC-8 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-8 S3 (8'-12') (Cellar) 03/21/2022 (mg/kg)	SC-10 S1 (0'-4') (Cellar) 03/17/2022 (mg/kg)	SC-10 S3 (8'-12') (Cellar) 03/17/2022 (mg/kg)	SC-12 S1 (0'-4') (Cellar) 03/21/2022 (mg/kg)	SC-13 S1 (0'-4') (Cellar) 03/22/2022 (mg/kg)
1,4 - Dioxane	0.1	ND	ND	ND	ND	ND	ND	ND

Notes:

- NYSDEC Standards
- All units are in mg/kg or ppm
- Bold text indicates exceedances
- ND – Not Detected
- NS (Blank) – No Standard

Table 10

Groundwater Analytical Results
Volatile Organic Compounds
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC GQS (µg/L)	GWMW-1 03/29/2022 (µg/L)	GWMW-2 03/29/2022 (µg/L)	GWMW-3 03/29/2022 (µg/L)	GWMW-4 03/29/2022 (µg/L)	GWMW-5 03/29/2022 (µg/L)	GWMW-6 03/29/2022 (µg/L)	GWMW-7 03/29/2022 (µg/L)	GW-8 03/29/2022 (µg/L)	GW-9 03/29/2022 (µg/L)	GW-10 03/29/2022 (µg/L)	GW-11 03/29/2022 (µg/L)
1,1,1,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	5	**92**	**420**	ND	**87**	**53**	**43**	**1,300**	**7**	**110**	**3,100**	**1,200**
1,2-Dibromo-3-chloropropane	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	0.0006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	5	**73**	**200**	ND	**43**	**11**	2.6	**380**	**46**	**150**	**710**	**370**
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Isopropyltoluene	5	ND	ND	ND	2.8	ND	ND	3	ND	ND	ND	ND
4-Chlorotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**20**
cis-1,3-Dichloropropene	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC GQS (µg/L)	GWMW-1 03/29/2022 (µg/L)	GWMW-2 03/29/2022 (µg/L)	GWMW-3 03/29/2022 (µg/L)	GWMW-4 03/29/2022 (µg/L)	GWMW-5 03/29/2022 (µg/L)	GWMW-6 03/29/2022 (µg/L)	GWMW-7 03/29/2022 (µg/L)	GW-8 03/29/2022 (µg/L)	GW-9 03/29/2022 (µg/L)	GW-10 03/29/2022 (µg/L)	GW-11 03/29/2022 (µg/L)
Dibromochloromethane	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	**230**	**350**	**55**	**14**	**34**	**5.3**	**16**	**130**	**550**	**2,000**	**970**
Hexachlorobutadiene	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	5	**140**	**130**	**120**	**73**	**60**	**9**	**60**	**110**	**110**	**120**	**100**
m&p-Xylene	NS	110	610	19	83	5	ND	140	11	180	7,700	2,300
Methyl ethyl ketone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-butyl ether (MTBE)	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	**270**	**330**	**230**	**60**	**150**	**47**	**190**	**200**	**540**	**1,300**	**500**
n-Butylbenzene	5	**38**	**48**	**28**	**23**	**27**	**6.1**	**24**	**40**	**39**	**23**	**28**
n-Propylbenzene	5	**400**	**400**	**340**	**250**	**180**	**25**	**230**	**360**	**320**	**350**	**300**
o-Xylene	5	**6.2**	**18**	ND	**6.8**	ND	ND	4.8	ND	ND	**1,900**	**650**
p-Isopropyltoluene	5	**6**	**7**	**5.1**	ND	ND	1.3	**6.4**	**6**	**9.1**	**8.5**	**6.4**
sec-Butylbenzene	5	**17**	**21**	**15**	**11**	**12**	2.3	**13**	**19**	**16**	ND	**15**
Styrene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND	ND	ND	ND	3.1	ND	ND	**16**	ND
Tetrahydrofuran (THF)	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	4.2	ND	ND	ND	ND	**21**	**190**	**59**
Total Xylenes	5	**116.2**	**628**	**19**	**89.8**	**5**	ND	**144.8**	**11**	**180**	**9,600**	**2,950**
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,4-dichloro-2-butene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorotrifluoroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- NYS Groundwater Quality Standards
- All units are in ug/L or ppb
- Bold text indicates NYSDEC GQS exceedances.
- ND – Not Detected
- NS (Blank) – No Standard

Table 11

Groundwater Analytical Results
Semi-Volatile Organic Compounds
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC GQS (µg/L)	GWMW-1 03/29/2022 (µg/L)	GWMW-2 03/29/2022 (µg/L)	GWMW-3 03/29/2022 (µg/L)	GWMW-4 03/29/2022 (µg/L)	GWMW-5 03/29/2022 (µg/L)	GWMW-6 03/29/2022 (µg/L)	GWMW-7 03/29/2022 (µg/L)	GW-8 03/29/2022 (µg/L)	GW-9 03/29/2022 (µg/L)	GW-10 03/29/2022 (µg/L)	GW-11 03/29/2022 (µg/L)
1,2,4,5-Tetrachlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2'-Oxybis(1-Chloropropane)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	50	**74**	**74**	**57**	ND	**93**	ND	**93**	**180**	**220**	**180**	**100**
2-Methylphenol (o-cresol)	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol (m&p-cresol)	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-2-methylphenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aniline	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzidine	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzyl butyl phthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethoxy)methane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-chloroethyl)ether	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethylphthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND	NYSDEC GQS (µg/L)	GWMW-1 03/29/2022 (µg/L)	GWMW-2 03/29/2022 (µg/L)	GWMW-3 03/29/2022 (µg/L)	GWMW-4 03/29/2022 (µg/L)	GWMW-5 03/29/2022 (µg/L)	GWMW-6 03/29/2022 (µg/L)	GWMW-7 03/29/2022 (µg/L)	GW-8 03/29/2022 (µg/L)	GW-9 03/29/2022 (µg/L)	GW-10 03/29/2022 (µg/L)	GW-11 03/29/2022 (µg/L)
Di-n-butylphthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octylphthalate	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	**180**	**200**	**160**	**46**	**78**	ND	**72**	**83**	**93**	**690**	**350**
N-Nitrosodi-n-propylamine	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benz(a)anthracene	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyridine	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- NYS Groundwater Quality Standards
- All units are in ug/L or ppb
- Bold text indicates NYSDEC GQS exceedances.
- ND – Not Detected
- NS (Blank) – No Standard

Table 12

Groundwater Analytical Results
Pesticides, 8081 Target List
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC GQS (µg/L)	GWMW-1 03/29/2022 (µg/L)	GWMW-2 03/29/2022 (µg/L)	GWMW-3 03/29/2022 (µg/L)	GWMW-4 03/29/2022 (µg/L)	GWMW-5 03/29/2022 (µg/L)	GWMW-6 03/29/2022 (µg/L)	GWMW-7 03/29/2022 (µg/L)	GW-8 03/29/2022 (µg/L)	GW-9 03/29/2022 (µg/L)	GW-10 03/29/2022 (µg/L)	GW-11 03/29/2022 (µg/L)
4,4' -DDD	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4' -DDE	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4' -DDT	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
a-BHC	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
a-chlordane	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alachlor	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	NS	ND	ND	ND	ND	0.003	ND	ND	ND	ND	ND	ND
b-BHC	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
d-BHC	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.004	ND	ND	ND	ND	ND	ND	**0.01**	ND	ND	ND	ND
Endosulfan I	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
g-BHC (Lindane)	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
g-chlordane	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	0.03	ND	ND	ND	**0.035**	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- NYS Groundwater Quality Standards
- All units are in ug/L or ppb
- Bold text indicates NYSDEC GQS exceedances.
- ND – Not Detected
- NS (Blank) – No Standard

Table 13

Groundwater Analytical Results
Polychlorinated Biphenyls (PCBs)
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC GQS (µg/L)	GWMW-1 03/29/2022 (µg/L)	GWMW-2 03/29/2022 (µg/L)	GWMW-3 03/29/2022 (µg/L)	GWMW-4 03/29/2022 (µg/L)	GWMW-5 03/29/2022 (µg/L)	GWMW-6 03/29/2022 (µg/L)	GWMW-7 03/29/2022 (µg/L)	GW-8 03/29/2022 (µg/L)	GW-9 03/29/2022 (µg/L)	GW-10 03/29/2022 (µg/L)	GW-11 03/29/2022 (µg/L)
Aroclor 1016	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
*Total Polychlorinated Biphenyls	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- NYS Groundwater Quality Standards
- All units are in ug/L or ppb
- Bold text indicates NYSDEC GQS exceedances.
- ND – Not Detected
- NS (Blank) – No Standard

Table 14

Groundwater Analytical Results
Metals, Target Analyte
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC GQS (µg/L)	GWMW-1 (ICP) 03/29/2022 (µg/L)	GWMW-1 (ICP- dissolved) 03/29/2022 (µg/L)	GWMW-2 (ICP) 03/29/2022 (µg/L)	GWMW-2 (ICP-dissolved) 03/29/2022 (µg/L)	GWMW-3 (ICP) 03/29/2022 (µg/L)	GWMW-3 (ICP-dissolved) 03/29/2022 (µg/L)	GWMW-4 (ICP) 03/29/2022 (µg/L)	GWMW-4 (ICP-dissolved) 03/29/2022 (µg/L)	GWMW-5 (ICP) 03/29/2022 (µg/L)	GWMW-5 (ICP-dissolved) 03/29/2022 (µg/L)	GWMW-6 (ICP) 03/29/2022 (µg/L)
Aluminum	100	77	12	**174**	16	**143**	ND	66	ND	**235**	ND	**235**
Antimony	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	ND	ND	6	ND	8	ND	ND	ND	ND	ND	ND
Barium	1000	160	97	245	160	262	141	104	61	86	32	27
Beryllium	3	2	ND	2	ND	2	ND	2	ND	2	ND	2
Cadmium	5	ND	ND	1	ND	2	ND	ND	ND	ND	ND	ND
Calcium	NS	37600	38900	40600	42600	38100	39600	15800	17000	18500	18200	6200
Chromium	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	NS	ND	ND	ND	ND	ND	ND	2	1	ND	ND	ND
Copper	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	**19800**	**9160**	**44400**	**5270**	**62400**	**5060**	**23200**	**386**	**16000**	**5020**	**4460**
Lead	25	5	2	8	5	5	ND	ND	ND	6	ND	4
Magnesium	35,000	12400	11800	11000	10700	15900	15400	5470	5160	5000	4520	1610
Manganese	300	**1010**	**1030**	**3690**	**3150**	**6390**	**4670**	**3260**	**2820**	**1270**	**1180**	**324**
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	4	4	6	2	6	3	9	7	7	2	5
Potassium	NS	4300	4000	7700	7100	6800	6500	3500	3200	3000	2900	1700
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	**173000**	**184000**	**142000**	**131000**	**126000**	**103000**	**50600**	**51900**	**99200**	**102000**	**51900**
Thallium	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	ND	2	ND	ND	ND	ND	3	ND	ND	ND	ND
Zinc	5,000	4	3	9	ND	11	4	5	ND	5	ND	ND

COMPOUND	NYSDEC GQS (mg/L)	GWMW-6 (ICP-dissolved) 03/29/2022 (µg/L)	GWMW-7 (ICP) 03/29/2022 (µg/L)	GWMW-7 (ICP-dissolved) 03/29/2022 (µg/L)	GW-8 (ICP) 03/29/2022 (µg/L)	GW-8 (ICP-dissolved) 03/29/2022 (µg/L)	GW-9 (ICP) 03/29/2022 (µg/L)	GW-9 (ICP-dissolved) 03/29/2022 (µg/L)	GW-10 (ICP) 03/29/2022 (µg/L)	GW-10 (ICP-dissolved) 03/29/2022 (µg/L)	GW-11 (ICP) 03/29/2022 (µg/L)	GW-11 (ICP-dissolved) 03/29/2022 (µg/L)
Aluminum	100	ND	**122**	ND	57	12	88	ND	28	13	**120**	ND
Antimony	3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	ND

COMPOUND	NYSDEC GQS (mg/L)	GWMW-6 (ICP-dissolved) 03/29/2022 (µg/L)	GWMW-7 (ICP) 03/29/2022 (µg/L)	GWMW-7 (ICP-dissolved) 03/29/2022 (µg/L)	GW-8 (ICP) 03/29/2022 (µg/L)	GW-8 (ICP-dissolved) 03/29/2022 (µg/L)	GW-9 (ICP) 03/29/2022 (µg/L)	GW-9 (ICP-dissolved) 03/29/2022 (µg/L)	GW-10 (ICP) 03/29/2022 (µg/L)	GW-10 (ICP-dissolved) 03/29/2022 (µg/L)	GW-11 (ICP) 03/29/2022 (µg/L)	GW-11 (ICP-dissolved) 03/29/2022 (µg/L)
Barium	1000	14	35	31	104	35	166	35	63	39	82	26
Beryllium	3	ND	2	ND	2	ND	1	ND	2	ND	2	ND
Cadmium	5	ND	ND	ND	ND	ND	2	ND	ND	ND	ND	ND
Calcium	NS	5970	9840	10400	32500	33300	24100	31400	26300	29400	25100	24700
Chromium	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt	NS	ND	ND	1	ND	ND	4	ND	ND	ND	ND	ND
Copper	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron	300	**2230**	**2150**	**1530**	**9560**	ND	**61600**	**3710**	**12600**	32	**25400**	**1020**
Lead	25	ND	ND	ND	4	ND	10	ND	**30**	**27**	16	11
Magnesium	35,000	1330	1200	1240	6700	6230	8650	6140	4370	4310	4440	4140
Manganese	300	292	50	54	**939**	**836**	**7650**	**877**	**603**	**594**	**1740**	**1600**
Mercury	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	100	1	7	5	3	1	5	3	ND	ND	5	1
Potassium	NS	1400	2200	2100	4900	4500	4200	4500	5500	5400	3100	2800
Selenium	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	20,000	**47100**	**112000**	**108000**	**155000**	**140000**	**47000**	**144000**	**102000**	**102000**	**28200**	**27100**
Thallium	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	ND	2	2	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	5,000	ND	ND	4	ND	ND	12	3	ND	ND	4	5

Notes:

- NYS Groundwater Quality Standards
- All units are in mg/L or ppm
- Bold text indicates NYSDEC GQS exceedances.
- ND – Not Detected
- NS (Blank) – No Standard

Table 15

Groundwater Analytical Results
PFAS, NYSDEC Target List
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC Standards (ng/L)	GWMW-1 03/29/2022 (ng/L)	GWMW-4 03/29/2022 (ng/L)	GWMW-5 03/29/2022 (ng/L)	GWMW-7 03/29/2022 (ng/L)	GW-8 03/29/2022 (ng/L)	GW-9 03/29/2022 (ng/L)
1H,1H,2H,2H-Perfluorodecanesulfonic acid	NS	ND	ND	ND	ND	ND	ND
1H,1H,2H,2H-Perfluorooctanesulfonic acid	NS	ND	ND	ND	ND	ND	ND
NEtFOSAA	NS	ND	ND	ND	ND	ND	ND
NMeFOSAA	NS	ND	ND	ND	ND	ND	ND
Perfluoro-1-decanesulfonic acid (PFDS)	NS	ND	ND	ND	ND	ND	ND
Perfluoro-1-heptanesulfonic acid (PFHpS)	NS	ND	ND	ND	ND	ND	ND
Perfluoro-1-octanesulfonamide (FOSA)	NS	ND	ND	ND	ND	ND	ND
Perfluorobutanesulfonic acid (PFBS)	NS	14.8	8.4	8.33	13.6	24	4.91
Perfluorodecanoic acid (PFDA)	NS	2	ND	ND	ND	ND	ND
Perfluorododecanoic acid (PFDoA)	NS	ND	ND	ND	ND	ND	ND
Perfluoroheptanoic acid (PFHpA)	NS	2.41	9.74	6.36	2.08	3.11	25.1
Perfluorohexanesulfonic Acid (PFHxS)	NS	ND	2.07	ND	ND	ND	5.1
Perfluorohexanoic acid (PFHxA)	NS	5.71	6.05	4.63	2.48	4.61	9.88
Perfluoro-n-butanoic acid (PFBA)	NS	29.1	ND	19.1	ND	89.3	ND
Perfluorononanoic acid (PFNA)	NS	2.09	3.29	ND	ND	ND	ND
Perfluorooctanesulfonic Acid (PFOS)	0.01	16.4	56.5	13.5	23.2	72	92
Perfluorooctanoic acid (PFOA)	0.01	**6.2**	**68.2**	**23**	**6.17**	**11.4**	**116**
Perfluoropentanoic acid (PFPeA)	NS	**9.14**	**7.37**	**31.6**	**2.6**	**77.4**	**7.71**
Perfluorotetradecanoic acid (PFTA)	NS	ND	ND	ND	ND	ND	ND
Perfluorotridecanoic acid (PFTrDA)	NS	ND	ND	ND	ND	ND	ND
Perfluoroundecanoic acid (PFUnA)	NS	ND	ND	ND	ND	ND	ND

Notes:

- NYS Standards
- All units are in ng/L or ppt
- Bold text indicates NYSDEC exceedances.
- ND – Not Detected
- NS (Blank) – No Standard

Table 16

Groundwater Analytical Results
Semi Volatiles, 1,4,-Dioxane 8270 SIM
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND	NYSDEC Standards (µg/L)	GWMW-1 03/29/2022 (µg/L)	GWMW-4 03/29/2022 (µg/L)	GWMW-5 03/29/2022 (µg/L)	GWMW-7 03/29/2022 (µg/L)	GW-8 03/29/2022 (µg/L)	GW-9 03/29/2022 (µg/L)
1,4 - Dioxane	1.0	ND	ND	ND	ND	ND	ND

Notes:

- NYS Standards
- All units are in ug/L or ppb
- Bold text indicates NYSDEC GQS exceedances.
- ND – Not Detected
- NS (Blank) – No Standard

Table 17

Soil Vapor Analytical Results
Volatile Organic Compounds
1810-1818 Cropsey Avenue, Brooklyn, NY

COMPOUND Volatile Organics, EPA TO-15	NYSDOH Matrix A Sub-Slab Vapor Concentration Lower Threshhold	NYSDOH Matrix B Sub-Slab Vapor Concentration Lower Threshhold	NYSDOH Matrix C Sub-Slab Vapor Concentration Lower Threshhold	NYSDOH Background Standards – Indoor Air (25^{th}-75^{th} Percentile) ($\mu g/m^3$)	SV-1 (14-Feet) 03/15/2022 ($\mu g/m^3$)	SS-1 03/15/2022 ($\mu g/m^3$)	SS-2 03/15/2022 ($\mu g/m^3$)	SS-3 03/16/2022 ($\mu g/m^3$)	SS-4 03/16/2022 ($\mu g/m^3$)	IA-1 03/16/2022 ($\mu g/m^3$)	IA-2 03/16/2022 ($\mu g/m^3$)	OA-1 03/16/2022 ($\mu g/m^3$)
1,1,1,2-Tetrachloroethane				NS	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		100		<0.25 - 1.1	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	6			<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene				0.7 - 4.3	ND	ND	ND	**6.58**	**6.93**	ND	ND	ND
1,2-Dibromoethane(EDB)				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene				0.3 – 1.7	ND	ND	ND	ND	**1.59**	ND	ND	ND
1,3-Butadiene				NS	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene				<0.25 – 0.5	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dioxane				NS	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone(MBK)				NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyltoluene				NS	ND	9.7	6.44	12.1	12.3	ND	ND	ND
4-Isopropyltoluene				NS	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)				NS	ND	ND	ND	ND	ND	ND	ND	ND
Acetone				10 - 52	ND	ND	5.29	ND	3.68	4.53	4.61	4.53
Acrylonitrile				NS	ND	ND	ND	ND	ND	ND	ND	ND
Benzene				1.1 – 5.9	ND	ND	ND	**6.48**	**6.03**	ND	ND	ND
Benzyl chloride				NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane				NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform				NS	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide				NS	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	6			<0.25 – 0.59	ND	ND	ND	ND	ND	**0.43**	**0.4**	**0.41**
Chlorobenzene				<0.25	ND	ND	ND	ND	ND	ND	ND	ND

COMPOUND **Volatile Organics, EPA TO-15**	**NYSDOH Matrix A Sub-Slab Vapor Concentration Lower Threshhold**	**NYSDOH Matrix B Sub-Slab Vapor Concentration Lower Threshhold**	**NYSDOH Matrix C Sub-Slab Vapor Concentration Lower Threshhold**	**NYSDOH Background Standards – Indoor Air (25^{th}-75^{th} Percentile) ($\mu g/m^3$)**	**SV-1 (14-Feet) 03/15/2022 ($\mu g/m^3$)**	**SS-1 03/15/2022 ($\mu g/m^3$)**	**SS-2 03/15/2022 ($\mu g/m^3$)**	**SS-3 03/16/2022 ($\mu g/m^3$)**	**SS-4 03/16/2022 ($\mu g/m^3$)**	**IA-1 03/16/2022 ($\mu g/m^3$)**	**IA-2 03/16/2022 ($\mu g/m^3$)**	**OA-1 03/16/2022 ($\mu g/m^3$)**
Chloroethane				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform				<0.25 – 0.54	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane				<0.25 – 1.8	ND	ND	ND	ND	ND	**1.28**	**1.36**	**1.25**
Cis-1,2-Dichloroethene	6			NS	ND	**70.9**	**29.6**	**79.2**	**38**	ND	ND	ND
cis-1,3-Dichloropropene				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane				<0.25 – 2.6	**7,640**	ND	ND	ND	**2.64**	ND	ND	ND
Dibromochloromethane				NS	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane				<0.25 – 4.1	ND	ND	ND	ND	ND	**1.46**	**1.35**	**1.23**
Ethanol				<0.25 - 540	139	**11.8**	**10.9**	**14.2**	**9.42**	**20.7**	**11.2**	**6.89**
Ethyl acetate				NS	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene				0.4 – 2.8	529	**5.25**	ND	**8.55**	**7.51**	ND	ND	ND
Heptane				1 – 7.6	**56,500**	ND	ND	**8.36**	**6.23**	ND	ND	ND
Hexachlorobutadiene				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
Hexane				0.63 - 6	**93,700**	**12.5**	**7.4**	**15.1**	**14.9**	**1.84**	ND	**1.4**
Isopropylalcohol				NS	ND	ND	ND	6.17	1.25	ND	6.24	2.53
Isopropylbenzene				0.25 – 0.5	**287**	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene				0.5 – 4.6	ND	**24.2**	**18.7**	**35.1**	**35**	**4.28**	**4.2**	**3.72**
Methyl Ethyl Ketone				1.4 – 7.3	ND	ND	ND	ND	2.1	1.19	ND	1.23
Methyl tert-butyl ether (MTBE)				<0.25 – 5.6	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride		100		<0.25 – 6.6	ND	ND	ND	ND	ND	**6.28**	ND	ND
n-Butylbenzene				<0.25 – 0.5	ND	ND	ND	ND	1.06	ND	ND	ND
o-Xylene				0.39 – 3.1	ND	ND	ND	**8.68**	**8.94**	**1.31**	**1.31**	**1.02**
Propylene				NS	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene				<0.25 – 0.6	ND	ND	ND	ND	ND	ND	ND	ND
Styrene				<0.25 – 0.6	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene		100		<0.25 – 1.1	**75.9**	**1,320**	**1,780**	**1,290**	**712**	**0.52**	**0.49**	ND
Tetrahydrofuran				<0.25 – 0.3	ND	ND	ND	ND	1.31	ND	ND	ND
Toluene				3.5 – 24.8	**133**	**79.8**	**27.9**	**118**	**94.5**	ND	1.01	ND
Trans-1,2-Dichloroethene				NS	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene				<0.25	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	6			<0.25	ND	**29**	**22.1**	**35.9**	**25.1**	ND	ND	ND
Trichlorofluoromethane				1.1 – 5.4	ND	ND	ND	ND	**1.46**	**1.49**	**1.51**	**1.52**
Trichlorotrifluoroethane				NS	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride			6	<0.25	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

- Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Table C1, Indoor Air, NYSDOH 2003
- All units are in µg/m^3.
- Bold text indicates NYSDOH Background Standards – Indoor Air (25^{th}-75^{th} Percentile) exceedance.
- Shaded cell indicates concentration of compound exceeds the NYSDOH Matrix Sub-slab vapor concentration criteria
- ND – Not Detected
- NS (blank) – No Standard

FIGURE 1
Site Location Map

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PREPARED FOR:

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REVISION DATA:

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FIGURE 1:
SITE LOCATION MAP

SEAL & SIGNATURE:

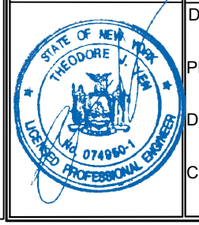

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FIGURE 2
Site Survey

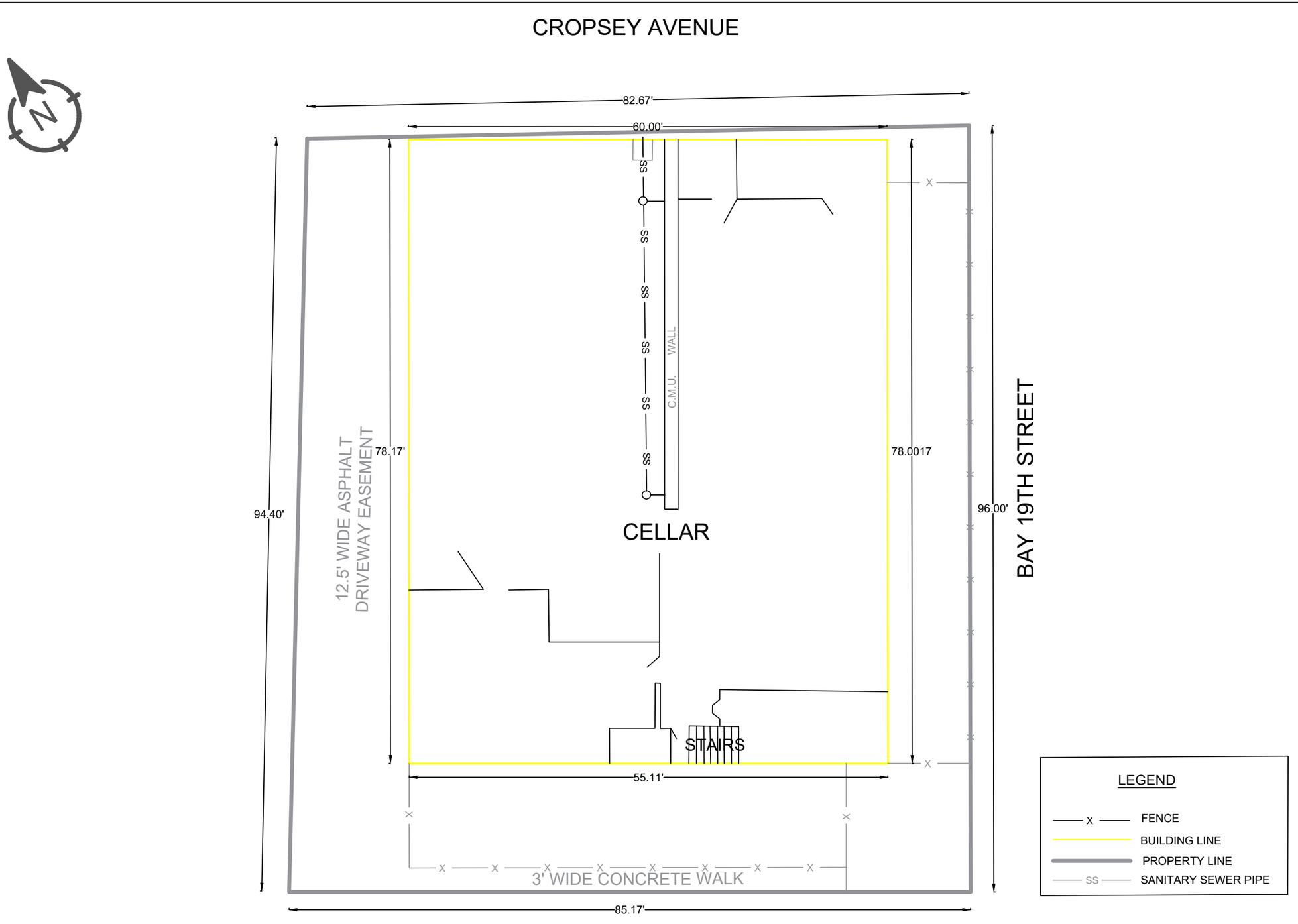

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FIGURE 2:
SITE SURVEY

SEAL & SIGNATURE:

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FIGURE 3
Surrounding Land Use

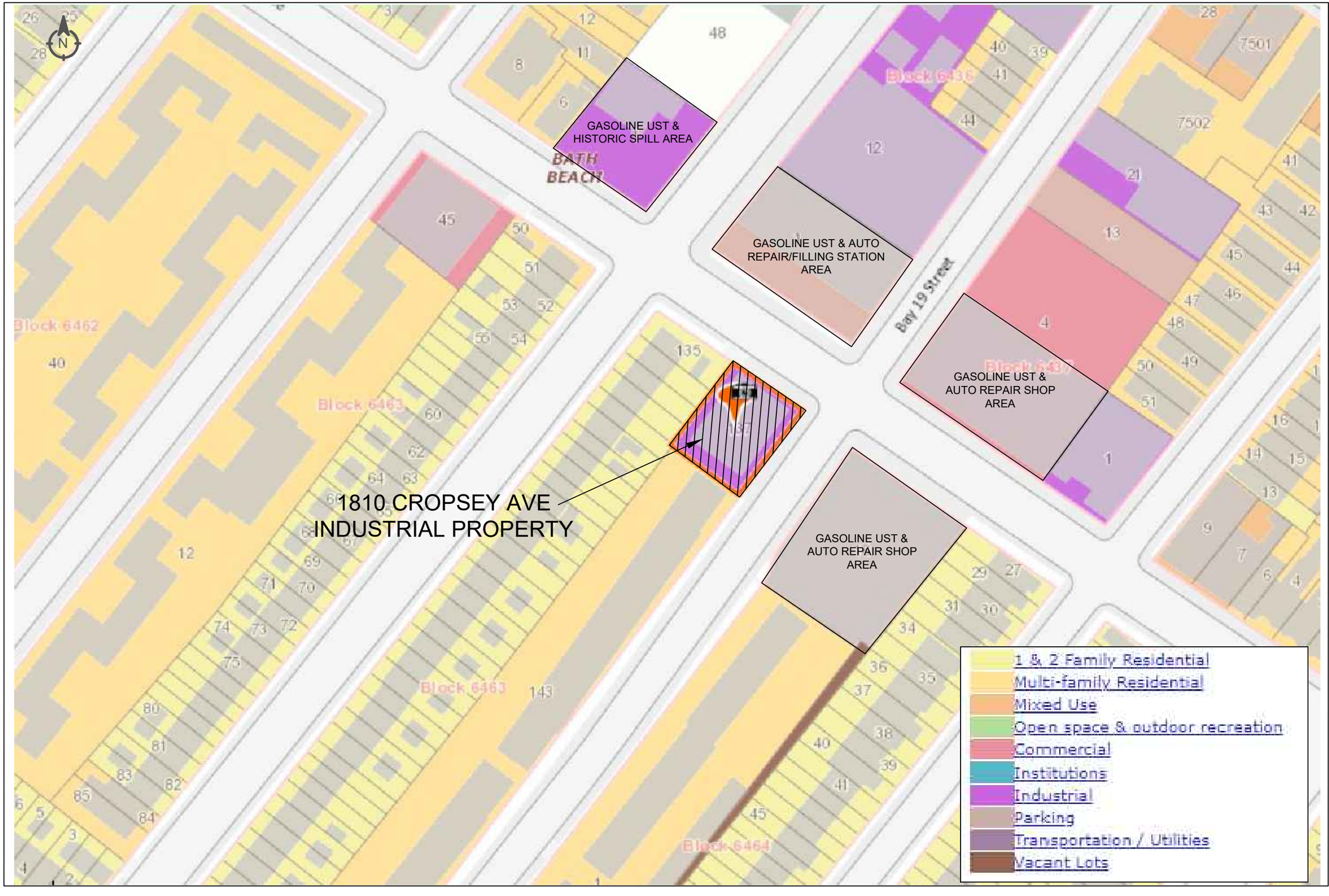

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FIGURE 3: SURROUNDING LAND USE

SEAL & SIGNATURE:

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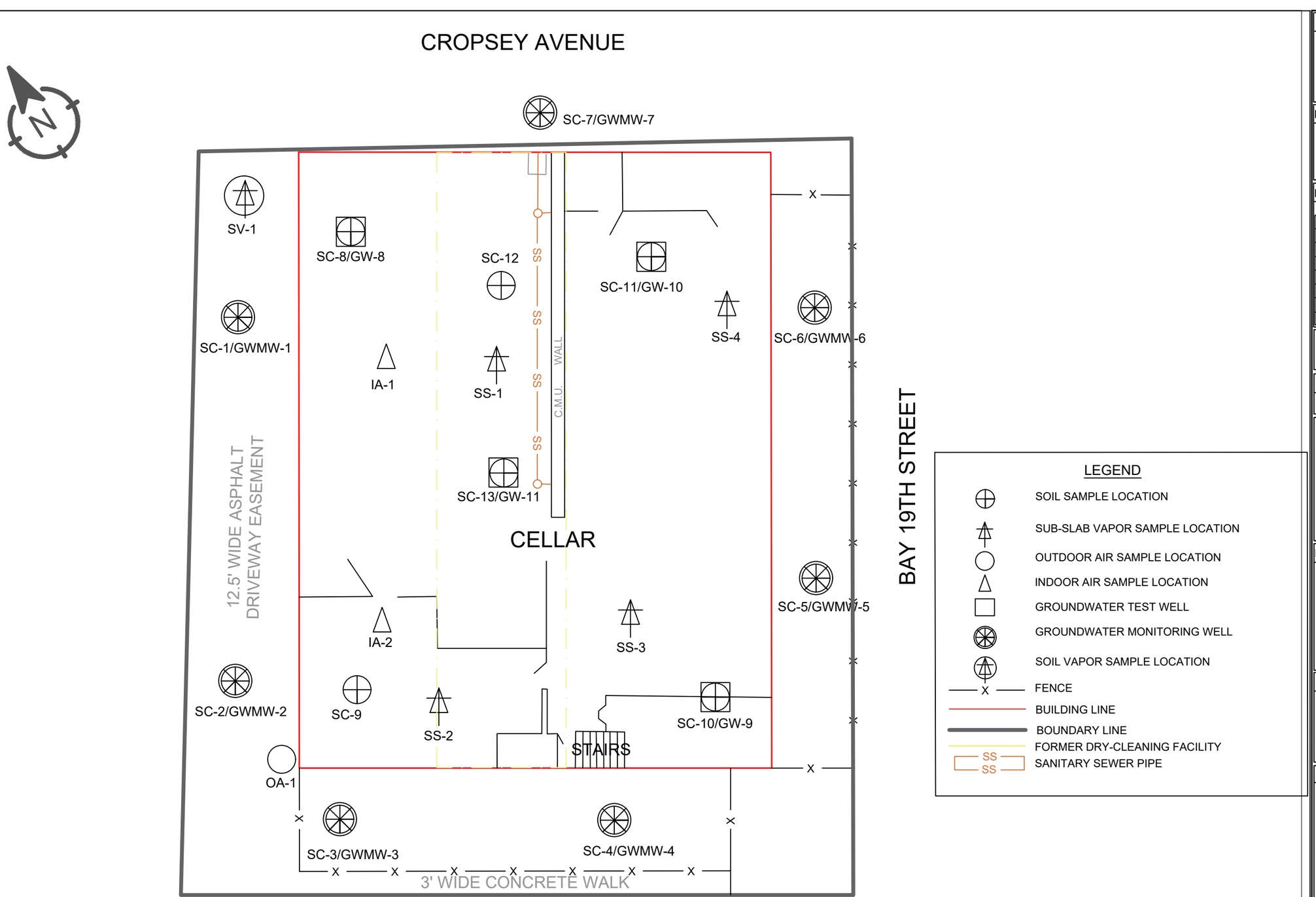
FIGURE 4
Sampling Plan Location



LEGEND

- SOIL SAMPLE LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SANITARY SEWER PIPE

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PROJECT NAME:

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BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 4:
SAMPLING LOCATION PLAN

SEAL & SIGNATURE:

DRAWING DATA:

DATE: 8/10/2022

PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

FIGURE 4A
Soil Exceedances Spider Map

NYCRR PART 375 SCOs			
Compound	**CSCO**	**RRSCO**	**UUSCO**
VOCs (mg/kg)			
1,2,4-Trimethylbenzene	190	52	3.6
1,3,5-Trimethylbenzene	190	52	8.4
Ethylbenzene	390	41	1
Methylene chloride	500	100	0.05
n-Butylbenzene	500	100	12
n-Propylbenzene	500	100	3.9
SVOCs (mg/kg)			
Naphthalene	500	100	12
Pesticides (mg/kg)			
4,4' -DDD	92	13	0.0033
Dieldrin	1.4	0.2	0.005
4,4' -DDE	62	8.9	0.0033
4,4' -DDT	47	7.9	0.0033
TAL Metals (mg/kg)			
Chromium	-	-	30
Nickel	310	310	30
Lead	1000	400	63

Compound	SC-1 S5 (16'-20')
SVOCs (mg/kg)	
2-Methylnaphthalene	22
Naphthalene	8.4
TAL Metals (mg/kg)	
Nickel	42.3
Compound	**SC-1 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.009
1,3,5-Trimethylbenzene	0.01
2-Isopropyltoluene	0.00043
Acetone	0.011
Carbon Disulfide	0.0008
Ethylbenzene	0.042
Isopropylbenzene	0.011
m&p-Xylene	0.015
Naphthalene	0.13
n-Butylbenzene	0.006
n-Propylbenzene	0.036
p-Isopropyltoluene	0.001
sec-Butylbenzene	0.003
TAL Metals (mg/kg)	
Nickel	33

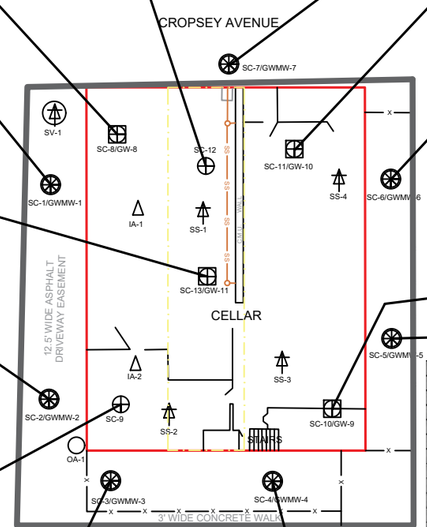
Compound	SC-8 S1 (0'-4')
TAL Metals (mg/kg)	
Nickel	53.3
Compound	**SC-8 S3 (8'-12')**
TAL Metals (mg/kg)	
Nickel	55.1
Compound	**SC-8 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.003
1,3,5-Trimethylbenzene	0.031
2-Isopropyltoluene	0.001
Carbon Disulfide	0.0007
Ethylbenzene	0.017
Isopropylbenzene	0.016
Naphthalene	0.022
n-Butylbenzene	0.016
n-Propylbenzene	0.11
p-Isopropyltoluene	0.0024
sec-Butylbenzene	0.0061
TAL Metals (mg/kg)	
Nickel	36

Compound	SC-12 S1 (0'-4')
VOCs (mg/kg)	
Tetrachloroethene	0.001
TAL Metals (mg/kg)	
Nickel	35.3

Compound	SC-13 S1 (0'-4')
VOCs (mg/kg)	
Tetrachloroethene	0.001
TAL Metals (mg/kg)	
Nickel	40.9

Compound	SC-2 S5 (16'-20')
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	110
1,3,5-Trimethylbenzene	36
Ethylbenzene	6.9
Isopropylbenzene	4.2
m&p-Xylene	3.1
Naphthalene	10
n-Butylbenzene	9.5
n-Propylbenzene	19
p-Isopropyltoluene	2.1
sec-Butylbenzene	3
SVOCs (mg/kg)	
2-Methylnaphthalene	21
Naphthalene	9.3
Pesticides (mg/kg)	
4,4' -DDD	0.006
TAL Metals (mg/kg)	
Nickel	47
Compound	**SC-2 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.006
1,3,5-Trimethylbenzene	0.003
Ethylbenzene	0.002
m&p-Xylene	0.005
Naphthalene	0.006
n-Propylbenzene	0.001
SVOCs (mg/kg)	
2-Methylnaphthalene	0.14
TAL Metals (mg/kg)	
Nickel	53.4

Compound	SC-9 S1 (0'-4')
VOCs (mg/kg)	
Tetrachloroethene	0.0009
TAL Metals (mg/kg)	
Nickel	47.8
Compound	**SC-9 S3 (8'-12')**
TAL Metals (mg/kg)	
Nickel	30.2
Compound	**SC-9 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.0051
1,3,5-Trimethylbenzene	0.15
2-Isopropyltoluene	0.001
Ethylbenzene	0.13
Isopropylbenzene	0.022
m&p-Xylene	0.0034
Naphthalene	0.13
n-Butylbenzene	0.016
n-Propylbenzene	0.18
p-Isopropyltoluene	0.0025
sec-Butylbenzene	0.0061
SVOCs (mg/kg)	
2-Methylnaphthalene	0.18
Naphthalene	0.12
TAL Metals (mg/kg)	
Nickel	49.5



Compound	SC-3 S5 (16'-20')
VOCs (mg/kg)	
Isopropylbenzene	0.004
n-Butylbenzene	0.0014
n-Propylbenzene	0.0077
sec-Butylbenzene	0.00083
Pesticides (mg/kg)	
4,4' -DDT	0.018
TAL Metals (mg/kg)	
Nickel	35.5
Compound	**SC-3 S6 (20'-24')**
SVOCs (mg/kg)	
Acetone	0.0049
Tetrachloroethene	0.0028
Pesticides (mg/kg)	
4,4' -DDD	0.0057
4,4' -DDE	0.061
4,4' -DDT	0.19
TAL Metals (mg/kg)	
Nickel	39.7

Compound	SC-4 S5 (16'-20')
VOCs (mg/kg)	
Tetrachloroethene	0.0014
TAL Metals (mg/kg)	
Nickel	39.6
Compound	**SC-4 S6 (20'-24')**
VOCs (mg/kg)	
Tetrachloroethene	0.0015
SVOCs (mg/kg)	
Benz(a)anthracene	0.44
Benzo(a)pyrene	0.49
Benzo(b)fluoranthene	0.48
Benzo(ghi)perylene	0.39
Benzo(k)fluoranthene	0.4
Chrysene	0.54
Fluoranthene	0.75
Indeno(1,2,3-cd)pyrene	0.41
Phenanthrene	0.38
Pyrene	0.6
TAL Metals (mg/kg)	
Nickel	47.2

Compound	SC-5 S5 (16'-20')
VOCs (mg/kg)	
Ethylbenzene	0.2
Isopropylbenzene	0.94
Naphthalene	1.8
n-Butylbenzene	3
n-Propylbenzene	4.1
p-Isopropyltoluene	0.57
sec-Butylbenzene	0.94
SVOCs (mg/kg)	
2-Methylnaphthalene	41
Bis(2-ethylhexyl)phthalate	0.29
Naphthalene	29
Pesticides (mg/kg)	
4,4' -DDD	0.049
TAL Metals (mg/kg)	
Nickel	34.3
Compound	**SC-5 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	1.9
2-Isopropyltoluene	0.21
Ethylbenzene	0.83
isopropylbenzene	2.1
Methylene chloride	0.78
Naphthalene	9.5
n-Butylbenzene	4.5
n-Propylbenzene	9.2
p-Isopropyltoluene	0.62
sec-Butylbenzene	1.3
SVOCs (mg/kg)	
2-Methylnaphthalene	5.2
Naphthalene	3.2
Pesticides (mg/kg)	
4,4' -DDD	0.009
TAL Metals (mg/kg)	
Nickel	30.1

Compound	SC-6 S5 (16'-20')
VOCs (mg/kg)	
2-Isopropyltoluene	0.13
Ethylbenzene	0.21
Isopropylbenzene	0.99
n-Butylbenzene	2
n-Propylbenzene	4.2
p-Isopropyltoluene	0.2
sec-Butylbenzene	0.61
SVOCs (mg/kg)	
2-Methylnaphthalene	22
Bis(2-ethylhexyl)phthalate	0.22
Naphthalene	15
Pesticides (mg/kg)	
4,4' -DDD	0.037
TAL Metals (mg/kg)	
Nickel	34
Compound	**SC-6 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.3
2-Isopropyltoluene	0.041
Ethylbenzene	0.11
Isopropylbenzene	0.4
Naphthalene	1.3
n-Butylbenzene	0.69
n-Propylbenzene	1.6
p-Isopropyltoluene	0.13
sec-Butylbenzene	0.24
SVOCs (mg/kg)	
2-Methylnaphthalene	2.7
Naphthalene	1.4
Pesticides (mg/kg)	
4,4' -DDD	0.012
TAL Metals (mg/kg)	
Nickel	42.1
Compound	**SC-6 S7 (24'-28')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.007
2-Isopropyltoluene	0.00082
Acetone	0.008
Carbon Disulfide	0.001
Ethylbenzene	0.002
Isopropylbenzene	0.008
Naphthalene	0.015
n-Butylbenzene	0.014
n-Propylbenzene	0.031
p-Isopropyltoluene	0.002
sec-Butylbenzene	0.005
TAL Metals (mg/kg)	
Chromium	40.9
Nickel	119

Compound	SC-11 S1 (0'-4')
VOCs (mg/kg)	
cis-1,2-Dichloroethene	0.0003
m&p-Xylene	0.001
o-Xylene	0.0009
Tetrachloroethene	0.0009
TAL Metals (mg/kg)	
Nickel	67.3
Compound	**SC-11 S3 (8'-12')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.27
1,3,5-Trimethylbenzene	0.2
2-Isopropyltoluene	0.0023
Carbon Disulfide	0.0016
Ethylbenzene	0.086
Isopropylbenzene	0.026
m&p-Xylene	0.25
Naphthalene	0.11
n-Butylbenzene	0.033
n-Propylbenzene	0.099
o-Xylene	0.06
p-Isopropyltoluene	0.0088
sec-Butylbenzene	0.014
Tetrachloroethene	0.0019
Toluene	0.0005
SVOCs (mg/kg)	
2-Methylnaphthalene	3.8
Naphthalene	2.3
Pesticides (mg/kg)	
4,4' -DDD	0.015
TAL Metals (mg/kg)	
Nickel	53.9
Compound	**SC-11 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	3.7
1,3,5-Trimethylbenzene	1.1
Ethylbenzene	0.99
Isopropylbenzene	0.14
m&p-Xylene	3.6
Naphthalene	1.1
n-Butylbenzene	0.21
n-Propylbenzene	0.54
o-Xylene	0.9
p-Isopropyltoluene	0.039
sec-Butylbenzene	0.062
Toluene	0.039
SVOCs (mg/kg)	
2-Methylnaphthalene	5.4
Naphthalene	6.4
Pesticides (mg/kg)	
4,4' -DDD	0.01
TAL Metals (mg/kg)	
Nickel	45.1

Compound	SC-10 S1 (0'-4')
VOCs (mg/kg)	
cis-1,2-Dichloroethene	0.0005
Tetrachloroethene	0.11
Trichloroethene	0.0004
SVOCs (mg/kg)	
Benz(a)anthracene	0.21
Benzo(a)pyrene	0.22
Benzo(b)fluoranthene	0.19
Benzo(ghi)perylene	0.15
Benzo(k)fluoranthene	0.18
Chrysene	0.22
Fluoranthene	0.41
Indeno(1,2,3-cd)pyrene	0.18
Phenanthrene	0.21
Pyrene	0.39
Pesticides (mg/kg)	
4,4' -DDE	0.0047
4,4' -DDT	0.007
TAL Metals (mg/kg)	
Lead	91.7
Nickel	41.6
Compound	**SC-10 S3 (8'-12')**
VOCs (mg/kg)	
Acetone	0.0046
TAL Metals (mg/kg)	
Nickel	41.4
Compound	**SC-10 S4 (12'-16')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	10
1,3,5-Trimethylbenzene	12
2-Isopropyltoluene	0.13
Ethylbenzene	9.2
Isopropylbenzene	2
m&p-Xylene	5.9
Naphthalene	7.5
n-Butylbenzene	2.9
n-Propylbenzene	7.6
p-Isopropyltoluene	0.52
sec-Butylbenzene	0.9
SVOCs (mg/kg)	
2-Methylnaphthalene	3.9
Naphthalene	3.3
TAL Metals (mg/kg)	
Chromium	115
Nickel	73.9

Compound	SC-7 S1 (0'-4')
PFAS (21) (ng/g)	
PFOS	0.87
PFOA	0.33
Compound	**SC-7 S5 (16'-20')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	69
1,3,5-Trimethylbenzene	24
2-Isopropyltoluene	0.87
Isopropylbenzene	1.8
n-Butylbenzene	15
n-Propylbenzene	14
p-Isopropyltoluene	2.8
sec-Butylbenzene	6
SVOCs (mg/kg)	
2-Methylnaphthalene	0.9
Naphthalene	0.42
Pesticides (mg/kg)	
4,4' -DDD	0.026
Dieldrin	0.017
TAL Metals (mg/kg)	
Nickel	30.7
Compound	**SC-7 S6 (20'-24')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	91
1,3,5-Trimethylbenzene	29
2-Isopropyltoluene	1
Isopropylbenzene	2.7
n-Butylbenzene	15
n-Propylbenzene	17
p-Isopropyltoluene	2.8
sec-Butylbenzene	5.6
SVOCs (mg/kg)	
2-Methylnaphthalene	16
Naphthalene	3.3
TAL Metals (mg/kg)	
Nickel	46.7
Compound	**SC-7 S7 (24'-28')**
VOCs (mg/kg)	
1,2,4-Trimethylbenzene	0.61
1,3,5-Trimethylbenzene	0.18
2-Isopropyltoluene	0.00072
Carbon Disulfide	0.001
Ethylbenzene	0.002
Isopropylbenzene	0.009
m&p-Xylene	0.017
Naphthalene	0.027
n-Butylbenzene	0.011
n-Propylbenzene	0.098
o-Xylene	0.00064
p-Isopropyltoluene	0.002
sec-Butylbenzene	0.005
TAL Metals (mg/kg)	
Nickel	55.7

LEGEND

- SOIL BORING LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SANITARY SEWER PIPE

PREPARED BY:

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PREPARED FOR:

1810 CROPSEY AVE LLC
1762 BENSON AVENUE
BROOKLYN, NY 11214

REVISION DATA:

REV	DATE	COMMENT	BY

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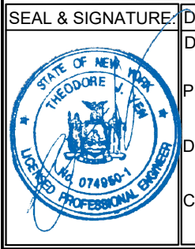
PROJECT NAME:

1810 CROPSEY AVENUE BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 4A: SOIL EXCEEDANCES SPIDER MAP

SEAL & SIGNATURE:



DRAWING DATA:

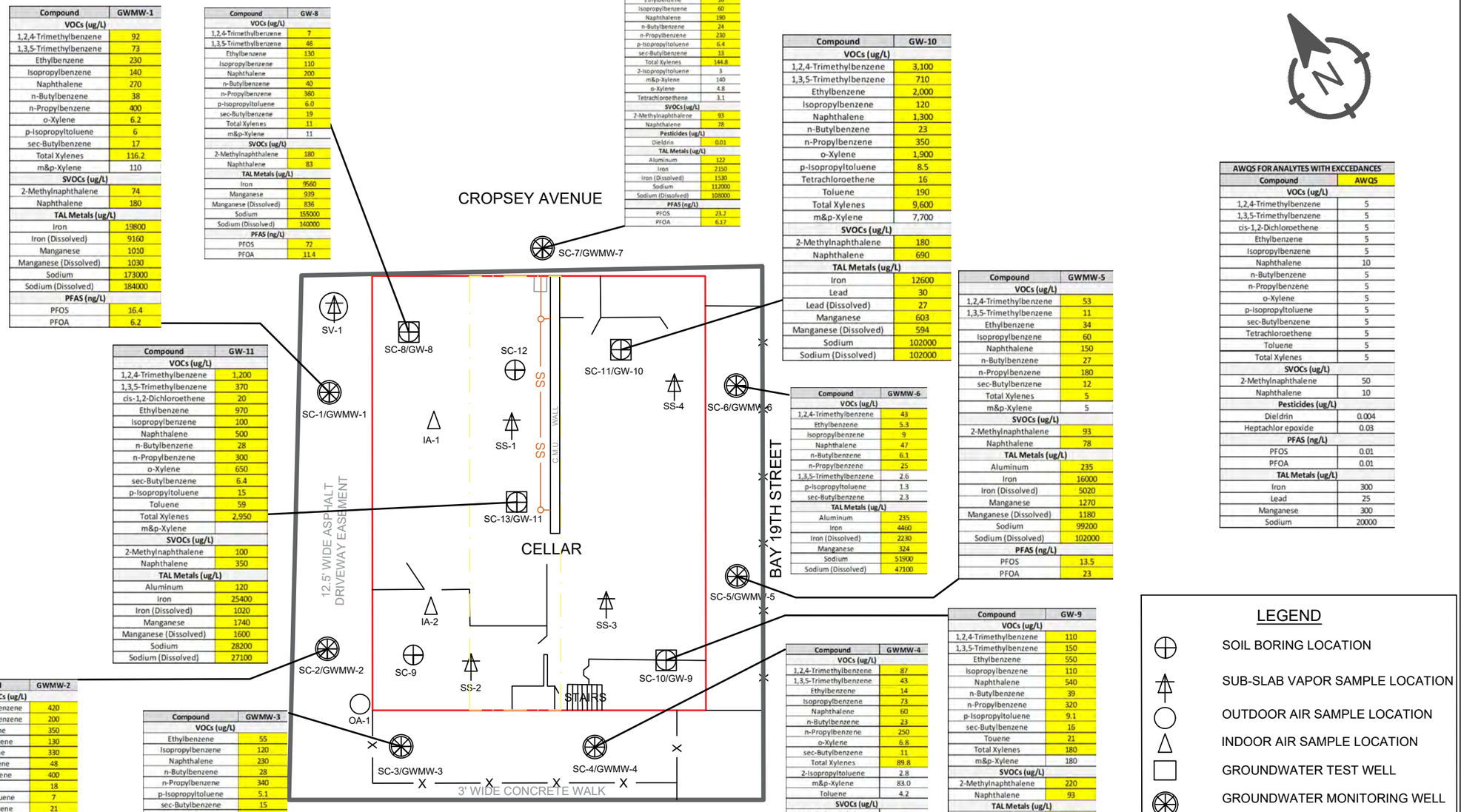
DATE: 5/17/2022

PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

FIGURE 4B
Groundwater Exceedances Spider Map



Compound	GWMW-1
VOCs (ug/L)	
1,2,4-Trimethylbenzene	92
1,3,5-Trimethylbenzene	73
Ethylbenzene	230
Isopropylbenzene	140
Naphthalene	270
n-Butylbenzene	38
n-Propylbenzene	400
o-Xylene	6.2
p-Isopropyltoluene	6
sec-Butylbenzene	17
Total Xylenes	116.2
m&p-Xylene	110
SVOCs (ug/L)	
2-Methylnaphthalene	74
Naphthalene	180
TAL Metals (ug/L)	
Iron	19800
Iron (Dissolved)	9160
Manganese	1010
Manganese (Dissolved)	1030
Sodium	173000
Sodium (Dissolved)	184000
PFAS (ng/L)	
PFOS	16.4
PFOA	6.2

Compound	GW-8
VOCs (ug/L)	
1,2,4-Trimethylbenzene	7
1,3,5-Trimethylbenzene	46
Ethylbenzene	130
Isopropylbenzene	110
Naphthalene	200
n-Butylbenzene	40
n-Propylbenzene	360
p-Isopropyltoluene	6.0
sec-Butylbenzene	19
Total Xylenes	11
m&p-Xylene	11
SVOCs (ug/L)	
2-Methylnaphthalene	180
Naphthalene	83
TAL Metals (ug/L)	
Iron	9560
Manganese	939
Manganese (Dissolved)	836
Sodium	155000
Sodium (Dissolved)	140000
PFAS (ng/L)	
PFOS	72
PFOA	11.4

Compound	GWMW-7
VOCs (ug/L)	
1,2,4-Trimethylbenzene	1,300
1,3,5-Trimethylbenzene	380
Ethylbenzene	16
Isopropylbenzene	60
Naphthalene	190
n-Butylbenzene	24
n-Propylbenzene	230
p-Isopropyltoluene	6.4
sec-Butylbenzene	13
Total Xylenes	144.8
2-Isopropyltoluene	3
m&p-Xylene	140
o-Xylene	4.8
Tetrachloroethane	3.1
SVOCs (ug/L)	
2-Methylnaphthalene	93
Naphthalene	78
Pesticides (ug/L)	
Dieldrin	0.01
TAL Metals (ug/L)	
Aluminum	122
Iron	2150
Iron (Dissolved)	1530
Sodium	112000
Sodium (Dissolved)	108000
PFAS (ng/L)	
PFOS	23.2
PFOA	6.17

Compound	GW-10
VOCs (ug/L)	
1,2,4-Trimethylbenzene	3,100
1,3,5-Trimethylbenzene	710
Ethylbenzene	2,000
Isopropylbenzene	120
Naphthalene	1,300
n-Butylbenzene	23
n-Propylbenzene	350
o-Xylene	1,900
p-Isopropyltoluene	8.5
Tetrachloroethene	16
Toluene	190
Total Xylenes	9,600
m&p-Xylene	7,700
SVOCs (ug/L)	
2-Methylnaphthalene	180
Naphthalene	690
TAL Metals (ug/L)	
Iron	12600
Lead	30
Lead (Dissolved)	27
Manganese	603
Manganese (Dissolved)	594
Sodium	102000
Sodium (Dissolved)	102000

Compound	GWMW-5
VOCs (ug/L)	
1,2,4-Trimethylbenzene	53
1,3,5-Trimethylbenzene	11
Ethylbenzene	34
Isopropylbenzene	60
Naphthalene	150
n-Butylbenzene	27
n-Propylbenzene	180
sec-Butylbenzene	12
Total Xylenes	5
m&p-Xylene	5
SVOCs (ug/L)	
2-Methylnaphthalene	93
Naphthalene	78
TAL Metals (ug/L)	
Aluminum	235
Iron	16000
Iron (Dissolved)	5020
Manganese	1270
Manganese (Dissolved)	1180
Sodium	99200
Sodium (Dissolved)	102000
PFAS (ng/L)	
PFOS	13.5
PFOA	23

Compound	GW-11
VOCs (ug/L)	
1,2,4-Trimethylbenzene	1,200
1,3,5-Trimethylbenzene	370
cis-1,2-Dichloroethene	20
Ethylbenzene	970
Isopropylbenzene	100
Naphthalene	500
n-Butylbenzene	28
n-Propylbenzene	300
o-Xylene	650
sec-Butylbenzene	6.4
p-Isopropyltoluene	15
Toluene	59
Total Xylenes	2,950
m&p-Xylene	
SVOCs (ug/L)	
2-Methylnaphthalene	100
Naphthalene	350
TAL Metals (ug/L)	
Aluminum	120
Iron	25400
Iron (Dissolved)	1020
Manganese	1740
Manganese (Dissolved)	1600
Sodium	28200
Sodium (Dissolved)	27100

Compound	GWMW-6
VOCs (ug/L)	
1,2,4-Trimethylbenzene	43
Ethylbenzene	5.3
Isopropylbenzene	9
Naphthalene	47
n-Butylbenzene	6.1
n-Propylbenzene	25
1,3,5-Trimethylbenzene	2.6
p-Isopropyltoluene	1.3
sec-Butylbenzene	2.3
TAL Metals (ug/L)	
Aluminum	235
Iron	4460
Iron (Dissolved)	2230
Manganese	324
Sodium	51900
Sodium (Dissolved)	47100

Compound	GWMW-2
VOCs (ug/L)	
1,2,4-Trimethylbenzene	420
1,3,5-Trimethylbenzene	200
Ethylbenzene	350
Isopropylbenzene	130
Naphthalene	330
n-Butylbenzene	48
n-Propylbenzene	400
o-Xylene	18
p-Isopropyltoluene	7
sec-Butylbenzene	21
Total Xylenes	628
m&p-Xylene	610
SVOCs (ug/L)	
2-Methylnaphthalene	74
Naphthalene	200
TAL Metals (ug/L)	
Aluminum	174
Iron	44400
Iron (Dissolved)	5270
Manganese	3690
Manganese (Dissolved)	3150
Sodium	142000
Sodium (Dissolved)	131000

Compound	GWMW-3
VOCs (ug/L)	
Ethylbenzene	55
Isopropylbenzene	120
Naphthalene	230
n-Butylbenzene	28
n-Propylbenzene	340
p-Isopropyltoluene	5.1
sec-Butylbenzene	15
Total Xylenes	19
m&p-Xylene	19
SVOCs (ug/L)	
2-Methylnaphthalene	57
Naphthalene	160
TAL Metals (ug/L)	
Aluminum	143
Iron	62400
Iron (Dissolved)	5060
Manganese	6390
Manganese (Dissolved)	4670
Sodium	126000
Sodium (Dissolved)	103000

Compound	GWMW-4
VOCs (ug/L)	
1,2,4-Trimethylbenzene	87
1,3,5-Trimethylbenzene	43
Ethylbenzene	14
Isopropylbenzene	73
Naphthalene	60
n-Butylbenzene	23
n-Propylbenzene	250
o-Xylene	6.8
sec-Butylbenzene	11
Total Xylenes	89.8
2-Isopropyltoluene	2.8
m&p-Xylene	83.0
Toluene	4.2
SVOCs (ug/L)	
2-Methylnaphthalene	6
Naphthalene	46
Pesticides (ug/L)	
Heptachlor epoxide	0.035
TAL Metals (ug/L)	
Iron	23200
Iron (Dissolved)	386
Manganese	3260
Manganese (Dissolved)	2820
Sodium	50600
Sodium (Dissolved)	51900
PFAS (ng/L)	
PFOS	56.5
PFOA	68.2

Compound	GW-9
VOCs (ug/L)	
1,2,4-Trimethylbenzene	110
1,3,5-Trimethylbenzene	150
Ethylbenzene	550
Isopropylbenzene	110
Naphthalene	540
n-Butylbenzene	39
n-Propylbenzene	320
p-Isopropyltoluene	9.1
sec-Butylbenzene	16
Touene	21
Total Xylenes	180
m&p-Xylene	180
SVOCs (ug/L)	
2-Methylnaphthalene	220
Naphthalene	93
TAL Metals (ug/L)	
Iron	61600
Iron (Dissolved)	3710
Manganese	7650
Manganese (Dissolved)	877
Sodium	47000
Sodium (Dissolved)	144000
PFAS (ng/L)	
PFOS	92
PFOA	116

AWQS FOR ANALYTES WITH EXCCEDANCES	
Compound	**AWQS**
VOCs (ug/L)	
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
cis-1,2-Dichloroethene	5
Ethylbenzene	5
Isopropylbenzene	5
Naphthalene	10
n-Butylbenzene	5
n-Propylbenzene	5
o-Xylene	5
p-Isopropyltoluene	5
sec-Butylbenzene	5
Tetrachloroethene	5
Toluene	5
Total Xylenes	5
SVOCs (ug/L)	
2-Methylnaphthalene	50
Naphthalene	10
Pesticides (ug/L)	
Dieldrin	0.004
Heptachlor epoxide	0.03
PFAS (ng/L)	
PFOS	0.01
PFOA	0.01
TAL Metals (ug/L)	
Iron	300
Lead	25
Manganese	300
Sodium	20000

LEGEND

- SOIL BORING LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- X — FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SS / SS — SANITARY SEWER PIPE

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PREPARED FOR:

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REVISION DATA:

REV	DATE	COMMENT	BY

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PROJECT NAME:

1810 CROPSEY AVENUE
BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 4B:
GW EXCEEDANCES SPIDER MAP

SEAL & SIGNATURE:

STATE OF NEW YORK THEODORE VOLKMAN 074050-1 LICENSED PROFESSIONAL ENGINEER

DRAWING DATA:

DATE: 5/17/2022

PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

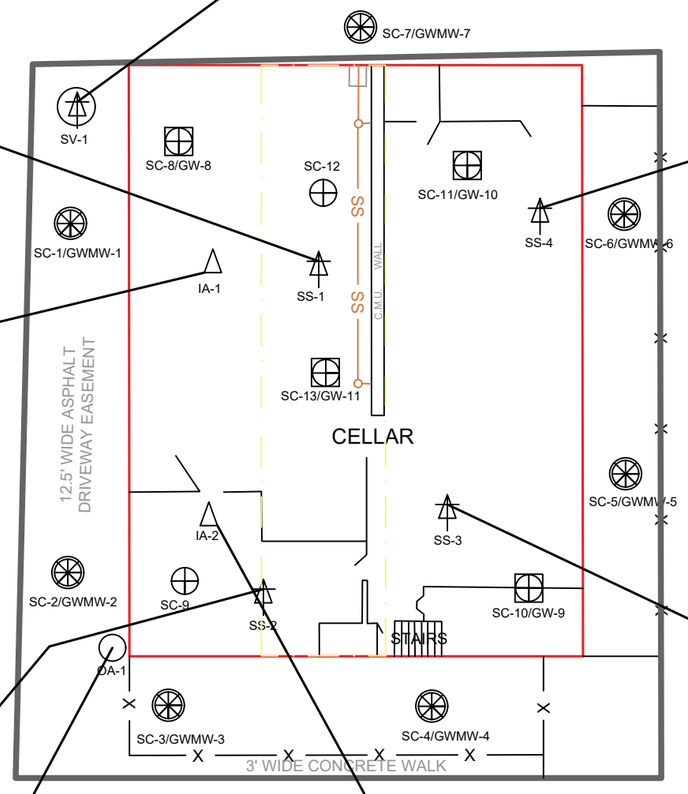
FIGURE 4C
Soil Vapor & Indoor/Ambient Air Exceedances Spider Map

Compound	SV-1
VOCs (ug/m3)	
Cyclohexane	7,640
Ethanol	139
Ethylbenzene	529
Heptane	56,500
Hexane	93,700
Tetrachloroethene	75.9
Toluene	133

Compound	SS-1
VOCs (ug/m3)	
Cis-1,2-Dichloroethene	70.9
Ethanol	11.8
Ethylbenzene	5.25
Hexane	12.5
m,p-Xylene	24.2
Tetrachloroethene	1,320
Toluene	79.8
Trichloroethene	29

Compound	IA-1
VOCs (ug/m3)	
Carbon Tetrachloride	0.43
Chloromethane	1.28
Dichlorodifluoromethane	1.46
Ethanol	20.7
Hexane	1.84
m,p-Xylene	4.28
Methylene Chloride	6.28
o-Xylene	1.31
Tetrachloroethene	0.52
Trichlorofluoromethane	1.49

Compound	SS-2
VOCs (ug/m3)	
Cis-1,2-Dichloroethene	29.6
Ethanol	10.9
Hexane	7.4
m,p-Xylene	18.7
Tetrachloroethene	1,780
Toluene	27.9
Trichloroethene	22



Compound	OA-1
VOCs (ug/m3)	
Carbon Tetrachloride	0.41
Chloromethane	1.25
Dichlorodifluoromethane	1.23
Ethanol	6.89
Hexane	1.4
m,p-Xylene	3.72
o-Xylene	1.02
Trichlorofluoromethane	1.52

Compound	IA-2
VOCs (ug/m3)	
Carbon Tetrachloride	0.4
Chloromethane	1.36
Dichlorodifluoromethane	1.35
Ethanol	11.2
m,p-Xylene	4.2
o-Xylene	1.31
Tetrachloroethene	0.49
Trichlorofluoromethane	1.51

Compound	SS-4
VOCs (ug/m3)	
1,2,4-Trimethylbenzene	6.93
1,3,5-Trimethylbenzene	1.59
Benzene	6.03
Cis-1,2-Dichloroethene	38
Cyclohexane	2.64
Ethanol	9.42
Ethylbenzene	7.51
Heptane	6.23
Hexane	14.9
m,p-Xylene	35
o-Xylene	8.94
Tetrachloroethene	712
Toluene	94.5
Trichloroethene	25.1
Trichlorofluoromethane	1.46

Compound	SS-3
VOCs (ug/m3)	
1,2,4-Trimethylbenzene	6.58
Benzene	6.48
Cis-1,2-Dichloroethene	79.2
Ethanol	14.2
Ethylbenzene	8.55
Heptane	8.36
Hexane	15.1
m,p-Xylene	35.1
o-Xylene	8.68
Tetrachloroethene	1,290
Toluene	118
Trichloroethene	35.9

LEGEND

- SOIL BORING LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SANITARY SEWER PIPE

PREPARED BY:

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(T) 718-438-2200

PREPARED FOR:

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1762 BENSON AVENUE
BROOKLYN, NY 11214

REVISION DATA:

REV	DATE	COMMENT	BY

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PROJECT NAME:

1810 CROPSEY AVENUE BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 4C:
SOIL GAS & INDOOR/AMBIENT AIR AIR EXCEEDANCES SPIDER MAP

SEAL & SIGNATURE:

STATE OF NEW YORK THEODORE LICENSED PROFESSIONAL ENGINEER No. 074960-1

DRAWING DATA:

DATE: 8/10/2022

PROJECT NO:

DRAWING BY: BM

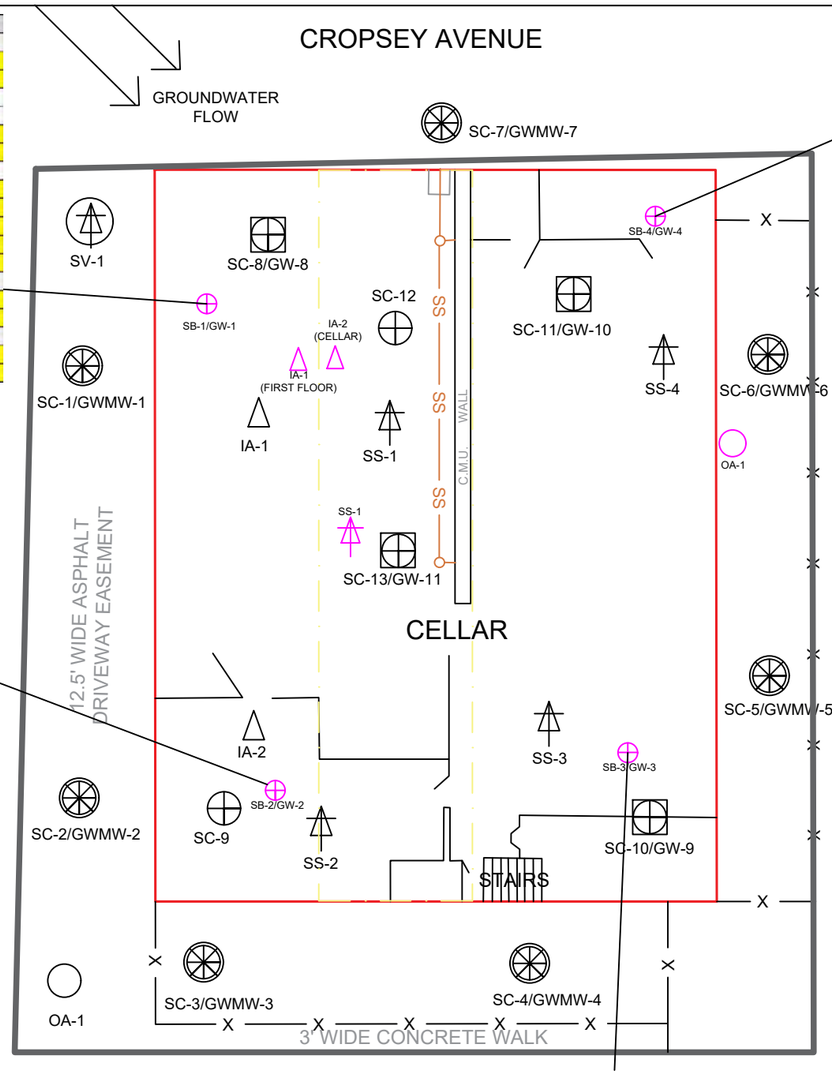
CHECK BY: DS

FIGURE 5A
September 2020 Groundwater Exceedances Spider Map

Compound	GW-1/SB-1
VOCs (ug/L)	
1,2,4-Trimethylbenzene	12,000
1,3,5-Trimethylbenzene	1600
Acetone	26
Cyclohexane	210
Ethyl Benzene	1900
Isopropylbenzene	240
Methylcyclohexane	330
n-Butylbenzene	290
n-Propylene	760
sec-Butylbenzene	51
p&m Xylenes	260
p-Isopropyltoluene	37
SVOCs (ug/L)	
2-Methylnapthalene	5030
Napthalene	5210
RCRA Metals (ug/L)	
Chromium	404
Lead	319

Compound	GW-2/SB-2
VOCs (ug/L)	
1,2,4-Trimethylbenzene	140
1,3,5-Trimethylbenzene	150
Cyclohexane	27
Ethyl Benzene	110
Isopropylbenzene	38
Methylcyclohexane	38
n-Butylbenzene	48
n-Propylene	130
sec-Butylbenzene	11
p&m Xylenes	7.1
p-Isopropyltoluene	8
SVOCs (ug/L)	
2-Methylnapthalene	551
Acenaphthene	0.233
Acenaphthylene	0.2
Anthracene	0.267
Benzo(a)anthracene	0.0556
Fluoranthene	0.2
Fluorene	1.2
Phenanthrene	1.44
Pyrene	0.311
Napthalene	698
RCRA Metals (ug/L)	
Lead	51.4

Compound	GW-3/SB-3
VOCs (ug/L)	
1,2,4-Trimethylbenzene	19
1,3,5-Trimethylbenzene	77
Acetone	13
Cyclohexane	170
Ethyl Benzene	1000
Isopropylbenzene	100
Methylcyclohexane	170
n-Butylbenzene	41
n-Propylene	280
sec-Butylbenzene	14
Toluene	23
p&m Xylenes	42
p-Isopropyltoluene	8.6
SVOCs (ug/L)	
2-Methylnapthalene	164
Acenaphthene	0.144
Acenaphthylene	0.0556
Fluorene	0.256
Phenanthrene	0.289
Napthalene	604
RCRA Metals (ug/L)	
Chromium	65.1



AWQS FOR ANALYTES WITH EXCEEDANCES					
VOCs (ug/L)	AWQS	SVOCs (ug/L)	AWQS	RCRA Metals (ug/L)	AWQS
1,2,4-Trimethylbenzene	5	2-Methylnapthalene	50	Arsenic	25
1,3,5-Trimethylbenzene	5	Napthalene	10	Chromium	50
Ethyl Benzene	5	Benzo(a)anthracene	0.002	Lead	25
Isopropylbenzene	5	Benzo(f)fluoranthene	0.002		
n-Butylbenzene	5	Bis(2-ethylhexyl)phthalate	5		
n-Propylene	5	Napthalene	10		
sec-Butylbenzene	5				
Toluene	5				
p&m Xylenes	5				
p-Isopropyltoluene	5				

Compound	GW-4/SB-4
VOCs (ug/L)	
1,2,4-Trimethylbenzene	3,200
1,3,5-Trimethylbenzene	470
Cyclohexane	140
Ethyl Benzene	650
Isopropylbenzene	120
Methylcyclohexane	280
n-Butylbenzene	94
n-Propylene	360
sec-Butylbenzene	24
Toluene	2
p&m Xylenes	36
p-Isopropyltoluene	18
SVOCs (ug/L)	
1,1' - Biphenyl	6.53
2-Methylnapthalene	827
Benzo(a)anthracene	0.0923
Benzo(f)fluoranthene	0.0513
Bis(2-ethylhexyl)phthalate	5.57
Acenaphthene	1.09
Acenaphthylene	0.503
Anthracene	0.441
Benzo (g, h, i) perylene	0.0923
Chrysene	0.0923
Fluoranthene	0.39
Fluorene	2.04
Phenanthrene	2.63
Pyrene	0.615
Napthalene	756
RCRA Metals (ug/L)	
Arsenic	39.4
Chromium	388
Lead	242

LEGEND

- SOIL SAMPLE LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SANITARY SEWER PIPE
- SOIL BORING/GROUNDWATER SAMPLE LOCATION (SEPTEMBER 2020)
- SUB-SLAB VAPOR SAMPLE LOCATION (SEPTEMBER 2020)
- OUTDOOR AIR SAMPLE LOCATION (SEPTEMBER 2020)
- INDOOR AIR SAMPLE LOCATION (SEPTEMBER 2020

PREPARED BY:

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(T) 718-438-2200

PREPARED FOR:

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1762 BENSON AVENUE
BROOKLYN, NY 11214

REVISION DATA:

REV	DATE	COMMENT	BY

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PROJECT NAME:

1810 CROPSEY AVENUE BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 5A: SEPTEMBER 2020 EXCEEDANCES IN GROUNDWATER

SEAL & SIGNATURE:

DRAWING DATA:

DATE: 5/17/2022

PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

FIGURE 5B
September 2020 Soil Vapor & Indoor Air Exceedances Spider Map

1810-1818 CROPSEY AVENUE a.k.a. BAY 19TH STREET, BROOKLYN, NY 11214

Exceedances in Soil Vapor Analytical Results – RCRA Target Analyte Metals				
	NYSDOH Background Standards– Indoor Air 25th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 75th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 95th Percentile ug/m³	IA–2 (Cellar)
1,3,5–Trimethylbenzene	0.25	0.25	6.5	2.1
n–Heptane	1	7.6	33	4.3
n–Hexane	0.6	5.9	35	2.9
Isopropanol	NS	NS	NS	18
Methylene chloride	0.3	6.6	45	5.3
Tetrachloroethylene (PERC)	0.25	1.1	4.1	19
p&m–Xylene	0.5	4.6	NS	1.1

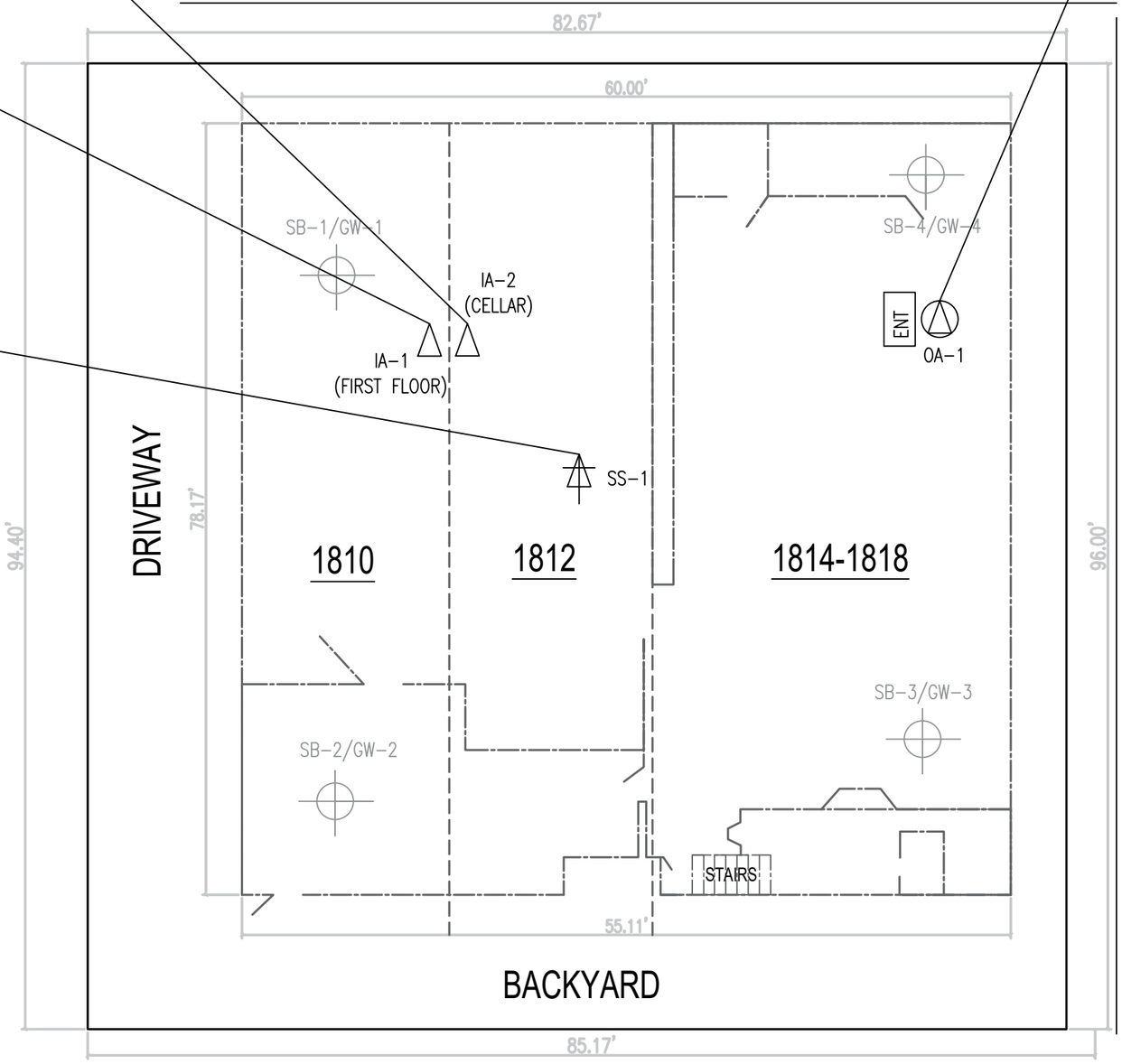
Exceedances in Soil Vapor Analytical Results – RCRA Target Analyte Metals				
	NYSDOH Background Standards– Indoor Air 25th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 75th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 95th Percentile ug/m³	IA–1 (1st Floor)
Acetone	9.9	52	140	16
2–Butanone	NS	NS	NS	1.4
n–Hexane	0.6	5.9	35	0
Isopropanol	NS	NS	NS	56
Methylene chloride	0.3	6.6	45	10
Methyl Methacrylate	0.25	0.25	1.1	1
Tetrachloroethylene (PERC)	0.25	1.1	4.1	2
p&m–Xylene	0.5	4.6	NS	1

Exceedances in Soil Vapor Analytical Results RCRA Target Analyte Metals				
	NYSDOH Background Standards– Indoor Air 25th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 75th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 95th Percentile ug/m³	SS–1 (Cellar)
1,2,4–Trimethylbenzene	0.7	4.3	18	120
1,2–Dichloroethane	0	0.25	0.25	3.9
1,2–Dichloroethylene (cis)	0.25	0.25	1.2	110
1,3,5–Trimethylbenzene	0.25	0.25	6.5	43
Acetone	9.9	52	140	69
Benzene	1.1	5.9	15	58
2–Butanone	NS	NS	NS	6
Cyclohexane	0.25	2.6	19	24
Ethyl Benzene	0.25	2.8	13	62
n–Heptane	1	7.6	33	41
n–Hexane	0.6	5.9	35	56
Isopropanol	NS	NS	NS	29
Tetrachloroethylene (PERC)	0.25	1.1	4.1	330
Toluene	3.5	25	110	630
Trichloroethylene (TCE)	NS	NS	2	24
O–Xylene	0.4	3.1	13	94
p&m–Xylene	0.5	4.6	NS	220
p–Ethyltoluene	NS	NS	NS	93

Exceedances in Soil Vapor Analytical Results – RCRA Target Analyte Metals				
	NYSDOH Background Standards– Indoor Air 25th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 75th Percentile ug/m³	NYSDOH Background Standards– Indoor Air 95th Percentile ug/m³	OA–1 (Outside)
Isoproponal	NS	NS	NS	7.1
Methylene chloride	0.3	6.6	45	4.6

LEGEND

- SOIL BORING / GROUNDWATER SAMPLE LOCATIONS
- SUBSLAB SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATIONS (CELLAR AND FIRST FLOOR)
- OUTDOOR AIR SAMPLE LOCATION
- FORMER BUILDING SECTIONS
- ONE–STORY BRICK BUILDING LINE
- SUBJECT PROPERTY LINE



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QUEENS, NY 11418
T: (718) 438–2200

PREPARED FOR:

ONTIME WATCH INC.
1762 BENSON AVENUE,
BROOKLYN, NY 11214

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PROJECT NAME:

1810-1818 CROPSEY AVENUE,
BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 5B.
EXCEEDANCES IN
SOIL VAPOR

SEAL & SIGNATURE:

STATE OF NEW YORK THEODORE J. KIM No. 074960-1 LICENSED PROFESSIONAL ENGINEER

DRAWING DATA:

DATE: 02/01/2021
PROJECT NO:
20200909–1810/PH2
DRAWING BY: KN
CHECK BY: DS

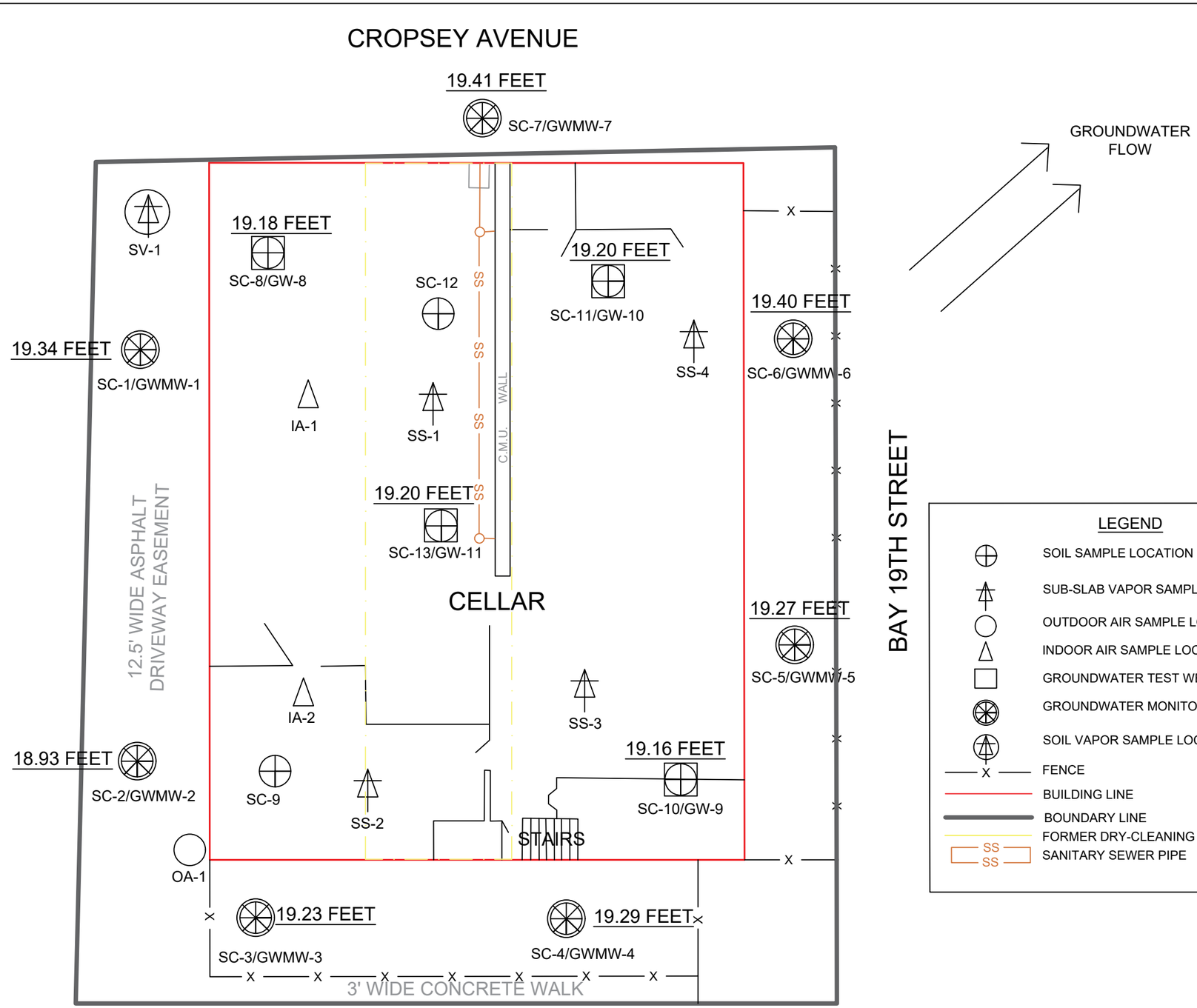
DRAWING NO.:

ESV–001.00

CAD FILE NO.:

Z:20200909–1810/PH2

FIGURE 6
Groundwater Elevation and Flow Map



LEGEND

- SOIL SAMPLE LOCATION
- SUB-SLAB VAPOR SAMPLE LOCATION
- OUTDOOR AIR SAMPLE LOCATION
- INDOOR AIR SAMPLE LOCATION
- GROUNDWATER TEST WELL
- GROUNDWATER MONITORING WELL
- SOIL VAPOR SAMPLE LOCATION
- FENCE
- BUILDING LINE
- BOUNDARY LINE
- FORMER DRY-CLEANING FACILITY
- SANITARY SEWER PIPE

PREPARED BY:

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RICHMOND HILL, NY 11418
(T) 718-438-2200

PREPARED FOR:

1810 CROPSEY AVE LLC
1762 BENSON AVENUE
BROOKLYN, NY 11214

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PROJECT NAME:

1810 CROPSEY AVENUE BROOKLYN, NY 11214

DRAWING TITLE:

FIGURE 6: GROUNDWATER ELEVATION AND FLOW DIRECTION MAP

SEAL & SIGNATURE:

DRAWING DATA:

DATE: 5/17/2022

PROJECT NO:

DRAWING BY: BM

CHECK BY: DS

APPENDIX A – Site Characterization Work Plan Approval Letter

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau B
625 Broadway, 12th Floor, Albany, NY 12233-7016
P: (518) 402-9767 I F: (518) 402-9773
www.dec.ny.gov

Sent via E-mail

February 25, 2022

Eli Hoffman
1810 Cropsey Ave LLC
1762 Benson Ave
Benson, NY 11214
eli@ontimewatch.com

Re: Site Characterization Work Plan
1810-1818 Cropsey Ave Site, Site No. 224320
Site Location: 1810-1818 Cropsey Avenue, Brooklyn, NY 11214
Site Characterization Work Plan Approval

Dear Eli Hoffman,

The New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) have reviewed the revised Site Characterization Work Plan (SCWP) prepared by RSK Environmental Group, dated January 24, 2022, for the 1810-1818 Cropsey Ave site located at 1810-1818 Cropsey Avenue, Brooklyn, NY. Based on this review, the work planed is approved. Please provide a final, signed and dated report for placement in the Department's site file and provide at least seven business days' notice prior to starting any field work.

Should you have any questions, I can be contacted at steven.walsh@dec.ny.gov or (518) 402-9824.

Sincerely,

Steve Walsh Environmental Engineer
Remedial Bureau B, Section B
Division of Environmental Remediation

ec: D. Dmello, drumita@rskenvironmental.com
E. Hoffman, eli@ontimewatch.com
G. Burke, NYSDEC
J. O'Connell, NYSDEC
B. Bennett, NYSDEC
A. Martin, NYSDOH
S. McLaughlin, NYSDOH
DECDOCS

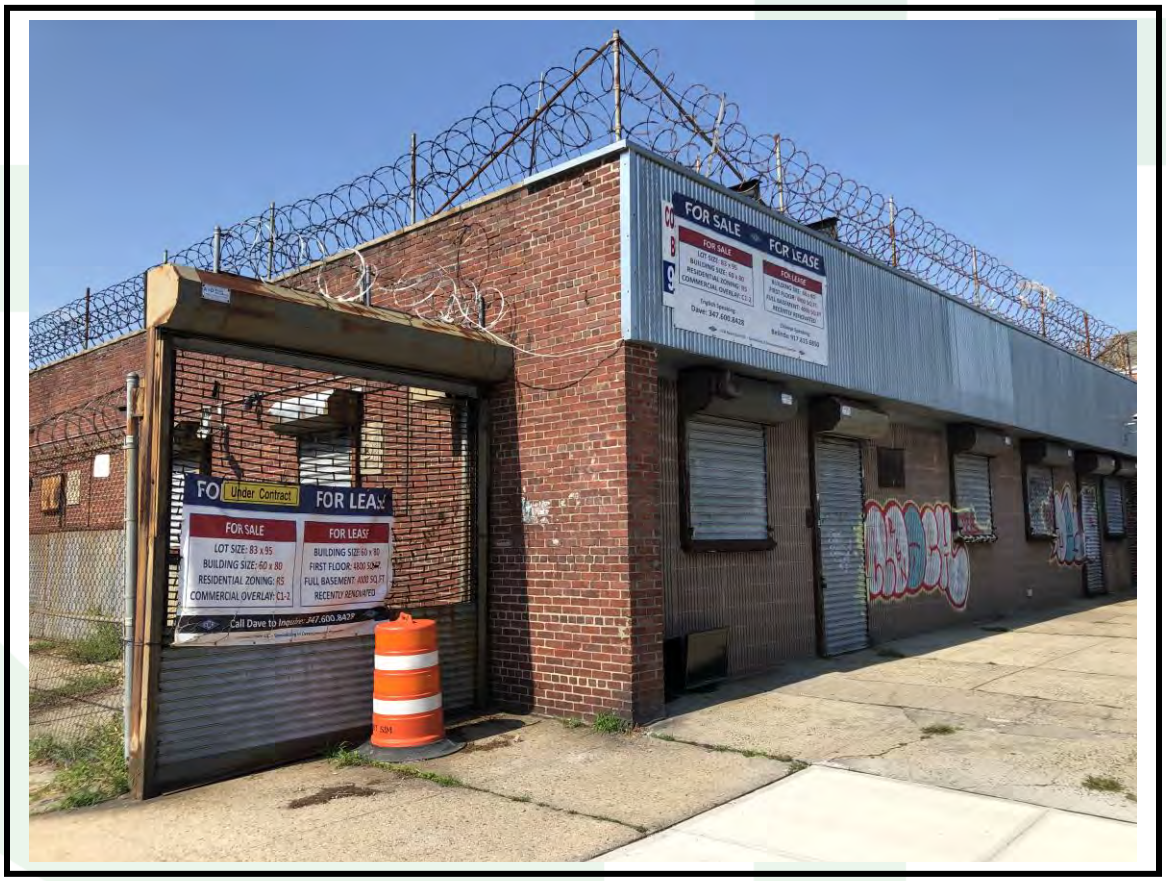
APPENDIX B – Previous Environmental Reports

RSK Environmental Group

BROOKLYN: 3611 14TH AVE. Suite #551 Brooklyn NY 11218 QUEENS: 132-02 89TH AVE. Suite #211 Richmond Hill, NY 11418

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

for



1810-1818 Cropsey Avenue,
Brooklyn, NY 11214
(Block: 6463, Lot: 137)

September 14, 2020

PHASE I
ENVIRONMENTAL SITE ASSESSMENT
ASTM E 1527-13

SITE ADDRESS: 1810-1818 Cropsey Avenue,
(A.k.a. 232 Bay 19th Street)
Brooklyn, NY 11214
Block: 6463, Lot: 137
(A one-story commercial building with cellar)

PREPARED FOR: SBA Loan Group
400 Rella Boulevard, Ste. 165
Montebello, NY 10901
Attn: Mr. Shimon Glauber

PREPARED BY: RSK Environmental Group, LLC
132-02 89th Avenue, Ste. 211
Richmond Hill, NY 11418
Tel: (718) 438-2200

DATE: September 14, 2020

SCOPE OF THIS PHASE I ENVIRONMENTAL SURVEY

To thoroughly inspect all accessible areas and facilities in and around the property located at ***1810-1818 Cropsey Avenue (A.k.a. 232 Bay 19th Street), Brooklyn, NY 11214*** and to assess the environmental status of the subject property. The tasks were conducted via a visual inspection of the site, review of available historical records documenting usage of the property along with persons knowledgeable about the subject property.

The main objective of this ESA was to identify *Recognized Environmental Conditions* (*RECs*) in connection with the subject property, defined in ASTM Practice E 1527-13 as the presence or likely presence of any hazardous substances or petroleum products that indicate an existing release, a past release, or a material threat of a release. This ESA also includes a preliminary evaluation of certain potential environmental conditions that are outside the scope of ASTM Practice E 1527-13.

This survey assessed any ongoing or former operations, whether current or former operators/lessees used or stored chemicals on the premises, if any waste materials arising from operations have been dumped on the premises or if any landfill operations have taken place. Visual inspection of the immediate vicinity around the premises were also conducted, wherever possible or reasonable, in order to determine whether any sites adjoining the premises are used for heavy manufacturing or the generation, storage, shipping or disposal of hazardous waste, chemical materials or fuel supplies; if there are any underground or suspended transformer, capacitors, etc. containing PCB's on the subject property or if there are any underground storage tanks.

As part of this environmental survey, inquiry was made with the U.S. Environmental Protection Agency and appropriate State and Local Agencies to ascertain the location of any potential, alleged or known hazardous waste sites within a one-half mile radius of subject property. The CERCLIS (Comprehensive Emergency Response, Compensation and Liability Information System) is the U.S. EPA's compilation of such alleged, potential or known hazardous waste sites brought to the attention of the U.S. EPA Office of Emergency and Remedial Response, which has been, will be or are currently under investigation for suspected or known environmentally hazardous activities. The National Priorities List (NPL) is the U.S. EPAs listing of known contaminated sites, which have been targeted for cleanup due to the immediate threat posed to human health, and/or the environmental integrity of that property as well as its marketability.

If appropriate inquiry was also made with the US Environmental Protection Agency and appropriate State and Local agencies regarding their acknowledgment that the presence and/or disposal of hazardous or toxic chemicals, if any, are within their guidelines and compliance.

Recommendations, wherever appropriate, have been given as to the action, if any, which should be taken to confirm with the most current guidelines and rules for compliance as set forth by these agencies.

The Phase I Environmental Survey is limited in budget and scope. No sampling, testing or laboratory analysis is conducted unless so noted and the assessment is based on the professional opinion of the Environmental Consultant. The Phase I Environmental Survey is not and should not be considered a warranty or guarantee about the presence or absence of environmental contaminants which might affect the subject property.

The owner is responsible for investigating environmental liens on the subject property. This report was prepared in accordance with ASTM E 1527-13 protocols for Phase I Environmental Site Assessments.

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EXECUTIVE SUMMARY

SITE DESCRIPTION

- The subject property is known as:
  1810-1818 Cropsey Avenue (A.k.a. 232 Bay 19th Street), Brooklyn, NY 11214 also identified as (Block: 6463, Lot: 137). The subject property was documented with NYC Dept. of City Planning as having an alternate address as 1770 Cropsey Avenue, Brooklyn.
- The primary zoning for the subject property is R5 district which are mapped for the residential use, with a C1-2 commercial overlay mapped in Brooklyn, NY.
- The subject property is a rectangular shaped parcel with a lot area approximately 7,798-ft^2 in size and is currently developed with a one-story commercial building constructed circa 1931 with a building area of approximately 4,680-ft^2.
- The lot is situated south of Cropsey Avenue (A.k.a. Victor V. Allegretti Way), north of Shore Parkway, east of 18th Avenue and west of Bay 19th Street in Kings County in Brooklyn, NY.
- RSK performed a site reconnaissance on September 4, 2020; during our site reconnaissance, access gained throughout the entire building, including the cellar. The access to the roof was unavailable at the time of our inspection.

SURROUNDING LAND USE

DIRECTION	ADJOINING USE(S)	VICINITY USE(S)
North	Ultra Auto Inc – Used Car Dealership • Along Cropsey Avenue (Victor V. Allegretti Way)	Commercial
South	Attached residential buildings • Along Bay 19th Street	Residential
East	High one-story industrial building • Corner of Cropsey Avenue & Bay 19th Street	Industrial
West	Semi-detached residential buildings • Along 18th Avenue	Residential

- Surrounding properties are mainly used as mixed-use residential, commercial and a few industrial properties.

SITE ACTIVITIES

- During our site reconnaissance, the subject property was identified as developed with a one-story brick and concrete building with a full cellar and a flat roof which is vacant with no activities for the past four (4) years.

MUNICIPAL RECORDS REVIEW

A review of available public records for the subject property completed are as follows:

- According to an Environmental Liens and AUL search conducted by EDR on September 3, 2020, a Deed was found for the subject property dated October 2, 2018, stating that the subject property is owned by Cropsey Golden Court LLC located at 1770 Cropsey Avenue, Brooklyn, NY 11214, and it was formerly owned by Lucia H Choi, address listed as 2932 165th Street, Flushing, NY 11358. An Affidavit of Compliance with smoke detector requirement for one- and two- family dwelling was included with the deed. No environmental liens or other AULs were documented by EDR.
- According to a Building Permit Report search conducted by EDR on September 1, 2020, a Permit no. 300401303-02-PL was found for the subject property and dated July 24, 1995. The permit was described as Plumbing for A2 – Alteration Type 2. The contractor who performed the work was Lloyd G. Drummond Plumbing & Con.
- According to a Building Permit Report search conducted by EDR on September 1, 2020, a Permit no. 300401303-02-EW-OT was found for the subject property and dated November 2, 1994. The permit was described as Other Construction Equipment for Equipment Work – A2 – Alteration Type 2. The contractor who performed the work was AD Iron Works.
- According to a Building Permit Report search conducted by EDR on September 1, 2020, a Permit no. 300401312-01-AL was found for the subject property and dated November 2, 1994. The permit was described for Alt–A3 (Alteration Type 3). The contractor who performed the work was AD Iron Works.
- According to a Building Permit Report search conducted by EDR on September 1, 2020, a Permit no. 300401303-02-EW-OT was found for the subject property and dated November 1, 1994. The permit was described as Other Construction Equipment for Equipment Work – A2 – Alteration Type 2. The contractor who performed the work was AD Iron Works.
- According to a Building Permit Report search conducted by EDR on September 1, 2020, a Permit no. K03873 was found for the subject property and dated April 16, 1984. The permit was described as Electrical. The contractor who performed the work was M. Ostroff Electric Inc.
- According to a Certificate of Occupancy #125248 and dated 1949, the subject property is in a commercial-use district, Block: 6463, Lot: 137, has a commercial occupancy classification. The cellar is listed as having an ordinary use, and the first floor is utilized as a store.
- According to the NYC Buildings website, OATH/ECB Violation No. 34116563J; DOB Violation No. 100694C13T1VW, was issued to the property, BIN 3169701 on October 6, 1994. The violation was for working without a permit. The work consisted of the demolition of fire rated ceiling and partition, in which it was stated that all work should cease, and a permit obtained prior to its continuation. in which the elevator needed an inspection to be completed. A certificate of correction was stated as accepted and found in compliance as of November 21, 1994.
- According to the NYC Buildings website, a permit application for Alteration Type 3 for Curb Cut was filed on October 28, 1994 for the subject property by K & K Engineering by Magner R Korsnes. The permit was for curb cutting on the south side of Cropsey Avenue, at the corner formed by the west side of Bay 19th Street and Cropsey Avenue. The application was approved on October 31, 1994 and signed off on August 30, 1995.

- According to the NYC Buildings website, a permit application for Alteration Type 2 for Other and Plumbing was filed on October 28, 1994 for the subject property by K & K Engineering by Magner R Korsnes. The permit was for the removal of plumbing fixtures and the rearrangement of interior partition within the building. The cost of the scope of work was $6,000.00. The application was approved on October 31, 1994 and signed off on November 14, 1994.

SITE HISTORY

Certified Sanborn® Map Report and Aerial Photographs

In reviewing the history of the subject property, a Sanborn Map Search and Aerial Photograph Search was conducted for ***1810-1818 Cropsey Avenue, Brooklyn, NY 11214***.

Sanborn Maps Findings:

YEAR	DESCRIPTION OF USE FOR *1810-1818 Cropsey Avenue, Brooklyn, NY 11214*
1895	The 1895 map depicts the subject property as an unparcelled block using the address as 119 Cropsey Avenue, which is developed with two structures (a two-story dormitory laundry and a one-story stable carriage storage) which was part of and utilized by New York Childrens Aid Society (NYCAS). Surrounding properties were lightly developed with residential and commercial usage. A coal yard (H. Henjes Coal & Wood was depicted east of the subject property.
1906	The 1906 map depicts the a one-story on the subject property extended to the north and used as a dormitory with the existing stable using the address as 1818 Cropsey Avenue which was part of and utilized by the NYCAS. Surrounding properties depicted additional developments as commercial properties.
1929	The 1929 map the building on the subject property extended south of the lot using the address as 1818 Cropsey Avenue which was still utilized as part of NYCAS. Surrounding properties were further developed with commercial and residential used properties. Three (3) gasoline filling stations with garages were depicted to the north, northeast and east of the subject property along Cropsey Avenue.
1950	The 1950 map depicted the block was divided into individual lots which were mainly used for dwellings and subject property's lot was redeveloped with a one-story brick and concrete building partitioned into three separate units as stores and used the addresses as 1810, 1812 and 1814-1818 Cropsey Avenue. Surrounding properties were further developed with residential properties (dwellings) to the west and south, and auto repair shops to the north and northeast of the subject property along Cropsey Avenue.
1968	The 1968 map did not depict any changes to the building on the subject property as compared with the 1950 map; however, the unit listed as 1812 Cropsey Avenue was utilized as a dry cleaner. *The former dry cleaner at the subject property is considered a REC at this time and will require a Phase-II Environmental Subsurface Investigation*. Surrounding properties were further developed and usage were changed.
1969-1983	The 1969-1983 maps depicted the no changes to the subject property structure or usage as compared with the 1968 map. Surrounding properties were further developed and usage were changed.
1986	The 1986 map depicted the subject property usage changed to one commercial and one manufacturing used building; no changes were made to the structure. Surrounding properties did not depict major changes as compared with the 1983 map.
1987-2007	The 1987-2007 map depicted no changes to the subject property as compared with the 1986 map. Surrounding properties did not depict major changes as compared with the 1986 map.

**Any data gaps identified herein, as defined by ASTM Practice E 1527-13 are not considered to have significantly affected the ability to identify Recognized Environmental Conditions (RECs) in connection with the subject property and do not alter the conclusions of this report.

Aerial Photographs Findings:

YEAR	OBSERVATIONS FOR *1810-1818 Cropsey Avenue, Brooklyn, NY 11214*
1924	The subject property is not identifiable in the 1924 photograph. Surrounding properties depicted as developed with residential and commercial properties.
1940	The 1940 photograph depict a small structure developed on the subject property. Surrounding properties were developed with a small structure to the west, a large two-story structure to the north, and a two-story structure to the west. The remaining surrounding properties to the south, southwest and southeast were unidentifiable.
1951-1954	The 1951-1954 photographs depict the subject property as developed with a large one-story structure which takes up half of the block along Cropsey Avenue. Surrounding properties were further developed with detached residential buildings to the west, southwest, south, and southeast. The property to the east consists of a large two-story building with a parking lot.
1961-1966	The 1961 photographs depict the subject property as unchanged from the 1954 photograph, (the storefront known as 1812 Cropsey Avenue is assumed to be utilized as a dry cleaner). Surrounding properties were further developed, with the property to the east having been further developed with the extension of the building overtaking the former parking lot. The property to the north was developed to be utilized as a filling station.
1976	The 1976 photograph is too blurry to determine if any changes occurred on the subject property. Surrounding properties were too blurry to determine if any changed occurred.
1980-1985	The 1980-1985 photographs depict the subject property as unchanged from the 1966 photograph. Surrounding properties remain unchanged.
1995	The 1995 photograph is too blurry to determine if any changes occurred on the subject property. Surrounding properties were too blurry to determine if any changed occurred.
2006-2017	The 2006-2017 photographs depict the subject property as unchanged from the 1985 photograph. Surrounding properties remain unchanged.

FUEL OIL AND GASOLINE STORAGE TANK

- At the time of inspection, RSK identified two (2) suspected fuel lines (a vent line and a remote fill line) on the most southern cellar wall within the former boiler room.
  - It was suspected at the time of inspection that the cut lines were connected to an aboveground fuel oil storage tank within the cellar.
- According to a radius search through EDR, the closest aboveground storage tank (AST) to the subject property was approximately 162-feet to the east and at a lower elevation. The closest underground storage tank (UST) to the subject property was Petro Home Services station located at 1820 Cropsey Avenue which was approximately 162-feet to the east and at a lower elevation. The site contains three active tanks, one 2,500-gallon UST and two 275-gallon ASTs. There is one listed case of a leaking tanks/spill documented for this service station.

SPILLS IDENTIFIED ON SITE

- According to a radius search through EDR the subject property was not listed as having any spills.

SPILLS IDENTIFIED ON SURROUNDING PROPERTIES

- According to a radius search conducted through EDR, there are six (6) Spill sites and twenty-seven (27) LTANKS site recorded within a 1-mile radius of the subject property.
  - Former Getty Service Station located at 1785 Cropsey Avenue, Brooklyn (Spill #9812361) was a former gasoline filling station circa 1929 through 1999 and soil and groundwater contamination (BTEX) was identified. The site completed an aggressive remediation with respect to groundwater and spill was closed by the NYSDEC case manager on August 26, 2016. *At this time the offsite spill where groundwater was impacted with BTEX is considered a REC for the subject property and will require a Phase-II Environmental Subsurface Investigation.*
  - Corner of Bay 19th Street and Cropsey Avenue (Facility ID #1404171), 98-feet away from and northeast of the subject property on Bay 19th Street and listed as Spill No. 1404171. On July 18, 2014, two abandoned drums were found by the NYCDEP, each were half-full and approximately 35-gallons of product was pumped out of them and disposed of in total. It is unknown if any specific resource was impacted. Spill was closed by the NYSDEC case manager on August 11, 2014.
  - Bayside Commercial (Facility ID #1606901, PBS # 2-017582); southeast and 162-feet away from the subject property. The site contained three closed in place USTs (one 4,000-gallon, one 1,080-gallon and one 550-gallon UST), as well as three (3) active tanks (one 2,500-gallon UST and two (2) 275-gallon ASTs). A tightness test was conducted on September 1, 2016, for one 2,500-gallon no. 2 fuel oil UST, which failed with a wet leak. The leaking lines were replaced, and the tank passed a full system test on October 14, 2016. There was no evidence of contamination within the excavation for the lines, and the spill was closed on October 19, 2016, thus was determined that no further action was needed at the site.

PCB's

- During our site reconnaissance, no signs of PCB storage tanks were utilized on the subject property.

WASTE CONTAINERS

- During our site reconnaissance, one (1) 55-gallon drum labeled as containing extra duty motor oil was identified on the first floor of the building on the subject property. In addition to this, several 5-gallon buckets containing soil and debris were found in the cellar of the subject property.

ENVIRONMENTAL DATA RESEARCH

- An Environmental Data Research Summary was performed for ***1810-1818 Cropsey Avenue, Brooklyn, NY 11214***:

DATABASE	SEARCH DISTANCE	TARGET PROPERTY	OFF-SITES LISTED
FEDERAL RCRA-LQG	¼ MILE	-	4
FEDERAL RCRA-SQG	¼ MILE	-	1
FEDERAL RCRA-VSQG	¼ MILE	-	1
NY SHWS	1 MILE	-	1
NY LTANKS	½ MILE	-	27
NY UST	¼ MILE	-	23
NY AST	¼ MILE	-	12
NY BROWNFIELDS	1/2 MILE	-	1
NY SPILLS	1/8 MILE	-	6
RCRA NONGEN / NLR	¼ MILE	-	38
NY DRYCLEANERS	¼ MILE	-	3
NY MANIFEST	¼ MILE	-	44
NJ MANIFEST	¼ MILE	-	12
RI MANIFEST	¼ MILE	-	1
PA MANIFEST	¼ MILE	-	1
ED HIST AUTO	1/8 MILE	-	2
EDR HIST CLEANER	1/8 MILE	-	1

** Due to poor or inadequate address information 8 records were unmapped.**

CONDITIONS OUTSIDE THE SCOPE OF ASTM PRACTICE E 1527-13

- **ASBESTOS CONTAINING MATERIALS (ACM)**
  - Structures that were built prior to 1980 are more likely to contain asbestos. The building on the subject property was built circa 1931.
    - During our site reconnaissance, RSK identified suspected signs of asbestos containing materials within the ceiling of the cellar and window caulking of the building on the subject property. The ceiling of the cellar is in fair to good condition at this time. Due to this visual assessment and the age of the building, RSK recommends that an asbestos inspection is performed by a certified asbestos inspector.

Please note: NO core samples were taken during this inspection unless noted, in the event of change in present status, e.g., demolition, alteration, modification, all suspect materials should tested and verified free of any ACM by a NYC certified asbestos investigator.

- **LEAD BASED PAINT (LBP)**
  - Structures that were built prior to 1978 are more likely to contain LBP than structures that were built after 1978. The building on the subject property was built circa 1931.
    - During our site reconnaissance, there were visual signs of chipped and flaking paint within the building cellar on the subject property. Due to this visual assessment and the age of the building, RSK recommends that a lead-based paint inspection is performed by a certified lead inspector.

Please note: NO paint chip samples were taken during this inspection unless noted, in the event of change in present status, e.g., demolition, alteration, modification, all suspect materials should tested and verified free of Lead by a NY certified lead inspector.

- **LEAD IN DRINKING WATER**
  - The subject property is connected to the municipal potable water supply as provided by the New York City Environmental Protection. According to the New York City Drinking Water Supply and Quality Report for 2019 the drinking water supplied to the subject property is compliant with state and federal standards, including those for lead and copper.

Please note: NO drinking/potable water samples were taken during this inspection unless noted; where required, it is recommended that drinking/potable water samples should be tested and verified free of lead by a certified inspector.

- **MOLD**
  - During our site reconnaissance, limited visual inspection for the noticeable presence of mold was performed. RSK observed visual signs of water staining and mold throughout the cellar walls and the ceiling of the first floor of the building on the subject property. In addition, water/mold damaged ceiling tiles were observed within the floor area of the first floor.
    - RSK suggests that a mold inspection should be conducted for the entire building in order to confirm the presence of mold and the water damaged areas should be repaired, and mitigation/remediation be undertaken immediately.

- **RADON**
  - Radon is a colorless, odorless, radioactive gas. Radon comes from the natural decay of uranium that is found in nearly all soils. Radon typically moves through the ground and

into building through cracks and openings in the foundation. The USEPA has developed a "Map of Radon Zones" indicating the levels of radon concentrations from testing and aerial surveys conducted in all counties in the state of New York. The U.S. Environmental Protection Agency's Map of Radon Zones identified the Subject Property as a Radon Zone 3 (Counties with predicted average indoor radon screening levels less than 2 pCi/L).

- **WETLANDS**
  - RSK reviewed available information regarding wetlands on the subject property, including National Wetlands Inventory online GIS mapping. RSK made general site observations for readily observable potential wetland characteristics. RSK did not observe surface water bodies or any evidence of potential wetlands on or adjacent to the subject property. The nearest body of water identified was the Gravesend Bay located approximately 1,020-feet south of the subject property. Groundwater is suspected to be at depths between 15-feet to 20-feet below the subject property and assumed to flow in south-southwest direction.

FINDINGS AS DEFINED BY ASTM E1527-13

A ***Recognized Environmental Condition (REC)*** refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property, due to release to the environment, under conditions indicative of a release to the environment, or under conditions that pose a material threat of a future release to the environment.

- This assessment **has revealed** evidence of two (2) RECs in conjunction with the subject property as follows:
    - Review of the historical data from EDR City Directory and Sanborn Maps, depicted the historical use of part of the subject property as a former dry cleaner circa 1960 to at least 1976. The former use as a dry cleaner is suspected to have impacted the subsurface quality beneath the subject property and is considered a REC at this time which warrants a Phase-II Environmental Subsurface Investigation.
    - Review of the historical data from EDR Radius Map depicted several spills that occurred north-northwest, northeast and at a higher elevation to the subject property. The spill cases offsite is suspected to have impacted the subsurface quality beneath the subject property and is considered a REC at this time which warrants a Phase-II Environmental Subsurface Investigation.

Controlled Recognized Environmental Conditions (CRECs) are defined by the ASTM Standard Practice E1527-13 as a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (e.g., as evidenced by the issuance of a NFA letter or equivalent, or meeting risk-based criteria established by the regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g. property use restrictions, AULs, institutional controls, or engineering controls).

- This assessment **has not revealed** evidence of CRECs in conjunction with the subject property.

Historical Recognized Environmental Conditions (HRECs) are defined by the ASTM Standard Practice E1527-13 as a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted residential use criteria established by a regulatory authority, without subjecting the property to any required controls (e.g., property use restrictions, AULs, institutional controls, or engineering controls).

- This assessment **has not revealed** evidence of HRECs in connection with the subject property.

Business Environmental Risk (BER) is defined by ASTM as "a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in ASTM Standard Practice E1527-13. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations."

- This assessment **has revealed** evidence of BERs in connection with the subject property as follows:

- The 55-gallon steel drum labeled as containing extra duty motor oil was identified on the first floor of the building, should be removed from the subject property and disposed of legally.
- During the investigation of the interior of the building, mold and water stained areas on the ceiling were observed. There were several indications of mold growth noted during the inspection.
- The building inhabiting the subject property constructed circa to 1931, and RSK identified visual signs of what may be asbestos-containing material in the window caulking and ceiling of the building on the subject property. Due to this and the age of the building, ACM material may be present in the building.
- The building inhabiting the subject property was constructed circa 1931, and there were visual signs of chipped and/or flaking paint throughout the building on the subject property. Due to this, and the age of the building, lead-based paint material may be present in the building.

CONCLUSIONS AND RECOMMENDATIONS

RSK has completed this Phase-I ESA in conformance with the scope and limitations as specified in the ASTM Practice E 1527-13 for the subject property located at 1810-1818 Cropsey Avenue, Brooklyn, NY 11214. RSK has considered the nature and extent of onsite sources of potential subsurface contamination by evaluating the current and available historical usage of the subject property and the potential sources of subsurface vapor migration through the review of available data was summarized in this Phase-I ESA.

REC Conclusions:

Based on the findings and conclusions of this assessment, RSK has concluded that the use of cleaning solvents from the historical use of the subject property as a dry cleaner and the offsite spill where BTEX impacted the groundwater quality may have impacted the subsurface quality beneath the subject property.

REC Recommendations:

RSK recommends that a Phase-II Environmental Subsurface Investigation which should include soil, groundwater and soil vapor assessments to ensure that the historical operations both onsite and offsite did not impact the subject property.

Non-scope ASTM Recommendations:

- An Asbestos, Lead-Based Paint and Mold inspection should be performed by a certified inspector for the entire building in order to determine the potential hazards and exposure within the building on the subject property.

Prepared by,

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Reviewed by,

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Submitted by,

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Reviewed by,

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INTRODUCTION

GENERAL

The general purpose of this Phase-I Environmental Site Assessment (ESA) is to determine whether or not the property is subject to certain Recognized Environmental Conditions *(RECs)* that may affect property use or increase the risk of liability exposure associated with the property. Recognized Environmental Conditions include the presence or possible presence of hazardous substances or petroleum related products that indicate an existing release, past release, or a significant threat of a release into structures on the property, into the ground, groundwater or surface water. Recognized Environmental Conditions can include past uses, disposal practices, spills, off-site contamination, and regulatory compliance.

This Environmental Site Assessments report includes a description of the subject property and surrounding areas, review of records and contains information gathered during site reconnaissance and interviews. RSK Environmental Group (RSK) Phase-I Environmental Site Assessments are prepared by environmental professionals, supervised by Professional Engineers.

LIMITING CONDITIONS & METHODOLOGY UTILIZED

The limiting conditions and methodology used in preparing this Phase-I Environmental Site Assessments report are those contained in ASTM Standard E 1527-13. This practice does not address requirements of any state or local laws or any federal laws other than the appropriate inquiry provisions of *CERCLA's "Innocent Landowner Defense"*. Users are cautioned that federal, state and local laws may impose environmental assessments obligations that are beyond the scope of this practice. Users should also be aware that there are likely to be other legal obligations with regard to hazardous substances or petroleum products discovered on the property that are not addressed in this practice and that may pose risks of civil and/or criminal sanctions for non-compliance.

The report is not, and should not be construed as, a guaranty, warranty, or certification of the presence or absence of any toxic substances, (which can be made only with testing), and contains no formal plans or recommendations to rectify or remediate the presence of any toxic substances, (which may be subject to regulatory approval). No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with the property. Performance of this practice under ASTM Standards is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the property.

Except for acts and omissions by RSK, or its employees which are shown to be grossly negligent and which represent intentional misconduct, the client has agreed, to the maximum extent permitted by law, to hold harmless and indemnify RSK from and against any and all claims and liabilities arising in respect to the Environmental Site Assessment performed by RSK on behalf of the client. All liability on the part of RSK shall be limited solely to the cost of this report. RSK shall have no liability for any other damages, whether consequential, compensatory, punitive, or special arising out of, incidental to, or as a result of this report. RSK assumes no liability for the use of this report by any person of entity other than the client for whom the report was prepared.

SITE INFORMATION

Survey of the Subject Property

A Phase-I Environmental Site Assessment survey was conducted on the property located at **1810-1818 Cropsey Avenue (A.k.a. 232 Bay 19th Street), Brooklyn, NY 11214,** beginning with a visual inspection by an Environmental Professional to determine if hazardous or potentially toxic materials or substances might be present. RSK performed a site reconnaissance on September 4, 2020; the weather was sunny and 85^{oF}. During our site reconnaissance, access was gained into the entire building, including the roof and cellars. A Phase-I Environmental Site Assessment does not involve any sampling, testing or laboratory analysis of on-site soil or groundwater, unless so noted and cannot confirm the nature of subsurface soil or groundwater quality on the subject property.

Location and Legal Description of the Subject Property

The subject property is a rectangular shaped parcel with a lot area approximately 7,798-ft^2 in size and is currently developed with a one-story commercial building constructed circa 1931 with a building area of approximately 4,680-ft^2. The primary zoning for the subject property is R5 district which are mapped for the residential use, with a C1-2 commercial overlay mapped in Brooklyn, NY. The lot is situated south of Cropsey Avenue (A.k.a. Victor V. Allegretti Way), north of Shore Parkway, east of 18th Avenue and west of Bay 19th Street in Kings County in Brooklyn, NY.

Current Uses of the Subject Property

During our site reconnaissance, the subject property was identified as developed with a one-story brick and concrete building with a full cellar and a flat roof which is vacant with no activities for the past four (4) years.

Current Uses of the Surrounding Properties

The current uses of the adjoining properties were mainly mixed-use residential, commercial and a few industrial properties. The property borders are as follows:

DIRECTION	ADJOINING USE(S)	VICINITY USE(S)
North	Ultra Auto Inc – Used Car Dealership • Along Cropsey Avenue (Victor V. Allegretti Way)	Commercial
South	Attached residential buildings • Along Bay 19th Street	Residential
East	High one-story industrial building • Corner of Cropsey Avenue & Bay 19th Street	Industrial
West	Semi-detached residential buildings • Along 18th Avenue	Residential

SITE PHYSICAL SETTING

Topography

The subject property and vicinity characteristics listed below were analyzed utilizing a current USGS 7.5 Minute Topographic Map. This information is useful in determining the grade and topography of the subject property. The subject property is located at an elevation of approximately 19-feet above mean sea level (msl). The topography of the subject property was primarily flat with some slight sloping observed. The slopes on the subject property range from 0 to 3 percent. The general topographic gradient is generally south-southwest. The subject property has been graded as for residential usage with a commercial overlay.

Geology and Soils

No bedrock outcroppings were observed at the subject property. Near-surface geology in heavily developed areas such as the subject property and vicinity is considered "urban land" and is characterized by a non-homogeneous distribution of soil and fill types. Excavation and backfilling for building foundations, utility conduits, subway systems and other construction results in a varied subsurface profile. In this setting, estimation of local subsurface parameters such as permeability, moisture content, and organic fraction is not feasible without site-specific testing data.

Hydrogeology and Hydrology

Local groundwater gradient is expected to follow with surface topography; therefore, groundwater flow near the subject property is expected to flow to the southwest. Groundwater depths and flow gradients are best evaluated by a subsurface investigation involving the installation of at least three groundwater monitoring wells and precise measurements of hydrostatic pressure. Monitoring wells were not observed on the subject property.

USER PROVIDED INFORMATION

Interview with Key Site Manager

Mr. David Sansone, real estate agent for the property owner was the key site manager who was available to provide site access. Ms. Lucy Choi (current property owner) was not available for a telephone interview however, she completed an environmental questionnaire during the preparation of this report.

Environmental Pre-Survey Questionnaire

Pursuant to ASTM E 1527-13, RSK requested the following site information from the User of this report and from the site contact.

Title Records

Title record information associated with the subject property has not been provided to RSK by the owner/tenant/occupant/user. Land title records provide information on previous ownership of any property. Typically, deeds signifying transfer of a land parcel are recorded in county files and can be researched to determine the identity of past owners. A “chain of title” is a continuous record of ownership for a specific parcel. A 50-year chain of title search was not included in the scope of work for this assessment.

Environmental Liens

The owner/key site personnel of the property have no special knowledge of Environmental Liens or Activity/Use Limitations on the site. An environmental lien search conducted by EDR as part of this assessment did not find any environmental liens and/or other activity and use limitations (AULs).

Specialized Knowledge

The owner/key site personnel of the property have no specialized knowledge concerning Recognized Environmental Conditions (RECs), Controlled Recognized Environmental Conditions (CRECs), or Historical Recognized Environmental Conditions (HRECs). RSK was not provided with or made aware of previous environmental assessments or other documentation that is material to RECs, CRECs or HRECs in connection with the subject property.

Commonly Known or Reasonably Ascertainable Information

The owner/key site personnel have no commonly known or reasonably ascertainable information within the local community about the subject property that is material to RECs, CRECs or HRECs in connection with the subject property.

Reason for Performing Phase I ESA Report

As part of a real estate transaction, this Phase I Environmental Site Assessment (ESA) was requested in order to identify existing or potential Recognized Environmental Conditions (as defined by ASTM Standard E 1527-13) in connection with the subject property. This ESA was also performed to permit the User to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on scope of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. §9601) liability (hereinafter, the "landowner liability protections," or "LLPs"). ASTM Standard E

1527-13 constitutes "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined at 42 U.S.C. §9601(35) (B).

Prior Environmental Reports

No prior environmental reports were available for review at the time of preparation of this Phase-I report.

ENVIRONMENTAL SITE ASSESSMENT

A visual inspection of the subject property and surrounding areas took place on September 4, 2020; the weather was sunny and 85^{oF}. During our site reconnaissance, access was gained throughout the entire building, including the cellar.

Improvements

The subject property is a rectangular shaped parcel with a lot area approximately 7,798-ft^2 in size and is currently developed with a one-story commercial building constructed circa 1931 with a building area of approximately 4,680-ft^2. The primary zoning for the subject property is R5 district which are mapped for the residential use, with a C1-2 commercial overlay mapped in Brooklyn, NY.

Streets

The lot is situated south of Cropsey Avenue (A.k.a. Victor V. Allegretti Way), north of Shore Parkway, east of 18th Avenue and west of Bay 19th Street in Kings County in Brooklyn, NY.

Potable Water Supply

The potable water in the neighborhood supply is provided by the municipal water supply system within the vicinity.

Sewage Disposal

The sewage disposal in the neighborhood is provided by the municipal sewer system.

Heating and Cooling System

The heating and cooling system is supplied by an HVAC system.

Electrical Supply

The electricity service of the subject property is provided by Con Edison Electric Company.

RECORDS REVIEW

Standard Environmental Record Sources

Information from standard Federal and State environmental record sources was provided through Environmental Data Resources, Inc. (EDR). Data from governmental agencies lists are updated and integrated into one database, which is updated accordingly as these data are released. This integrated database also contains postal service data in order to enhance address matching. Records from one government source are compared to records from another to clarify any address uncertainties. The demographic and geographic information available, provides assistance in identifying and managing potential environmental risk. The accuracy of the geological locations ranges between 1/8-mile to 1-mile radius to the subject property.

In some cases, location information supplied by the regulatory agencies are insufficient to allow the database companies to map facility locations. These facilities are listed under the unmappables section within the EDR report. A review of the unmappable facilities indicated that none of these facilities are within the ASTM minimum search distance from the subject property. Pertinent regulatory files/records associated with the subject property and/or any adjoining site(s) may be requested for review in the event the listing is associated with a facility at which a suspected or confirmed release has occurred that has not yet been closed to the satisfaction of the regulatory agency and/or if the facility represents a REC in connection with the subject property.

Regulatory information from the following database sources regarding possible recognized environmental conditions, within the ASTM minimum search distance from the subject property, were reviewed. Specific facilities are discussed below if determined likely that a potential recognized environmental condition has resulted at the subject property from the listed facilities. Specific property identified within the database report are further discussed below.

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 03/23/2020 has revealed that there are 4 RCRA-LQG sites within approximately 0.25 miles of the target property.

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/23/2020 has revealed that there is 1 RCRA-SQG site within approximately 0.25 miles of the target property.

RCRA-VSQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-VSQG list, as provided by EDR, and dated 03/23/2020 has revealed that there is 1 RCRA-VSQG site within approximately 0.25 miles of the target property.

State- and tribal - equivalent CERCLIS

NY SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Environmental Conservation's Inactive Hazardous waste Disposal Sites in New York State.

A review of the NY SHWS list, as provided by EDR, and dated 05/12/2020 has revealed that there is 1 NY SHWS site within approximately 1 mile of the target property.

State and tribal leaking storage tank lists

NY LTANKS: Leaking Storage Tank Incident Reports. These records contain an inventory of reported leaking storage tank incidents reported from 4/1/86 through the most recent update.

They can be either leaking underground storage tanks or leaking aboveground storage tanks. The causes of the incidents are tank test failures, tank failures or tank overfills.

A review of the NY LTANKS list, as provided by EDR, and dated 05/12/2020 has revealed that there are 27 NY LTANKS sites within approximately 0.5 miles of the target property. One (1) NY LTANKS facility was identified 162-feet away from and southeast of the subject property.

- Bayside Commercial (Facility ID #1606901, PBS # 2-017582); southeast and 162-feet away from the subject property. The site contained three closed in place USTs (one 4,000-gallon, one 1,080-gallon and one 550-gallon UST), as well as three (3) active tanks (one 2,500-gallon UST and two (2) 275-gallon ASTs). A tightness test was conducted on September 1, 2016, for one 2,500-gallon no. 2 fuel oil UST, which failed with a wet leak. The leaking lines were replaced, and the tank passed a full system test on October 14, 2016. There was no evidence of contamination within the excavation for the lines, and the spill was closed on October 19, 2016, thus was determined that no further action was needed at the site.

State and tribal registered storage tank lists

NY UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environmental Conservation's Petroleum Bulk Storage (PBS) Database

A review of the NY UST list, as provided by EDR, has revealed that there are 23 NY UST sites within approximately 0.25 miles of the target property. One (1) NY UST facility was identified 285-feet away from and northeast of the subject property.

- Giant Step Realty, LLC (PBS ID 2-017582); 1820 Cropsey Avenue, 162-feet and to the southeast of the subject property. The facility is listed as previously having three (3) closed in place USTs (one (1) 4,000-gallon, one (1) 1,080-gallon UST and one (1) 550-gallon UST). According to the NYSDEC PBS Database, the site currently, has one (1) 2,500-gallon UST and (2) 275-gallon ASTs which are in service. This facility was cross referenced on the NY LTANKS database (ID #1606901), whose case was closed on October 14, 2016, and no violations were found. As a result, is not considered an environmental concern at this time.

NY AST: The Aboveground Storage Tank database contains registered ASTs. The data come from the Department of Environmental Conservation's Petroleum Bulk Storage (PBS) Database.

A review of the NY AST list, as provided by EDR, has revealed that there are 12 NY AST sites within approximately 0.25 miles of the target property. One (1) NY AST facility was identified adjacent to the southeast of the subject property.

- Giant Step Realty, LLC (PBS ID 2-017582); 1820 Cropsey Avenue, 162-feet and to the southeast of the subject property. The facility is listed as previously having three (3) closed in place USTs (one (1) 4,000-gallon, one (1) 1,080-gallon UST and one (1) 550-gallon UST). According to the NYSDEC PBS Database, the site currently, has one (1) 2,500-gallon UST and (2) 275-gallon ASTs which are in service. This facility was cross referenced on the NY LTANKS database (ID #1606901), whose case was closed

on October 14, 2016, and no violations were found. As a result, is not considered an environmental concern at this time.

State and tribal Brownfields sites

NY BROWNFIELDS: Brownfields Site List

A review of the NY BROWNFIELDS list, as provided by EDR, and dated 05/12/2020 has revealed that there is 1 NY BROWNFIELDS site within approximately 0.5 miles of the target property.

ADDITIONAL ENVIRONMENTAL RECORDS

Records of Emergency Release Reports

NY Spills: Data collected on spills reported to NYSDEC. is required by one or more of the following: Article 12 of the Navigation Law, 6 NYCRR Section 613.8 (from PBS regs), or 6 NYCRR Section 595.2 (from CBS regs). It includes spills active as of April 1, 1986, as well as spills occurring since this date.

A review of the NY Spills list, as provided by EDR, and dated 05/12/2020 has revealed that there are 6 NY Spills sites within approximately 0.125 miles of the target property. One (1) NY Spill facility was identified northeast and 98-feet away from the subject property and is summarized below:

- Former Getty Service Station located at 1785 Cropsey Avenue, Brooklyn (Spill #9812361) was a former gasoline filling station circa 1929 through 1999 and soil and groundwater contamination (BTEX) was identified. The site completed an aggressive remediation with respect to groundwater and spill was closed by the NYSDEC case manager on August 26, 2016. *At this time the offsite spill where groundwater was impacted with BTEX is considered a REC for the subject property and will require a Phase-II Environmental Subsurface Investigation.*
- Corner of Bay 19th Street and Cropsey Avenue (Facility ID #1404171), 98-feet away from and northeast of the subject property on Bay 19th Street and listed as Spill No. 1404171. On July 18, 2014, two abandoned drums were found by the NYCDEP, each were half-full and approximately 35-gallons of product was pumped out of them and disposed of in total. It is unknown if any specific resource was impacted. Spill was closed by the NYSDEC case manager on August 11, 2014.

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 03/23/2020 has revealed that there are 38 RCRA NonGen / NLR sites within approximately 0.25 miles of the target property.

NY DRYCLEANERS: A listing of all registered drycleaning facilities.

A review of the NY DRYCLEANERS list, as provided by EDR, and dated 07/12/2019 has revealed that there are 3 NY DRYCLEANERS sites within approximately 0.25 miles of the target property.

NY MANIFEST: Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

A review of the NY MANIFEST list, as provided by EDR, and dated 01/01/2019 has revealed that there are 44 NY MANIFEST sites within approximately 0.25 miles of the target property.

PA MANIFEST: Hazardous waste manifest information.

A review of the PA MANIFEST list, as provided by EDR, and dated 06/30/2018 has revealed that there is 1 PA MANIFEST site within approximately 0.25 miles of the target property.

RI MANIFEST: Hazardous waste manifest information

A review of the RI MANIFEST list, as provided by EDR, and dated 12/31/2018 has revealed that there is 1 RI MANIFEST site within approximately 0.25 miles of the target property.

NJ MANIFEST: Hazardous waste manifest information.

A review of the NJ MANIFEST list, as provided by EDR, and dated 12/31/2018 has revealed that there are 12 NJ MANIFEST sites within approximately 0.25 miles of the target property.

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR Hist Auto: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Auto list, as provided by EDR, has revealed that there are 2 EDR Hist Auto sites within approximately 0.125 miles of the target property.

EDR Hist Cleaner: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Cleaner list, as provided by EDR, has revealed that there is 1 EDR Hist Cleaner site within approximately 0.125 miles of the target property

SEE RADIUS MAP SEARCH ATTACHED AS APPENDIX A.

**** Due to poor or inadequate address information 8 sites were unmapped.****

Historical Usage of the Subject Property and Surrounding Properties

In reviewing the history of the subject property, a Sanborn Map Search was conducted and determined for 1810-1818 Cropsey Avenue, Brooklyn, NY 11214.

A Sanborn site history "mapping and geographic" search was conducted for approximately a 100-year span (see documentation below for data gaps).

YEAR	DESCRIPTION OF USE
1895	The 1895 map depicts the subject property as an unparcelled block using the address as 119 Cropsey Avenue, which is developed with two structures (a two-story dormitory laundry and a one-story stable carriage storage) which was part of and utilized by New York Childrens Aid Society (NYCAS). Surrounding properties were lightly developed with residential and commercial usage. A coal yard (H. Henjes Coal & Wood was depicted east of the subject property.
1906	The 1906 map depicts the a one-story on the subject property extended to the north and used as a dormitory with the existing stable using the address as 1818 Cropsey Avenue which was part of and utilized by the NYCAS. Surrounding properties depicted additional developments as commercial properties.
1929	The 1929 map the building on the subject property extended south of the lot using the address as 1818 Cropsey Avenue which was still utilized as part of NYCAS. Surrounding properties were further developed with commercial and residential used properties. Three (3) gasoline filling stations with garages were depicted to the north, northeast and east of the subject property along Cropsey Avenue.
1950	The 1950 map depicted the block was divided into individual lots which were mainly used for dwellings and subject property's lot was redeveloped with a one-story brick and concrete building partitioned into three separate units as stores and used the addresses as 1810, 1812 and 1814-1818 Cropsey Avenue. Surrounding properties were further developed with residential properties (dwellings) to the west and south, and auto repair shops to the north and northeast of the subject property along Cropsey Avenue.
1968	The 1968 map did not depict any changes to the building on the subject property as compared with the 1950 map; however, the unit listed as 1812 Cropsey Avenue was utilized as a dry cleaner. *The former dry cleaner at the subject property is considered a REC at this time and will require a Phase-II Environmental Subsurface Investigation*. Surrounding properties were further developed and usage were changed.
1969-1983	The 1969-1983 maps depicted the no changes to the subject property structure or usage as compared with the 1968 map. Surrounding properties were further developed and usage were changed.
1986	The 1986 map depicted the subject property usage changed to one commercial and one manufacturing used building; no changes were made to the structure. Surrounding properties did not depict major changes as compared with the 1983 map.
1987-2007	The 1987-2007 map depicted no changes to the subject property as compared with the 1986 map. Surrounding properties did not depict major changes as compared with the 1986 map.

** Any data gaps identified herein, as defined by ASTM Practice E 1527-13 are not considered to have significantly affected the ability to identify Recognized Environmental Conditions (RECs) in connection with the subject property and do not alter the conclusions of this report.

SEE SANBORN (FIRE INSURANCE) MAP SEARCH ATTACHED AS APPENDIX B.

Aerial Photographs

Historical aerial photographs may be used to evaluate changes in land use and to identify visible areas of potential environmental concern. A search for historical aerial photographs depicting the Subject Property and vicinity was conducted by researching available historical aerial photographs from www.historicaerials.com and other available resources. Aerial photographs depicting the subject property were reviewed and are summarized in the following table.

AERIAL PHOTOGRAPH SUMMARY	
YEAR	**OBSERVATIONS FOR** *1810-1818 Cropsey Avenue, Brooklyn, NY 11214*
1924	The subject property is not identifiable in the 1924 photograph. Surrounding properties depicted as developed with residential and commercial properties.
1940	The 1940 photograph depict a small structure developed on the subject property. Surrounding properties were developed with a small structure to the west, a large two-story structure to the north, and a two-story structure to the west. The remaining surrounding properties to the south, southwest and southeast were unidentifiable.
1951-1954	The 1951-1954 photographs depict the subject property as developed with a large one-story structure which takes up half of the block along Cropsey Avenue. Surrounding properties were further developed with detached residential buildings to the west, southwest, south, and southeast. The property to the east consists of a large two-story building with a parking lot.
1961-1966	The 1961 photographs depict the subject property as unchanged from the 1954 photograph, (the storefront known as 1812 Cropsey Avenue is assumed to be utilized as a dry cleaner). Surrounding properties were further developed, with the property to the east having been further developed with the extension of the building overtaking the former parking lot. The property to the north was developed to be utilized as a filling station.
1976	The 1976 photograph is too blurry to determine if any changes occurred on the subject property. Surrounding properties were too blurry to determine if any changed occurred.
1980-1985	The 1980-1985 photographs depict the subject property as unchanged from the 1966 photograph. Surrounding properties remain unchanged.
1995	The 1995 photograph is too blurry to determine if any changes occurred on the subject property. Surrounding properties were too blurry to determine if any changed occurred.
2006-2017	The 2006-2017 photographs depict the subject property as unchanged from the 1985 photograph. Surrounding properties remain unchanged.

A review of the available historical aerial photographs indicated that the subject property was developed prior to 1924.

SEE CITY AERIAL PHOTOGRAPH SEARCH ATTACHED AS APPENDIX C.

City Directories

Street directories are commercial publications containing names and addresses, and in many cases, occupations of the occupants of a community. The directories may also contain information pertaining to business processes conducted within a community. A search for historical street directories was conducted by EDR. Historical street directories for the subject property known as 1810-1818 Cropsey Avenue, Brooklyn, NY 11214 were reviewed and are summarized in the following tables.

YEAR	USES/OCCUPANT 1810 Cropsey Avenue	USES/OCCUPANT 1812 Cropsey Avenue	USES/OCCUPANT 1814 Cropsey Avenue	USES/OCCUPANT 1816 Cropsey Avenue
1960	*Banner Meat Market*	*King Cleaners*		*Willabe Food Corp*
1965	*Rose Banner Meat Market*	*King Cleaners*		
1970	*Rose Banner Meat Market*	*King Cleaners*	*Leibow Murray Footwear Co*	
1973	*Rose Banner Meat Market*	*King Cleaners*	*Leibow Marray Footwear Co*	
1976	*Joe S Fish Town*	*King Cleaners*	*Leibow Murray Footwear Co*	
1980	*Deco Elevator Corp*		*Film Holders LTD*	
1992	*Cloverdale Transportation Service S Inc* *Deco Elevator Corp*			*Cloverdale Transportation SVC* *Cloverdale Two-Way Radio Taxi Assn Inc.*
1994	*Big Apple Car Inc* *Deco Elevator Corp*			
1997	*Big Apple Car Inc* *E Z Buying Trading Inc*	*ASLAM Tanveer*		
1999	*Big Apple Car Incorporated* *E Z Buying & Trading Inc*			
2000	*Big Apple Car Inc* *E-Z Buying & Trading*			
2004	*Big Apple Car Inc*			
2005	*Ranko International Trading Co*			
2009	*Ranko International Trading Co*			
2014	*Ranko International Trading Co*			

A review of the available City Directory information indicated that the subject property was utilized mainly for residential occupancy.

SEE CITY DIRECTORY SEARCH ATTACHED AS APPENDIX D.

Vapor Encroachment Conditions

All readily ascertainable information including all applicable Federal, State, Tribal and local database information, historical usage information, soil and groundwater sources and information from the site reconnaissance were reviewed to determine if there is a possibility of a Vapor Encroachment Condition regarding the subject property. Based upon the results of the site reconnaissance and review of historical data, Vapor Encroachment Condition is a concern at this time.

Presence of PCB's in Transformers and Other Electrical Equipment

An inspection was conducted at the subject property and in the immediate vicinity for the presence of any underground, surface or suspended transformers and visible power supply sources. Oil-containing transformers are known to frequently contain PCBs (Polychlorinated biphenyls). PCBs are contained in older transformers and other electrical equipment and have the potential for serious health risks. The U.S. Environmental Protection Agency, Regulations 40 CFR Part 761, regulates the level of PCB content in such transformers and electrical equipment.

During our site reconnaissance, no signs of PCB storage tanks were utilized on the subject property.

Fuel Oil and Gasoline Storage Tanks

The New York State Department of Environmental Conservation regulates the storage and handling of petroleum storage facilities. Aboveground and Underground storage tanks storing petroleum can, if not properly installed and maintained, because serious environmental problems include contamination of a water supply. In an effort to prevent leaks and spills, the Petroleum Bulk Storage Law (Article 17, Title 10 of the Environmental Conservation Law) requires the DEC to develop and enforce a State Code for the storage and handling of petroleum. The resulting regulations are Parts 612, 613 and 614. Any facility with a stationary tank combined capacity exceeding 1,100 gallons must be registered with the New York State Department of Environmental Conservation.

- At the time of inspection, RSK identified two (2) suspected fuel lines (a vent line and a remote fill line) on the most southern cellar wall within the former boiler room.
  - It was suspected at the time of inspection that the cut lines were connected to an aboveground fuel oil storage tank within the cellar.
- According to a radius search through EDR, the closest aboveground storage tank (AST) to the subject property was approximately 162-feet to the east and at a lower elevation. The closest underground storage tank (UST) to the subject property was Petro Home Services station located at 1820 Cropsey Avenue which was approximately 162-feet to the east and at a lower elevation. The site contains three active tanks, one 2,500-gallon UST and two 275-gallon ASTs. There is one listed case of a leaking tanks/spill documented for this service station.

WASTE CONTAINERS

- During our site reconnaissance, one (1) 55-gallon drum labeled as containing extra duty motor oil was identified on the first floor of the building on the subject property. In addition to this, several 5-gallon buckets containing soil and debris were found in the cellar of the subject property.

FINDINGS AS DEFINED BY ASTM E1527-13

A ***Recognized Environmental Condition (REC)*** refers to the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property, due to release to the environment, under conditions indicative of a release to the environment, or under conditions that pose a material threat of a future release to the environment.

- This assessment **has revealed** evidence of two (2) RECs in conjunction with the subject property as follows:
    - Review of the historical data from EDR City Directory and Sanborn Maps, depicted the historical use of part of the subject property as a former dry cleaner circa 1960 to at least 1976. The former use as a dry cleaner is suspected to have impacted the subsurface quality beneath the subject property and is considered a REC at this time which warrants a Phase-II Environmental Subsurface Investigation.
    - Review of the historical data from EDR Radius Map depicted several spills that occurred north-northwest, northeast and at a higher elevation to the subject property. The spill cases offsite is suspected to have impacted the subsurface quality beneath the subject property and is considered a REC at this time which warrants a Phase-II Environmental Subsurface Investigation.

Controlled Recognized Environmental Conditions (CRECs) are defined by the ASTM Standard Practice E1527-13 as a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (e.g., as evidenced by the issuance of a NFA letter or equivalent, or meeting risk-based criteria established by the regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g. property use restrictions, AULs, institutional controls, or engineering controls).

- This assessment **has not revealed** evidence of CRECs in conjunction with the subject property.

Historical Recognized Environmental Conditions (HRECs) are defined by the ASTM Standard Practice E1527-13 as a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted residential use criteria established by a regulatory authority, without subjecting the property to any required controls (e.g., property use restrictions, AULs, institutional controls, or engineering controls).

- This assessment **has not revealed** evidence of HRECs in connection with the subject property.

Business Environmental Risk (BER) is defined by ASTM as "a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in ASTM Standard Practice E1527-13. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations."

- This assessment **has revealed** evidence of BERs in connection with the subject property as follows:
    - The 55-gallon steel drum labeled as containing extra duty motor oil was identified on the first floor of the building, should be removed from the subject property and disposed of legally.

- During the investigation of the interior of the building, mold and water stained areas on the ceiling were observed. There were several indications of mold growth noted during the inspection.
- The building inhabiting the subject property constructed circa to 1931, and RSK identified visual signs of what may be asbestos-containing material in the window caulking and ceiling of the building on the subject property. Due to this and the age of the building, ACM material may be present in the building.
- The building inhabiting the subject property was constructed circa 1931, and there were visual signs of chipped and/or flaking paint throughout the building on the subject property. Due to this, and the age of the building, lead-based paint material may be present in the building.

CONCLUSIONS AND RECOMMENDATIONS

RSK has completed this Phase-I ESA in conformance with the scope and limitations as specified in the ASTM Practice E 1527-13 for the subject property located at 1810-1818 Cropsey Avenue, Brooklyn, NY 11214. RSK has considered the nature and extent of onsite sources of potential subsurface contamination by evaluating the current and available historical usage of the subject property and the potential sources of subsurface vapor migration through the review of available data was summarized in this Phase-I ESA.

REC Conclusions:

Based on the findings and conclusions of this assessment, RSK has concluded that the use of cleaning solvents from the historical use of the subject property as a dry cleaner and the offsite spill where BTEX impacted the groundwater quality may have impacted the subsurface quality beneath the subject property.

REC Recommendations:

RSK recommends that a Phase-II Environmental Subsurface Investigation which should include soil, groundwater and soil vapor assessments to ensure that the historical operations both onsite and offsite did not impact the subject property.

Non-scope ASTM Recommendations:

- An Asbestos, Lead-Based Paint and Mold inspection should be performed by a certified inspector for the entire building in order to determine the potential hazards and exposure within the building on the subject property.

CONDITIONS OUTSIDE THE SCOPE OF ASTM PRACTICE E 1527-13

FINDINGS AND RECOMMENDATIONS MADE BY AN RSK ENVIRONMENTAL CONSULTANT:

Asbestos Containing Materials (ACM)

Asbestos is the generic name for a group of naturally occurring hydrated mineral silicates that are characterized by fibers or bundles of fine single crystal fibers. The New York City Department of Environmental Protection defines asbestos containing materials as "any material which contains more than one percent asbestos by weight." Asbestos materials were used for many years in a variety of ways in building construction due to its excellent acoustic insulating and thermal barrier property. The durability of asbestos fibers and their small size and fibrous shape make asbestos an unusual environmental contaminant. Water infiltration contact during routine maintenance and age are major factors breaking down asbestos containing materials and creating exposure problems. According to the Environmental Protection Agency and included in the publication #EPA 560/5-85-024 "Guidance for Controlling Asbestos Containing Materials (ACM) in Buildings "asbestos containing materials are found in three forms: (1) Sprayed or troweled on ceilings and walls and structural steel; (2) in insulation around hot and cold piping, ducts, boilers and tanks; and (3) in a non-friable state in products such as ceilings/ floor tiles, wallboards and outside materials such as shingles and roofing materials in general, ACM in the first two categories is of greatest concern, especially if it is friable, causing the materials to release fibers into the air.

Presumed Asbestos Containing Material (PACM)

During our site reconnaissance, RSK identified suspected signs of asbestos containing materials within the ceiling of the cellar and window caulking of the building on the subject property. The ceiling of the cellar is in fair to good condition at this time. Due to this visual assessment and the age of the building, RSK recommends that an asbestos inspection is performed by a certified asbestos inspector.

In the event of change in present status, e.g., demolition, alteration, modification, all suspect materials should be analyzed and verify free of any ACM by a certified asbestos investigator.

Lead Based Paint (LBP)

Paint samples were **NOT** taken for lead content during our site reconnaissance. However, in older buildings it is likely that lead based paint was used within the multi-layered painted surfaces. (Lead base paint was banned in 1978). Lead paint can be hazardous if digested, especially by small children.

During our site reconnaissance, there were visual signs of chipped and flaking paint within the building cellar on the subject property. Due to this visual assessment and the age of the building, RSK recommends that a lead-based paint inspection is performed by a certified lead inspector.

In the event of change in present status, e.g., demolition, alteration, modification, all suspect materials should be analyzed and verify free of Lead by a certified inspector.

Lead in Drinking Water

The subject property is connected to the municipal potable water supply as provided by the New York City Environmental Protection. According to the New York City Drinking Water Supply and Quality Report the drinking water supplied to the subject property is compliant with state and federal standards, including those for lead and copper.

Radon

Radon is a colorless, odorless, radioactive gas. Radon comes from the natural decay of uranium that is found in nearly all soils. Radon typically moves through the ground and into building through cracks and openings in the foundation. The USEPA has developed a "Map of Radon Zones" indicating the levels of radon concentrations from testing and aerial surveys conducted in all counties in New York State. The U.S. Environmental Protection Agency's Map of Radon Zones identified the Subject Property as a Radon Zone 3 (Counties with predicted average indoor radon screening levels less than 2 pCi/L). Zone 3 signifies that the average predicted radon level indoors is less than 2 picocuries per liter and this is the lowest level in the state. This level compares favorably with the EPA action level of 4.0 picocuries per liter as the guideline (it should be noted that current radon information and EPA Action Levels are designated for residential spaces only and commercial and industrial facilities are not subject to EPA's Action Level of 4 picocuries per liter as the guideline and definitive information concerning radon gas in an individual building can only be obtained through long term testing).

The U.S. Environmental Protection Agency's Map of Radon Zones identified the Subject Property as a Radon Zone 3 (Counties with predicted average indoor radon screening levels less than 2 pCi/L).

Mold

Molds are a class of fungi and have been found to cause a variety of health problems in humans, including allergic, toxicological, and infectious responses. Molds are decomposers of organic materials and thrive in humid environments. As such, interior areas of buildings characterized by poor ventilation and high humidity are the most common locations of mold growth. Building materials including drywall, wallpaper, baseboards, wood framing, insulation and carpeting often play host to such growth.

- During our site reconnaissance, limited visual inspection for the noticeable presence of mold was performed. RSK observed visual signs of water staining and mold throughout the cellar walls and the ceiling of the first floor of the building on the subject property. In addition, water/mold damaged ceiling tiles were observed within the floor area of the first floor.
    - RSK suggests that a mold inspection should be conducted for the entire building in order to confirm the presence of mold and the water damaged areas should be repaired, and mitigation/remediation be undertaken immediately.

Wetlands

RSK reviewed available information regarding wetlands on the subject property, including National Wetlands Inventory online GIS mapping. RSK made general site observations for readily observable potential wetland characteristics. RSK did not observe surface water bodies or any evidence of potential wetlands on or adjacent to the subject property. The nearest body of water identified was the Gravesend Bay located approximately 1,020-feet south of the subject property.

Groundwater is suspected to be at depths between 15-feet to 20-feet below the subject property and assumed to flow in south-southwest direction.

Local Regulatory Agency Records

Local municipal offices were consulted during the completion of this assessment included the submittal of a Fuel Tank Search request to the NYC Fire Department, a records search of the NYC Building Department website and the NYC OASIS website. The information received would be reviewed in order to determine the possibility of documented adverse environmental conditions, violations or complaints associated with the subject property.

New York City Fire Department - Fuel Tank Search Request

The information used from the New York City Fire Department records was submitted on September 1, 2020 and used to determine if any active or previously removed tanks existed on the subject property, or if there are currently any tanks which exist, and to determine if any violations or permits exist for the subject property. The results of the Fuel Tank Search Request stated that no ascertainable documents were found for the site.

New York City Department of Buildings - Fuel Tank Search Request

The information used from the New York City Department of Buildings records was submitted on September 1, 2020 and used to determine if any active or previously removed tanks existed on the subject property, or if there are currently any tanks which exist, and to determine if any violations or permits exist for the subject property. The results of the Fuel Tank Search Request are currently pending at the time of preparation of this report.

NYC Department of Buildings Website

The information used from the NYC Department of Buildings website was used to determine block and lot information, to find any certificates of occupancy, and to determine if any violations or permits exist for the subject property. The website used is as follows: http://a810-bisweb.nyc.gov/bisweb/PropertyProfileOverviewServlet?boro=4&houseno=243-02&street=northern%20boulevard&requestid=0&s=A03C41B885B461E4F46BD08866A7430E

NYC OASIS (Website)

The information used from the NYC OASIS website was used to determine zoning and use of the subject property, as well as information regarding the building inhabiting the site. The website used is as follows: http://www.oasisnyc.net/map.aspx

RSK Environmental Group LLC has conducted this Phase I Environmental Survey as an aid in determining the presence of potentially toxic or hazardous chemicals or substances as of the date of inspection. Observations are made herein and conclusions drawn are not to be considered as a warranty or guarantee, and are based solely upon those areas directly visible and observable, without the removal or alterations of any item or structure and reflect conditions as on the day of inspection.

RSK Environmental Group LLC, their principals and employees are indemnified for any future changes or conditions of deterioration in or on the subject property. In as much as each has made not guarantees of the premises, expressed or implied in connection with this report, any liability, which each may have, shall be limited to the fee for the inspection of the property.

User Reliance

This Phase I Environmental Site Assessment (ESA) Report is for the benefit of Mr. Shimon Glauber D.b.a. SBA Loan Group, and this report may not be relied upon by any other person or entity without the written consent of RSK Environmental Group, LLC.

Only if written agreement has been executed granting the right to utilized this report, no third party which obtains all of portion of this report shall have any rights of recourse or recovery under any course of action against RSK Environmental Group, LLC, its officers, employees, vendors, successors or assigns.

Reliance is provided in accordance with RSK's Standard Phase I Environmental Site Assessment Contract and this report is for the benefit of Mr. Shimon Glauber D.b.a. SBA Loan Group, and its successors and assigns. This report has no other purpose and may not be relied upon by any other person or entity without the written consent of RSK Environmental Group, LLC.

Preliminary Budget:

Item	Quantity	Estimated Cost
Asbestos Inspection	Entire	$1,500.00 to $2,000.00
Lead-Based Paint Inspection	Entire	$1,000.00 to $1,200.00
Mold Inspection	Entire	$1,200.00 to $1,500.00
Phase-II Environmental Site Investigation	Entire	$10,000.00 to $15,000.00

PHOTOS

PHOTO LOCATION: Depicts facing west to the front of the subject property.

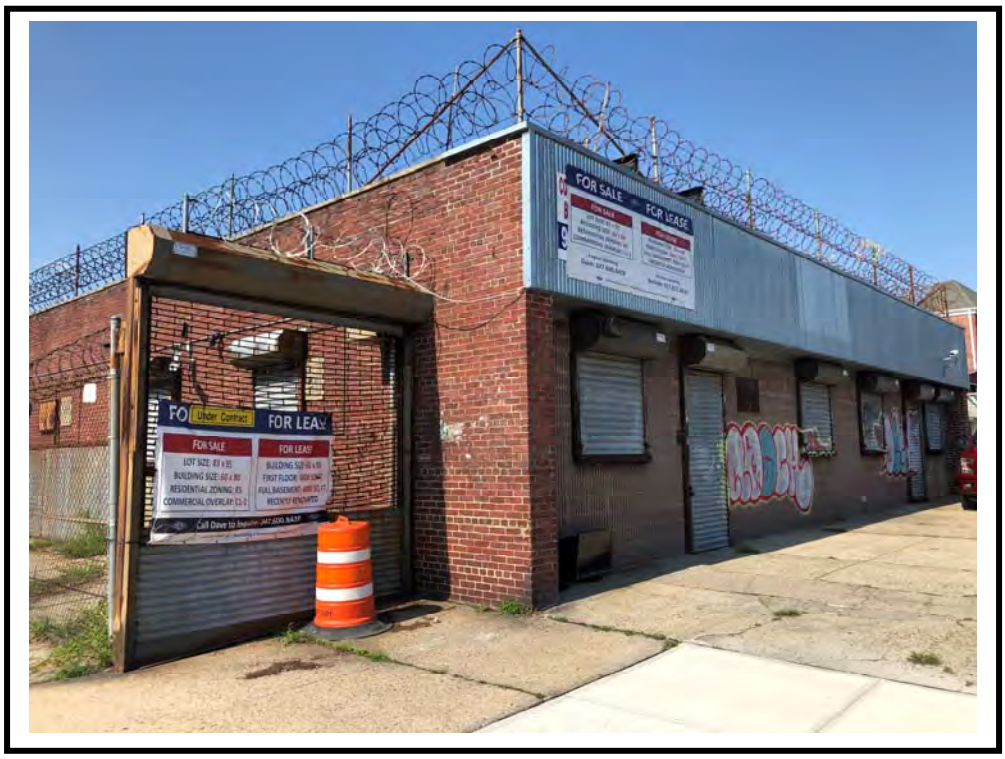

PHOTO LOCATION: Depicts facing southwest along Bay 19th Street.

PHOTO LOCATION: Depicts the view facing southeast along Cropsey Avenue.

PHOTO LOCATION: Depicts the view facing northeast along Bay 19th Street.

PHOTO LOCATION: Depicts facing southwest along the community driveway.

PHOTO LOCATION: Depicts adjoining properties south of the subject property.

PHOTO LOCATION: Depicts surrounding property west of the subject property.

PHOTO LOCATION: Depicts surrounding property north of the subject property.

PHOTO LOCATION: Depicts the property east of the subject property.

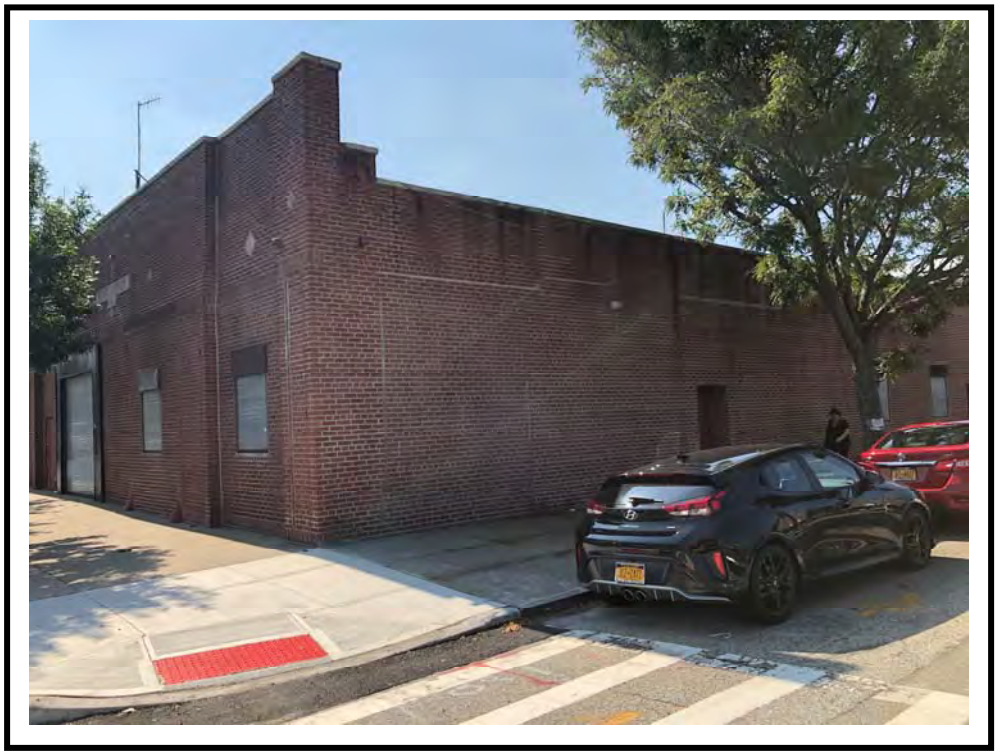

PHOTO LOCATION: Depicts the property northeast of the subject property.

PHOTO LOCATION: Depicts the view of the eastern most side of the subject property.

PHOTO LOCATION: Depicts the side door to leading into the building.

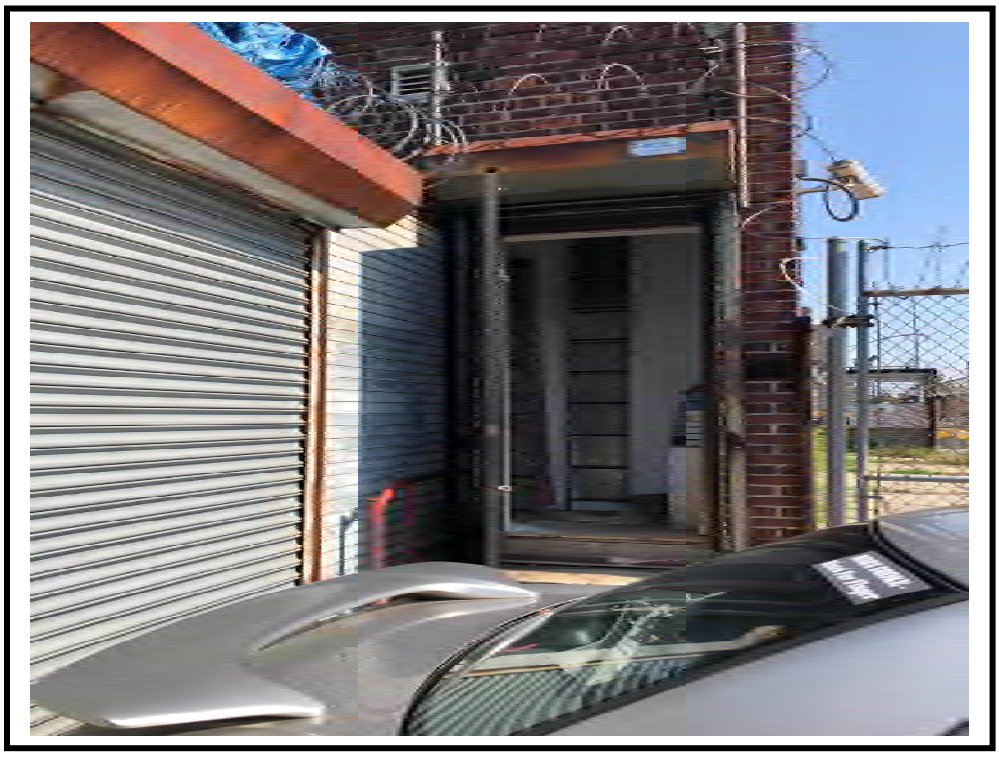

PHOTO LOCATION: Depicts the interior of the building.

PHOTO LOCATION: Depicts the interior of the building containing miscellaneous supplies.

PHOTO LOCATION: Depicts a 55-gallon drum containing motor oil.

PHOTO LOCATION: Depicts the lid of the one 55-gallon drum stating its contents, which was motor oil.

PHOTO LOCATION: Depicts the cracked floor of the one-story building.

PHOTO LOCATION: Depicts a 20-lb bucket previously containing Tide Powder Detergent, which contained an unknown material during the site inspection.

PHOTO LOCATION: Depicts exit leading to Bay 19th Street, towards the east.

PHOTO LOCATION: Depicts a hole in the ceiling with water staining and mold around it.

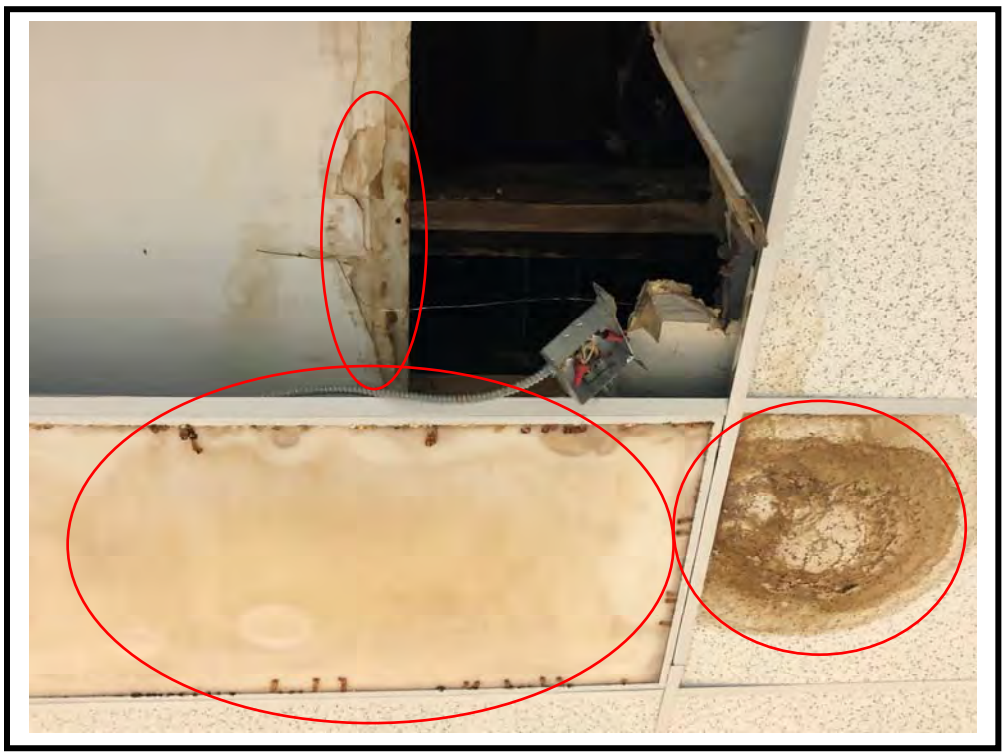

PHOTO LOCATION: Depicts a view of the open area within the buidling.

PHOTO LOCATION: Depicts water staining on the ceiling.

PHOTO LOCATION: Depicts the doorway leading to the electric meters for the building on the subject property.

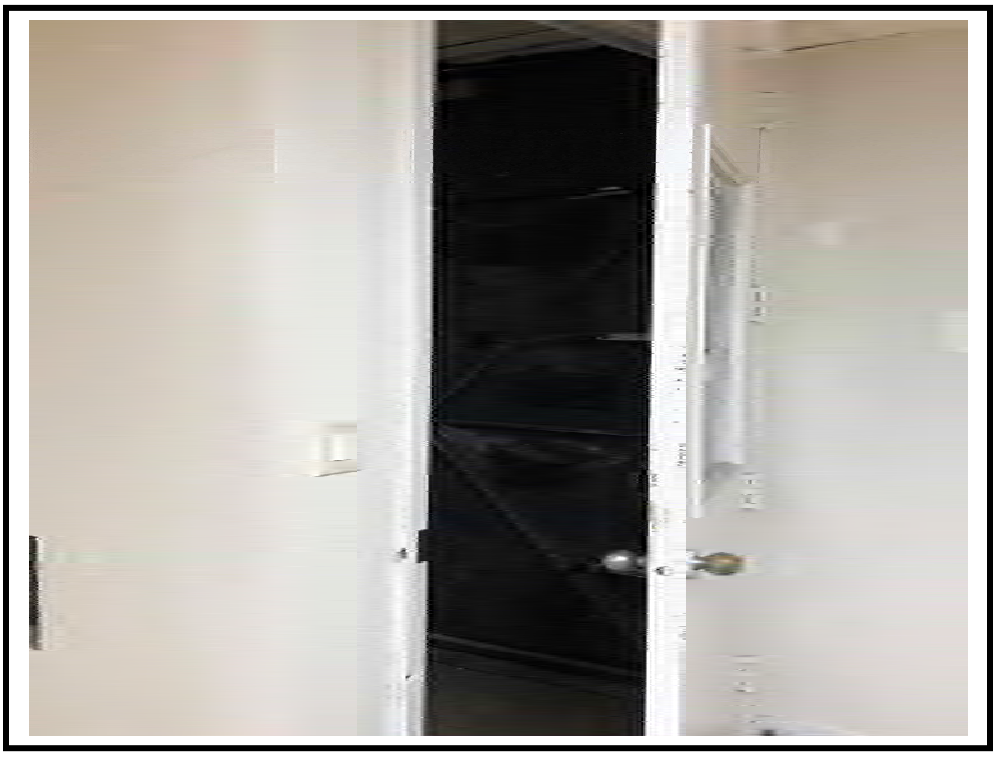

PHOTO LOCATION: Depicts a dilapidated window which may contain ACM and lead-based paint.

PHOTO LOCATION: Depicts material which may contain ACM or lead-based paint.

PHOTO LOCATION: Depicts chipping/flaking paint and caulking on the window within the building which may contain lead-based paint and ACM.

PHOTO LOCATION: Depicts the divide between the center floor and the previously renovated office space of the building.

PHOTO LOCATION: Depicts an office space along Bay 19th Street.

PHOTO LOCATION: Depicts a back door leading to the rear of the subject property.

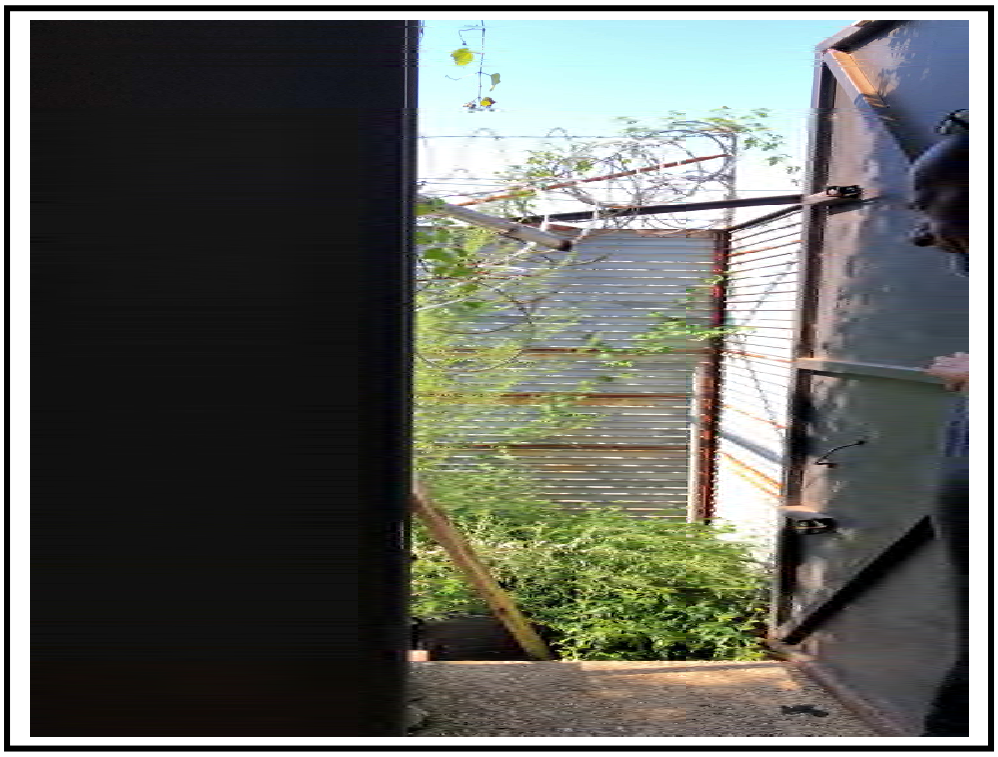

PHOTO LOCATION: Depicts a stairwell leading to the cellar of the building.

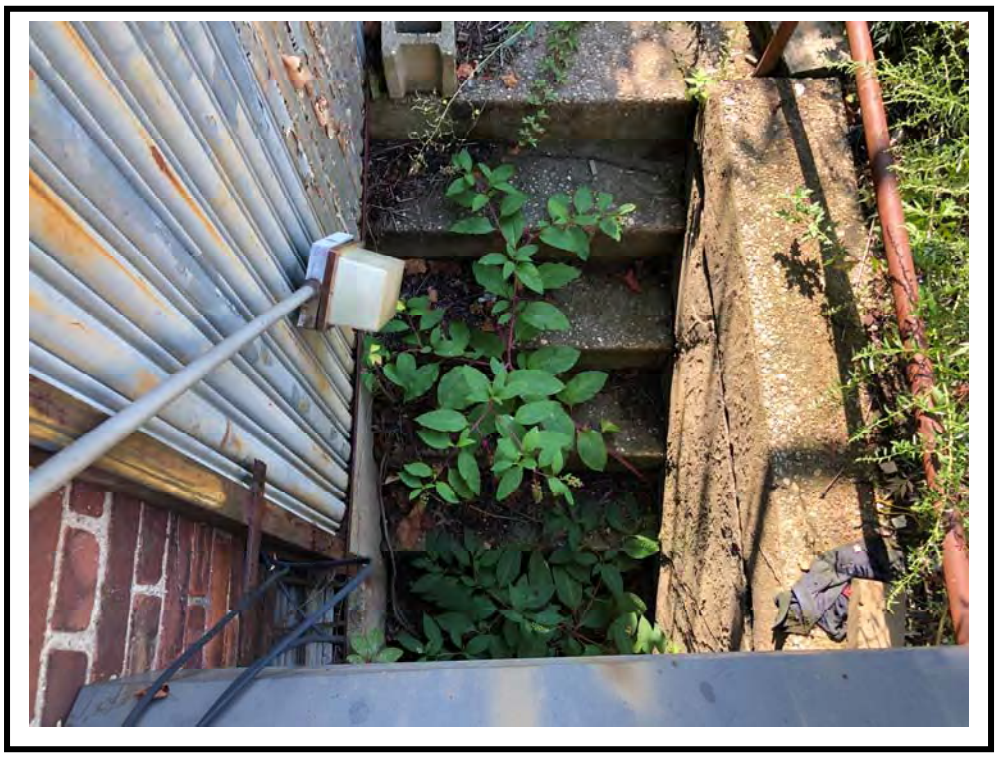

PHOTO LOCATION: Depicts overgrown foliage with various debris and waste in the rear of the subject property.

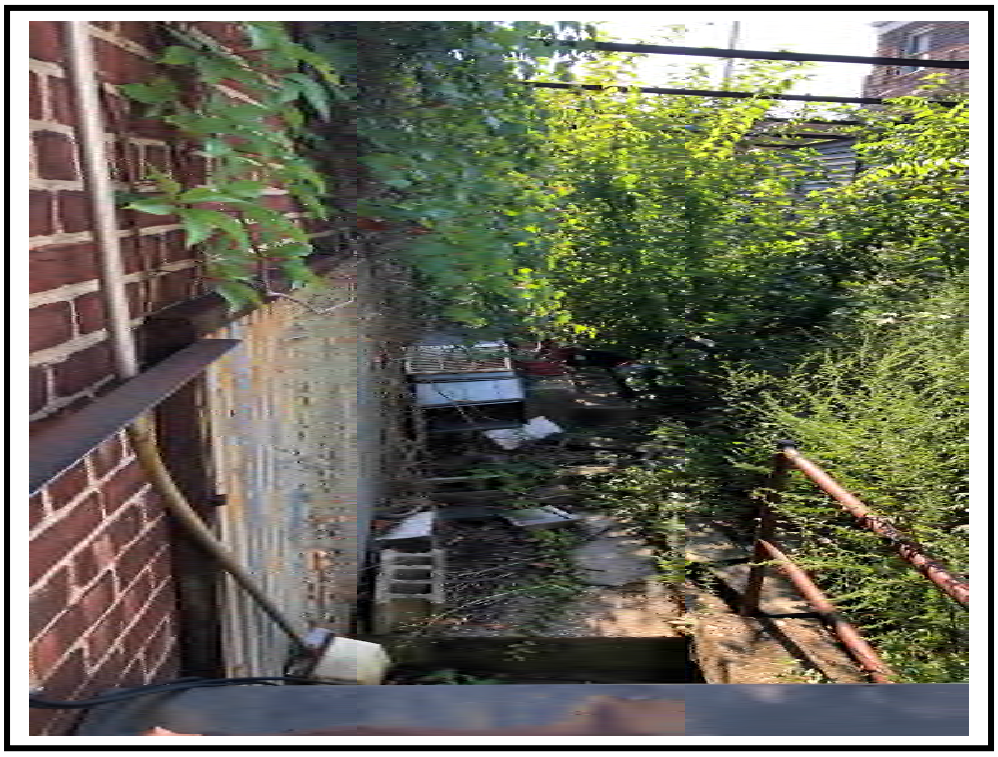

PHOTO LOCATION: Depicts a sealed doorway leading to the cellar of the building.

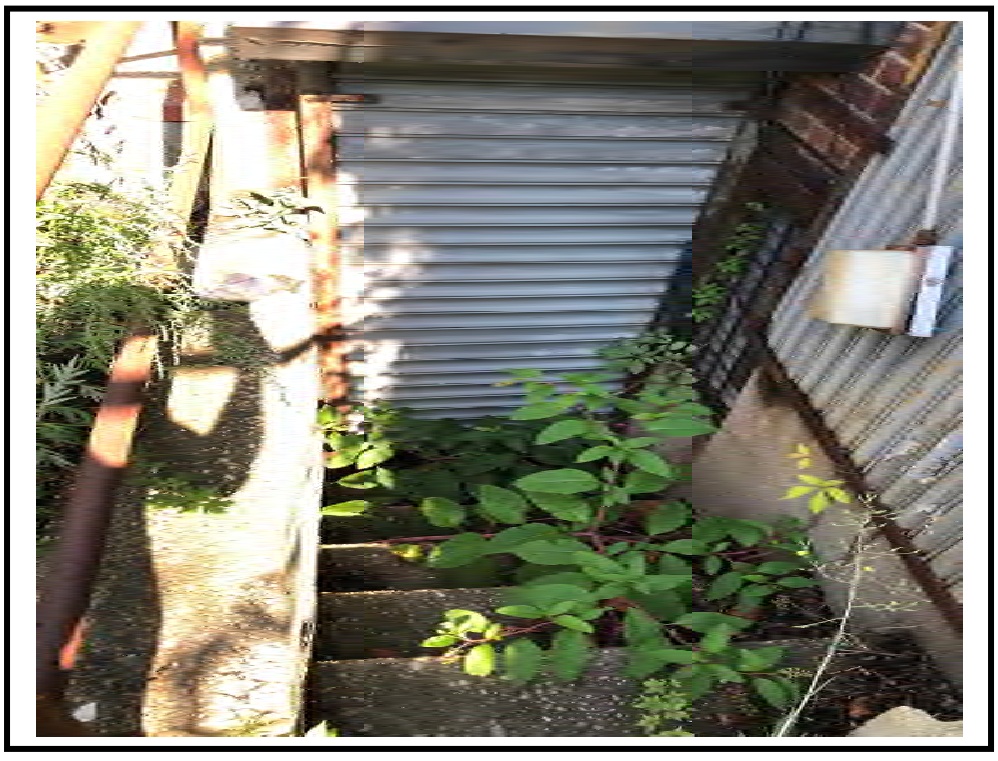

PHOTO LOCATION: Depicts miscellaneous debris and one 5-gallon pail in the rear of the subject property.

PHOTO LOCATION: Depicts the stairwell leading to the cellar of the building.

PHOTO LOCATION: Depicts the stairwell leading to the cellar of the building.

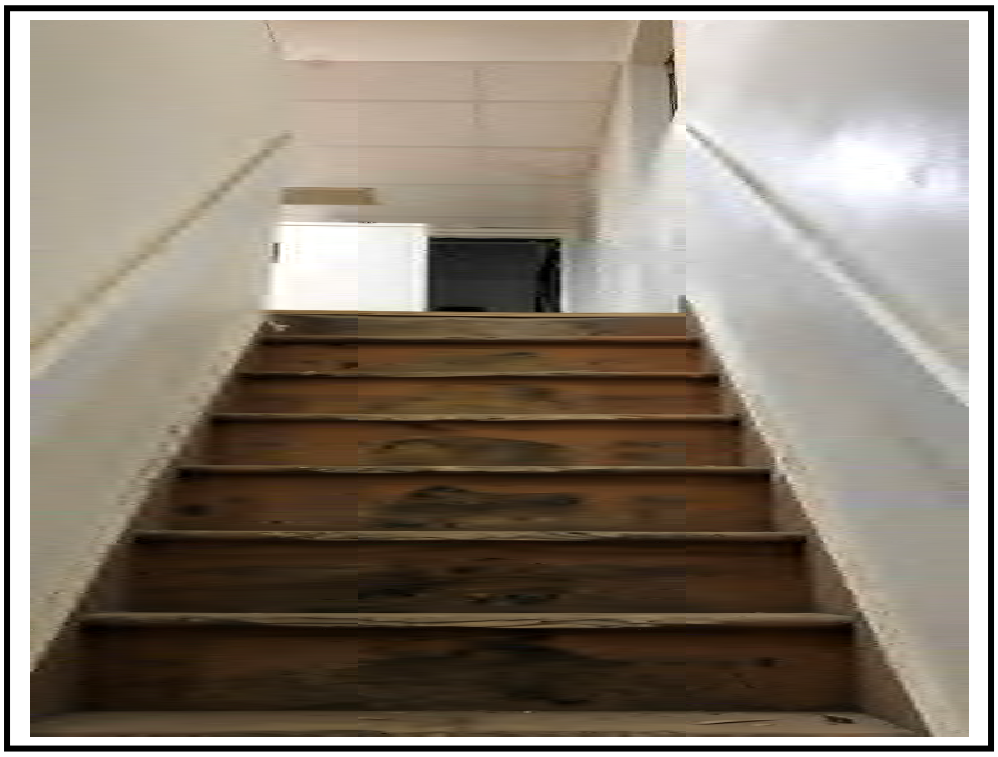

PHOTO LOCATION: Depicts the boiler in the cellar of the building.

PHOTO LOCATION: Depicts several bags of kitty litter in the cellar of the building.

PHOTO LOCATION: Depicts water damaged and what may be mold affected areas.

PHOTO LOCATION: Depicts chipped paint in the cellar of the building which may contain lead-based paint.

PHOTO LOCATION: Depicts a view of the cellar of the building.

PHOTO LOCATION: Depicts a view of the cellar of the building.

PHOTO LOCATION: Depicts the HVAC vent in the cellar of the building.

PHOTO LOCATION: Depicts an area of the building containing chipped/flaking paint which may contain lead-based paint.

PHOTO LOCATION: Depicts mold on one of the cellar doors.

PHOTO LOCATION: Depicts a hole in the ceiling of the cellar.

PHOTO LOCATION: Depicts a sealed vent or fill line in the cellar of the building.

PHOTO LOCATION: Depicts another section of the cellar of the building.

PHOTO LOCATION: Depicts several 20-lb drums containing soil and debris within the cellar.

PHOTO LOCATION: Depicts a door leading out to the rear of the subject property.

APPENDICES

The following sources were utilized to determine the physical setting of the subject site, current and past usage of the site and are researched to evaluate and Recognized Environmental Conditions that might have an adverse effect on the subject property.

- APPENDIX A – EDR Radius Map
- APPENDIX B – Sanborn Fire Insurance Maps
- APPENDIX C – Aerial Photograph Search
- APPENDIX D – EDR City Directory Abstract
- APPENDIX E – EDR Topographic Maps
- APPENDIX F – EDR Building Permit Report
- APPENDIX G – EDR Environmental Liens and AUL Search
- APPENDIX H – EDR Property Tax Map Report
- APPENDIX I – NYC Property Info
- APPENDIX J – Transaction Screen Questionnaire

NOT INCLUDED UNLESS REQUESTED

Appendix B – IRM Implementation Schedule

This IRM Work Plan is anticipated to begin in the third quarter of 2023 and will require approximately 3-months to complete. It is anticipated that the actual on-Site duration of major remedial construction tasks will be completed as follows (time frames are not necessarily consecutive):

ACTIVITY	Weeks from Approval Start	DURATION (weeks)
NYSDEC Approval of IRMWP	0	-
Mobilization and Site Preparation	1	1
Demolition activities	4	3
Limited Excavation activities	5	1
Installation of Engineering Control	6	2
Restoration	10	2
Demobilization	12	1
Submit IRM Construction Completion Report	17	4

Appendix C – Site-Specific Health and Safety Plan

RSK Environmental Group

BROOKLYN: 3611 14TH AVE. Suite #551 Brooklyn NY 11218 QUEENS: 132-02 89TH AVE. Suite #222 Richmond Hill, NY 11418

SITE-SPECIFIC HEALTH AND SAFETY PLAN

For

1810-1818 Cropsey Avenue, Brooklyn, NY 11214
Block: 6463 Lot: 137
NYSDEC Site No.: 224320 / Spill No.: 2007751

Prepared for:
1810 Cropsey Ave LLC
1762 Benson Avenue
Brooklyn, NY 11214

Prepared by:
RSK Environmental Group, LLC
132-02 89th Avenue, Suite 222
Richmond Hill, NY 11418

January 2023

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Client:	**1810 Cropsey Ave LLC**
Site Address:	**1810-1818 Cropsey Avenue, Brooklyn, NY 11214 ("Site")**
NYSDEC Site No.:	**224320; Site Spill Number: 2007751**
Date Prepared:	**January 5, 2023**
Project Description:	**Interim Remedial Measure Work**

RSK ENVIRONMENTAL GROUP, LLC AND ITS SUBCONTRACTORS DO NOT GUARANTEE THE HEALTH OR SAFETY OF ANY PERSON ENTERING THIS SITE. DUE TO THE NATURE OF THIS SITE AND THE ACTIVITY OCCURRING THEREON, IT IS NOT POSSIBLE TO DISCOVER, EVALUATE, AND PROVIDE PROTECTION FOR ALL POSSIBLE HAZARDS WHICH MAY BE ENCOUNTERED. STRICT ADHERENCE TO THIS HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL HELP REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR ANY INJURY AT THIS SITE. THE HEALTH AND SAFETY GUIDELINES IN THIS PLAN WERE PREPARED SPECIFICALLY FOR THIS SITE AND SHOULD NOT BE USED ON ANY OTHER SITE(S) WITHOUT PRIOR RESEARCH AND EVALUATION.

CONSTRUCTION HEALTH AND SAFETY PLAN

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APPENDIX E HOSPITAL INFORMATION, MAP AND FIELD ACCIDENT REPORT

STATEMENT OF COMMITMENT

This Site-Specific Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during any investigative activities planned specifically for the site located at **1810-1818 Cropsey Avenue, Brooklyn, NY** (the Site). This HASP, which applies to persons present at the Site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. The subcontractors are retained as independent contractors and are responsible for ensuring the health and safety of their own employees. The subcontractor has the option of adopting this HASP or providing its own for the planned scope of work.

1.0 INTRODUCTION

The Purpose and Policy of this Site-Specific Health and Safety Plan (HASP) has been developed to comply with the regulations under 26 CFR 1926, Construction, Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER), and COVID-19 Control and Prevention. It addresses safety and health hazards related to subsurface sample collection activities and is based on the best information available with the site work activities to be conducted at 1810-1818 Cropsey Avenue, Brooklyn, NY (the Site). This document describes the health and safety guidelines developed by RSK Environmental Group, LLC (RSK) for the implementation of an Interim Remedial Measure Work Plan (IRMWP) for the Site, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during the subsurface investigation activities. The HASP may be revised by RSK at the request of the New City State Department of Environmental Conservation (NYSDEC) upon receipt of added information regarding site conditions. Changes will be documented by written amendments signed by RSK's Project Manager, Site Safety Officer and/or the RSK Health and Safety Consultant.

1.1 Scope

This HASP addresses the potential hazards related to the Site as described in the IRMWP. The IRM activities are as described below:

- Development and execution of a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) for the protection of on-site workers and the nearby community during remediation and construction activities;
- Prior to conducting any intrusive field work, a geophysical survey will be conducted to mark out sub-grade utilities. The appropriate Dig Safe One Call center will also be notified;
- Site mobilization involving setup, equipment mobilization, utility mark outs and marking & staking work areas;
- A diagnostics measurement which will involve coring 2½-inch suction holes in the concrete floor especially in the areas of the three (3) proposed SVE pits, and 5/16-inch test holes at various distances from the suction hole. A specialized SSDV capable of up to 200cfm and a vacuum of 45-inches of water column ("W.C.) or better will be used with a variable speed controller to define the flow and vacuum characteristics of the soil beneath the slab. The information obtained from each suction point will be examined independently to identify the associated ROI for the specified locations during the applied test conditions. The test data from all the suction points will be examined collectively in order to achieve the proposed full-scale SSD and SVE systems suction points in order to address the area(s) of concern beneath the building.
- Limited demolition of the existing cellar slab to install the SVE system only, and removal offsite of all broken concrete pieces as C&D. The remainder of the existing cellar slab will be left intact;
- Limited excavation, handling, transportation, and off-site disposal of material, as necessary to complete efforts to install an engineering control (i.e., excavate three (3) extraction pits and trenches for SVE system within the existing 6-inch cellar slab);
- Continuous screening by an environmental scientist / geologist of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media which will be stockpiled on-site;
- In the event contaminated soil is observed by olfactory methods, elevated PID readings, or other observational or analytical data collected during the installation of the engineering controls, those impacted areas will be further excavated in a safe manner and all excavated materials will be stored onsite in 20-cubic yards roll off containers;
- If required for structural stability issues, the selected contractor may elect to utilize shoring boxes, sheet-piling systems, etc., to protect the integrity of the on-site building infrastructure. Such activities are the responsibility of the contractor and are not incorporated into the IRMWP;

- If any USTs are encountered during soil/fill removal actions, registration of tank(s) and appropriate closure of these spills in compliance with applicable local, State, and Federal laws and regulations;
- Collection and analysis of all excavated soil for waste characterization sampling as required for off-site disposal as described in the SMMP and the QA/QC;
- All excavated soils stored in roll off containers will be covered with a double-layer of 6-mil plastic sheeting pending their eventual load out for transport and disposal;
- Upon acceptance of waste disposal from approved disposal facilities, approximately 7-cubic yards of soil/fill will be transported offsite for the proper disposal at an appropriately licensed or permitted facility;
- Documentation of post remedial excavation endpoint soil sampling and analysis, collected from any remedial excavation areas will be provided to the NYSDEC.

1.2 Application

This HASP applies to all personnel involved in the above tasks who wish to gain access into the active work areas of the Site, including but not limited to:

- RSK employees and subcontractors.
- Client representatives; and
- Federal, state, or local representatives.

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The site safety officer is responsible for informing personnel (RSK employees and/or owner or owner's representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**. Site conditions may warrant an amendment to this HASP. Amendments to this HASP are acknowledged by completing forms included in **Appendix C**.

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Construction Health and Safety Plan are:

Name	Company/Title	Address	Contact Numbers
Dhanraj Singh	RSK Environmental Project Manager	132-02 89th Avenue Ste. #222 Richmond Hill, NY 11418	(718) 438-2200, Ext. 202 (347) 728-0768
Drumita Dmello	RSK Environmental Site Safety Officer	132-02 89th Avenue Ste. #222 Richmond Hill, NY 11418	(718) 438-2200, Ext. 205 (646) 249-6129
Ryan Seemungal, Rohan Singh, Gus Diaz	RSK Environmental Field Technicians	132-02 89th Avenue Ste. #222 Richmond Hill, NY 11418	(718) 438-2200, Ext. 201
Ted Yen, P.E.	Ted Yen & Associates, P.E.	132-02 89th Avenue Ste. #222 Richmond Hill, NY 11418	(917) 584-6299

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this HASP. The site safety officer will conduct daily (tail gate or toolbox) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this HASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.
2. Coordinating site safety decisions with the project manager.
3. Designating exclusion, decontamination, and support zones on a daily basis.
4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this HASP.
5. Maintaining the work zone entry/exit log and site entry/exit log.
6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site). The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

2.0 SITE BACKGROUND AND SCOPE OF WORK

The Site is also identified as Block: 6463, Lot: 137, and is located south of Cropsey Avenue (a.k.a. Victor V. Allegretti Way), north of Shore Parkway, east of 18th Avenue and west of Bay 19th Street which is situated within a mixed-use neighborhood in the Bensonhurst neighborhood of Kings County in Brooklyn, NY. The Site is approximately 7,798-square feet in size and is developed with a one-story commercial building with a full cellar which has a total area of approximately 4,680-square feet. The Site is currently vacant with no occupants or ongoing activities. The building is supplied by public potable water supply and municipal sanitary sewer system.

2.1 Prior Investigations

Records Search/Risk Assessment (RSRA):

A RSRA conducted for the Site by Bison Environmental LLC (BE) and dated August 21, 2020, identified the following:

- A Records Search/ Risk Assessment (RSRA) was conducted for the Site by Bison Environmental LLC (BE) dated August 31, 2020, where the property was considered to be of a high environmental risk. BE concluded the presence of a dry cleaner at 1812 Cropsey Avenue from at least 1960 through 1983, and recommended a Phase-I investigation to determine any indications of a discharge onsite and if the dry-cleaner might have been a drop-off location only.

Phase-I Environmental Site Assessment:

On-site Findings

A Phase-I Environmental Site Assessment was performed by RSK Environmental Group for the Site dated September 14, 2020, to address the risk mentioned by BE in the RSRA. As part of the Site history research, two (2) Recognized Environmental Conditions (RECs) and four (4) Business Environmental Risks (BERs) were identified for the Site. The Sanborn Maps and City Directory search for the Site depicted the presence of a dry-cleaning facility on-site using the address as 1812 Cropsey Avenue from 1960 to at least 1976. The EDR Radius Map review depicted various spills that occurred on the north-northwest and northeast section of the property at a higher elevation. These offsite spills were suspected to have impacted the subsurface quality beneath the Site due to its proximity and elevation, and warranted a Phase-II subsurface investigation.

RSK performed a follow-up site inspection on January 25, 2022, to assess the current condition of the Site. The Site did not depict any changes other than the drum previously identified on the first floor was no longer present at the Site.

Off-site Findings

According to the EDR Radius Search, a NY SPILL site (1785 Cropsey Avenue, Brooklyn, NY) was identified at approximately 240-feet northwest of the Site, at a higher elevation. The spill site (Former Getty S/S #98768) was reported to the NYSDEC on January 6, 1999 and documented with spill number 9812361, due to gasoline impacted soil encountered during the removal of underground storage tanks (USTs). Per the EDR records, ten (10) 550-gallon gasoline USTs and three (3) 4,000-gallon gasoline USTs were removed, and soils were excavated down to 14-feet below grade surface (bgs) where 214.66 tons of soil was removed. Soil analytical results identified significant exceedances in BTEX-related VOCs, and MTBE. Five (5) monitoring wells were installed on-site for monitoring groundwater concentrations, that resulted in significant spikes in BTEX-related compounds and MTBE. Groundwater depths ranged from 18-ft. to 20-ft. bgs, and flowed to the southeast. DEC required delineation of contamination across Cropsey Avenue, and 18th Avenue; groundwater remediation and submission of Quarterly Monitoring reports. A Soil Vapor Extraction (SVE) system was installed on-site for vapor mitigation. Per the 2006 Remedial Action Plan submitted to the DEC, pump test and SVE test for conventional pump-and-treat system, Vapor Extraction/Groundwater Extraction (VE/GE) and Oxygen Releasing Compound (ORC) injection for off-site remediation was proposed. For the ORC barrier injection, a Tidal Influence Study (TIS) was conducted to define plume migration which depicted to influence the southeast direction flow. In 2015, under new ownership, the environmental consultant submitted a RegenOx Injection Work plan to the DEC that was approved for execution. In 2016, a review of the injection report and quarterly follow-up reports indicated a successful effort to remediate the property, and natural attenuation of the plume. The closure report was approved by the DEC and the spill was closed on August 26, 2016.

Phase-II Site Investigation:

A Phase-II Environmental Subsurface Investigation was conducted by RSK Environmental Group at the Site on September 21, 2020, to address the suspected subsurface impacts by the historic usage as a dry-cleaning facility on-site and offsite spills. Soil, soil vapors and groundwater were sampled to determine the presence and extent of the contamination from dry-cleaning solvents and offsite petroleum spills. As part of the Phase-II, a total of four (4) soil samples, four (4) groundwater samples and four (4) air samples were collected for laboratory analysis. Four (4) soil borings (SB-1 through SB-4) were installed in the corners of the cellar at a depth of 10-feet below cellar grade and retrieved every 2-feet. The four soil borings were converted into temporary groundwater wells for sampling (GW-1 through GW-4). High PID readings were observed for the retrieved groundwater samples. A total of four (4) air samples were taken from the Site; one (1) sub-slab sample (SI-1) from beneath the cellar; two (2) indoor air samples (the 1st floor (IA-1) and cellar (IA-2)), and one outdoor sample (OA-1). Analytical results did not identify contamination in the soil samples, or the results were well below the NYSDEC UUSCOs. Groundwater analysis depicted a consistency of petroleum-related contaminants in all four (4) samples (GW-1 through GW-4), predominately GW-1, GW-3, and GW-4 where eleven (11) VOCs, four (4) SVOCs and three (3) RCRA metals exceeded NYSDEC Groundwater Quality Standards. Soil Vapor Analytical results identified petroleum-related and chlorinated solvent contamination in the sub slab air samples for thirteen (13) VOCs, and consistent contamination in all four (4) air samples (SI-1, IA-1, IA-2, OA-1) for four (4) VOCs which exceed the NYSDOH Background standards for Indoor Air. Based on these findings and results, a NYSDEC spill number (2007751) was generated for the Site and a review of the Phase-I ESA and Phase-II SIR was conducted by the state.

Site Characterization Report:

A Site Characterization Report was prepared by RSK to document the site investigation activities that were conducted per the Site Characterization Work Plan, (SCWP) prepared by RSK Environmental Group (RSK), and dated January 24, 2022. The investigation was performed to delineate the full extent of the contamination from dry-cleaning solvents and an offsite petroleum spill to soil and groundwater beneath the Site.

As part of the SCR, a total of thirty-four (34) soil samples were collected from thirteen (13) soil borings from the exterior and cellar of the building. BTEX contaminants were detected at concentrations above restricted residential SCOs, particularly in soil borings adjacent to Cropsey Avenue and Bay 19th Street (SC-5, SC-6, SC-7, SC-10, and SC-11). A hotspot for BTEX contaminants was also detected in the driveway easement (SC-2). Pesticides were detected at concentrations above unrestricted use SCOs. Metals, particularly nickel, were present in all samples above unrestricted use SCOs. The highest concentrations of contamination in the soil are generally in the 16-to-20-foot range below ground surface. PFAS compounds were detected in soil but were below the DEC cleanup values. The petrochemicals present in the soil beneath the Site is likely not from the result of on-site activity, but rather offsite from historical gasoline filling stations along Cropsey Avenue. Three (3) low-level detections of CVOCs, cis-1,2-Dichloroethene at a max. of 0.00045 mg/kg, Tetrachloroethene (PCE) at a max. of 0.110 mg/kg and Trichloroethene (TCE) at a max. of 0.00036 mg/kg were identified during the site characterization.

A total of eleven (11) groundwater samples were collected from seven (7) permanent wells on the exterior of the building and four (4) temporary wells on the interior of the building. BTEX contaminants were detected in all groundwater samples at concentrations above NYSDEC Groundwater Quality Standards. Based on the Phase-I ESA report prepared by RSK and dated September 14, 2020, RSK has identified two (2) potential sources which may contribute to the BTEX detected in groundwater, these sources are considered to be generating from either a spill site, a former Getty S/S #98768 located north of the Site at 1767-1777 (1785) Cropsey Avenue where BTEX-related VOCs and MTBE were identified in soil and groundwater (NYSDEC Spill #9812361), and a former gasoline filling station with auto repair located northeast of the Site at 1801-1817 Cropsey Avenue where ten (10) gasoline vent lines currently exists. Groundwater flow is determined to be in the south-southeast direction. Pesticides were detected at exceeding concentrations in GWMW-4 and GWMW-7. Metals, including iron, manganese, and sodium were detected at exceeding concentrations in all samples. PFAS compounds were detected in select groundwater samples ranging in concentration from max. 68.2 ng/L on the exterior of the building and max. 116 ng/L on the interior of the building. The PFAS contamination beneath the Site is likely from the result of historical on-site activities as a dry-cleaner.

A total of eight (8) soil vapor/ambient air samples were collected at the Site. One (1) soil vapor sample collected from the northern corner of the Site, four (4) sub-slab vapor samples collected from within the cellar, two (2) indoor air samples, and one (1) outdoor air sample. BTEX contaminants and chlorinated solvents were present beneath the cellar slab and within the indoor air of the building at elevated concentrations. Based on the elevated concentrations of BTEX and two (2) CVOCs (cis-1,2-Dichloroethene and PCE) mitigation should be completed for the building onsite. The two (2) elevated CVOCs, when compared to applicable decision matrices, mitigation is required.

Sampling results collected from this Site have indicated that there is significant environmental impact that has occurred due to former dry-cleaning operations and from surrounding properties that have historically been used as gasoline filling stations. When comparing the analytical data obtained from RSK's Phase-II report dated September 21, 2020, BTEX contamination is attenuating across the Site from NNW to SSE.

2.2 Redevelopment Plans

There is no proposed redevelopment plan for the Site at this time. The proposed future use of the building includes storage on the cellar floor and office space on the 1st floor.

3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones, or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Climbing Hazards

During site activities, workers may have to work on drilling equipment by climbing. The drilling contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

3.1.3 Cuts and Lacerations

Field activities that involve drilling activities usually involve contact with certain technical drilling machinery and tooling. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

3.1.4 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the drilling program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.5 Utility Hazards

Before conducting any drilling, the drilling contractor will be responsible for locating and verifying all existing utilities at each boring location.

3.1.6 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state, and federal agency regulations regarding such traffic and in accordance with DOT guidelines. The drilling contractor shall execute his operations without undue interference or delays to traffic. The drilling contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.1.7 Scaffolding Hazards

Falls are attributed to the lack of guardrails, improper installation of guardrails and failure to use personal fall arrest systems when required. The OSHA standard requires fall protection must be used when work heights reach 10’ or more. OSHA’s standards represent the minimum level of protection; many general contractors require 100% fall protection at 6’ or greater when working on scaffolds. Access in the form of a secured ladder, stair tower, ramp, etc. is required whenever there is 24” vertical change to an upper or lower level. The means of access must be determined before erection of the scaffold and employees are never allowed to climb on cross braces for either vertical or horizontal movement. Many individuals have been injured or killed due to being struck by materials or tools that have fallen from scaffold platforms. OSHA requires that this is done one of two ways. The first is to install toe boards or netting on work platforms to prevent these items from falling to the ground or lower-level work areas. The other option is to erect barricades that physically prevent individuals from walking under work platforms.

Caution or Danger tape is often used in an attempt to keep people away from overhead hazards but is often disregarded or taken down creating possible struck by hazards. A more robust system such as plastic mesh or wooden barricades is generally more effective and much easier to maintain. When members of the public could potentially move close enough to be struck by falling objects, creating barriers to prevent them from entering the area where objects can fall is a recognized best practice. Regardless of the type of falling object protection used, it is crucial that other individuals on the work site are aware of the overhead work.

3.1.8 Electrical Hazards

A minimum of 10' must be maintained between the scaffold and electrical hazards. If this distance cannot be maintained, then the hazard must be de-energized or properly insulated by the power company. Coordination between the power company and the company erecting / using the scaffold cannot be over stated. Lastly, all employees who work on scaffolds must have documented training. The training topics must include identification and prevention of fall hazards, falling tools and materials hazards, and knowledge of electrical hazards. Due to the dynamic, rugged nature of construction work, normal use of electrical equipment at your site causes wear and tear that results in insulation breaks, short-circuits, and exposed wires. [Flexible Cords and Power Tools] If there is no ground-fault protection, these can cause a ground-fault that sends current through the worker's body, resulting in electrical burns, explosions, fire, or death.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress. The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention
   a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
   b. Work in Pairs. Individuals should avoid undertaking any activity alone.
   c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or function as a quick-drench shower in case of an exposure incident.
   d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be conducted during the coolest part of the day.

2. Recognition and Treatment
   a. Heat Rash (or prickly heat):
      Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
      Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
      Treatment: Remove source of irritation and cool skin with water or wet cloths.

   b. Heat Cramps (or heat prostration)
      Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
      Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, normal body temperature.

Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.

c. Heat Exhaustion

Cause: Profuse perspiration resulting in loss of water and salt accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Cool, moist skin, heavy sweating, headache, nausea or vomiting, dizziness, light headedness, weakness, thirst, irritability, rapid pulse

Treatment: Provide worker with plenty of cool water or other beverage and sit/lay down in cool, shaded area. Cool worker with cold compresses or ice packs. Call 911 if symptoms worsen or do not improve within 60 minutes. The worker should not return to work for the rest of day.

d. Heat Stroke (hyperthermia)

Cause: Same as heat exhaustion. This is also an extremely serious condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

3.2.2 Heat Exposure

Exposure to hot weather and humid conditions may lead to excessive increases in body heat (hyperthermia). To guard against heat exposure and to prevent heat-related injuries, appropriate clothing should be worn, and a cooling station must be readily available to cool personal protective equipment. Rest periods should be adjusted as needed and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of heat exhaustion and heat stroke (hyperthermia) such as fainting, muscle weakness, reduced coordination, impaired judgement, and fatigue.

3.2.3 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may results in excessive loss of body heat (hypothermia) and/or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frostbite and hypothermia such ass shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated due to light and numbing of the toes and fingers.

3.3 Chemical Hazards

Chemical hazards will be full list of Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Pesticides/PCBs, Target Analyte List Metals, and Perfluoroalkyl Substances (PFAS). The primary routes of exposure to the identified contaminants in soil, groundwater or soil vapor to on-site workers are through inhalation, ingestion, and absorption.

Appendix D includes information sheets for chemicals that may be encountered at the site.

3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or drilling activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor. If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during site activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site-specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 µg/m3 over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 Organic Vapors

The site safety officer will periodically monitor organic vapors with a Photo-ionization Detector (PID) during site activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), 1910.132, and COVID-19 requirements. Protective equipment shall be NIOSH approved and respiratory protection including face mask shall conform to OSHA 29 CFR Part 1910.133, 1910.134, and COVID-19 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133 and COVID-19; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work clothes, coveralls, or Tyvek, as needed.
- steel toe and steel shank work boots.
- hard hat.
- gloves, as needed.
- safety glasses and/or face shield.
- face mask.
- hearing protection.
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when sustained concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), by more than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated Tyvek coveralls.
- steel-toe and steel-shank work boots.
- chemical resistant over-boots or disposable boots covers.
- disposable inner gloves (surgical gloves).
- disposable outer gloves.
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants.
- hard hat.
- face/splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection, engineering controls (i.e., Facing equipment away from the wind and placing site personnel upwind of drilling, active venting, etc.) will be implemented before requiring the use of respiratory protection.

5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Air Monitoring Requirements

If site work is performed, air will be monitored for VOCs with a portable MiniRAE 3000 Photo Ionization Detector (PID), or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRAE Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry.
- during any work where a potential IDLH condition or flammable atmosphere could develop.
- work begins on another portion of the site.
- contaminants, other than those previously identified, have been discovered.
- each time a different task or activity is initiated.
- during boring, trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage is exceeded:

1. The SSO will be consulted immediately.
2. All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (e.g., from the exclusion zone).
3. Monitoring will be continued until intrusive work resumes.

5.3 Action Levels During Site Activities

Instrument readings will be taken in the breathing zone within the Site unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	• Continue with site drilling activities • Level D protection • Continue monitoring every 10 minutes
1-50 ppm Above Background, Sustained Reading	1-30%	• Continue with site drilling activities • Level D protection • Continue monitoring every 10 minutes
50-250 ppm Above Background, Sustained Reading	30-60%	• Continue with site drilling activities • Level D protection and employ engineering controls • Continue monitoring for organic vapors 200 ft downwind • Continuous monitoring for LEL

>250 ppm Above Background, Sustained Reading	>60%	• Discontinue drilling activities, unless PID is only action level exceeded • Employ engineering controls • Continuous monitoring for organic vapors 200 ft downwind.

Notes: Air monitoring will occur in the breathing zone 30 inches above the site grade.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right-hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less than 5 ppm (see Community Air Monitoring Plan).

6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site logbook.

Due to the dimensions of the Site and the work area, it is expected that an exclusion zone will not be required. All onsite workers during drilling activities must provide evidence of OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer, if provided.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

7.2 Emergency Telephone Numbers

General Emergencies	911
Fire Department	911
NYC Health + Hospitals/Coney Island	(718) 616-3000
NYSDEC Spills Hotline	(800) 457-7362
National Response Center	(800) 424-8802
Poison Control	(800) 222-1222
Project Manager	(770) 331-7595
Sr. Project Manager	(347) 728-0768
Site Safety Officer	(646) 249-6129
Field Staff Scientist	(347) 345-9075

7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall function as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection.
- Ensure that appropriate federal, state, and local agencies are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation.
- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel.
- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Bradley Moore, Project Manager (347) 345-9075
- Drumita Dmello, Site Safety Officer (646) 249-6129

7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport.

First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix E**) must be filled out for any injury.
A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix E**) and information on the chemical(s) to which they may have been exposed (**Appendix D**).

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use of firefighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel, and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police.
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.

- All property line and off-site air monitoring locations and results associated with vapor releases will be recorded in the site safety logbook.

APPENDIX A
SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc.…):_____

_____

_____

_____

_____

2. OTHER ISSUES (HASP changes, attendee comments, etc.…):_____

_____

_____

_____

_____

_____

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B
COVID-19 DISCLOSURE FORM

Declaration Form (COVID-19)

Due to COVID-19, we are asking all employees, sub-contractors and clients to sign a declaration prior to coming on to the Site: _____ for the Health and Safety of everyone involved.

Prior to coming to the Site, we ask that you review the questions below and make a declaration if your response to all the questions below are "No."

- Have you, or anyone whom you are sharing a residence with, been in contact with any person suffering or suspected to be suffering from COVID-19 in the last 14-days?
- Did you have any fever in the last 48-hours or do you have the respiratory symptoms (e.g., cough, runny nose, sore throat or breathing difficulty)?
- Have you travelled outside the U.S in the last 21-days?

If your response to any of the above questions is "Yes," then we regret to inform that you are not permitted to the Site at this time.

By signing below, it is your declaration that your responses to the above questions are "No," and that this declaration is true and accurate to the best of your knowledge.

Print Name	Signature	Date

DUE TO COVID-19 REGULATIONS: Everyone must wear a mask at all times and maintain social distancing.

DEBIDO A LAS REGULACIONES DE COVID-19: Todos deben usar una mascara en todo momento y mantener el distanciamiento social.

APPENDIX C

SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

_____

_____

_____

_____

Alternative Procedures: _____

_____

_____

_____

Required Changes in PPE: _____

_____

_____

_____

_____

_____ _____

Project Superintendent (signature) Date

_____ _____

Health and Safety Consultant (signature) Date

_____

Site Safety Officer (signature) Date

APPENDIX D
CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

1,2,4-TRIMETHYLBENZENE **ICSC: 1433**
Pseudocumene **June 2002**

CAS #: 95-63-6
UN #: 1993
EC Number: 202-436-9

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Flammable. Above 44°C explosive vapour/air mixtures may be formed.	NO open flames, NO sparks and NO smoking. Above 44°C use a closed system, ventilation and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	Use alcohol-resistant foam, dry powder, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

PREVENT GENERATION OF MISTS!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness. Dry skin.	Protective gloves.	Rinse skin with plenty of water or shower.
Eyes	Redness. Pain.	Wear safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	See Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations. Do NOT wash away into sewer. Do NOT let this chemical enter the environment.

STORAGE

Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: III

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1,2,4-TRIMETHYLBENZENE **ICSC: 1433**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers

Chemical dangers
Decomposes on burning. This produces toxic and irritating fumes. Reacts violently with strong oxidants. This generates fire and explosion hazard.

Formula: C_9H_{12}
Molecular mass: 120,2
Boiling point: 169°C
Melting point: -44°C
Relative density (water = 1): 0.88
Solubility in water: very poor
Relative vapour density (air = 1): 4.1
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01
Flash point: 44°C c.c.
Auto-ignition temperature: 500°C
Explosive limits, vol% in air: 0.9-6.4
Octanol/water partition coefficient as log Pow: 3.8

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking. Repeated or prolonged inhalation may cause effects on the lungs. This may result in chronic bronchitis. The substance may have effects on the central nervous system and blood. See Notes.

OCCUPATIONAL EXPOSURE LIMITS

EU-OEL: 100 mg/m^3, 20 ppm as TWA.
MAK: 100 mg/m^3, 20 ppm; peak limitation category: II(2); pregnancy risk group: C

ENVIRONMENT

The substance is toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish.

NOTES

Use of alcoholic beverages enhances the harmful effect.
Depending on the degree of exposure, periodic medical examination is suggested.
See ICSCs 1155, 1362 and 1389.
1,3,5-Trimethylbenzene (Mesitylene) is classified as a marine pollutant.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn, N; R: 10-20-36/37/38-51/53; S: (2)-26-61

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n-HEPTANE **ICSC: 0657**
Heptane **June 2015**

CAS #: 142-82-5
UN #: 1206
EC Number: 205-563-8

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	Use alcohol-resistant foam, dry powder, carbon dioxide, water spray. In case of fire: keep drums, etc., cool by spraying with water.

PREVENT GENERATION OF MISTS!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Incoordination. Dizziness. Weakness. Nausea. Drowsiness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness. Swelling. Pain.	Protective gloves.	Rinse and then wash skin with water and soap. Refer for medical attention if skin irritation occurs.
Eyes	Redness.	Wear safety goggles in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Aspiration hazard! Sore throat. Abdominal pain. Headache. Dizziness. Nausea. Vomiting. Unconsciousness.	Do not eat, drink, or smoke during work.	Rinse mouth. Give nothing to drink. Do NOT induce vomiting. Refer immediately for medical attention. See Notes.

SPILLAGE DISPOSAL

Remove all ignition sources. Consult an expert! Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Carefully collect remainder. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants. Store in an area without drain or sewer access. Provision to contain effluent from fire extinguishing.

PACKAGING

Marine pollutant.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Highly flammable liquid and vapour
May be fatal if swallowed and enters airways
Causes skin irritation
May cause drowsiness or dizziness
Very toxic to aquatic life with long lasting effects

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

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n-HEPTANE **ICSC: 0657**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
VOLATILE COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Reacts violently with strong oxidants. This generates fire and explosion hazard. Attacks many plastics.

Formula: C_7H_{16} / $CH_3(CH_2)_5CH_3$
Molecular mass: 100.2
Boiling point: 98.4°C
Melting point: -90.7°C
Density (at 20°C): 0.68 g/ml
Solubility in water, mg/l at 25°C: 2.2 (very poor)
Vapour pressure, kPa at 20°C: 4.6
Relative vapour density (air = 1): 3.5
Flash point: -7°C c.c.
Auto-ignition temperature: 220°C
Explosive limits, vol% in air: 0.8-6.7
Octanol/water partition coefficient as log Pow: 4.66

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and by ingestion.

Effects of short-term exposure
The substance is irritating to the skin. The vapour is irritating to the respiratory tract. If swallowed the substance easily enters the airways and could result in aspiration pneumonitis. The substance may cause effects on the central nervous system.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 400 ppm as TWA; 500 ppm as STEL.
MAK: 2100 mg/m^3, 500 ppm; peak limitation category: I(1); pregnancy risk group: D.
EU-OEL: 2085 mg/m^3, 500 ppm as TWA

ENVIRONMENT

The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. Bioaccumulation of this chemical may occur in fish. It is strongly advised not to let the chemical enter into the environment.

NOTES

The odour warning when the exposure limit value is exceeded is insufficient.
The symptoms of chemical pneumonitis do not become manifest until a few hours or even days have passed.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, Xn, N; R: 11-38-50/53-65-67; S: (2)-9-16-29-33-60-61-62; Note: C

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ISOPROPYL ALCOHOL
1-methylethanol
2-hydroxypropane
2-Propanol
Propan-2-ol
Isopropanol
Dimethylcarbinol

ICSC: 0554

July 2020

CAS #: 67-63-0
UN #: 1219
EC Number: 200-661-7

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive. Risk of explosion on contact with strong oxidants.	NO open flames, NO sparks and NO smoking. NO contact with strong oxidizing agents. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	Use water, powder, alcohol-resistant foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Sore throat. Cough. Headache. Dizziness. Drowsiness. Further see Ingestion.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin.	Protective gloves.	First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. See Notes.
Eyes	Redness. Pain. Blurred vision. Burns.	Wear safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	See Inhalation. Abdominal pain. Nausea. Vomiting. Ataxia. Convulsions. Laboured breathing. Low blood pressure. Cardiac dysrhythmia. Unconsciousness.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give nothing to drink. Refer for medical attention .

SPILLAGE DISPOSAL

Evacuate danger area! Consult an expert! Remove all ignition sources. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable non-plastic containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations. Wash away remainder with plenty of water.

STORAGE

Fireproof. Separated from strong oxidants. Cool. Well closed.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Highly flammable liquid and vapour
Causes serious eye irritation
May cause drowsiness or dizziness

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

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ISOPROPYL ALCOHOL **ICSC: 0554**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID.

Physical dangers
The vapour mixes well with air, explosive mixtures are easily formed.

Chemical dangers
Reacts with strong oxidants. This generates explosion hazard. Decomposes on heating. This produces irritating fumes and flammable and toxic gas. Attacks some plastics and rubber.

Formula: C_3H_8O / $CH_3CHOHCH_3$
Molecular mass: 60.1
Boiling point: 83°C
Melting point: -90°C
Relative density (water = 1): 0.79
Solubility in water: miscible
Vapour pressure, kPa at 20°C: 4.4
Relative vapour density (air = 1): 2.1
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.05
Flash point: 11.7°C c.c.
Auto-ignition temperature: 456°C
Explosive limits, vol% in air: 2-12
Octanol/water partition coefficient as log Pow: 0.05

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour.

Effects of short-term exposure
The substance is irritating to the eyes and respiratory tract. The substance may cause effects on the central nervous system. Exposure far above the OEL could cause unconsciousness.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dryness and cracking.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 200 ppm as TWA; 400 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued.
MAK: 500 mg/m^3, 200 ppm; peak limitation category: II(2); pregnancy risk group: C

ENVIRONMENT

Environmental effects of the substance have been adequately investigated, but no significant effects have been found.

NOTES

When large surface areas of skin and clothes are exposed to the pure substance the fire hazard is the main concern, for which rinsing first and then removing clothes is advised.

ADDITIONAL INFORMATION

EC Classification

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METHYL ISOBUTYL KETONE **ICSC: 0511**

MIBK
4-Methyl-2-pentanone
Isopropylacetone
Hexone

July 1997

CAS #: 108-10-1
UN #: 1245
EC Number: 203-550-1

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	Use powder, AFFF, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

PREVENT GENERATION OF MISTS!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Diarrhoea. Dizziness. Headache. Nausea. Sore throat. Unconsciousness. Vomiting. Weakness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness. Pain.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .
Eyes	Redness. Pain.	Wear safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Abdominal pain. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants. Well closed.

PACKAGING

Airtight.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

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METHYL ISOBUTYL KETONE **ICSC: 0511**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour mixes well with air, explosive mixtures are easily formed.

Chemical dangers
The substance can form explosive peroxides on exposure to air. Reacts violently with strong oxidants and strong reducing agents.

Formula: $C_6H_{12}O$ / $CH_3COCH_2CH(CH_3)_2$
Molecular mass: 100.2
Boiling point: 117-118°C
Melting point: -84.7°C
Relative density (water = 1): 0.80
Solubility in water, g/100ml at 20°C: 1.91
Vapour pressure, kPa at 20°C: 2.1
Relative vapour density (air = 1): 3.45
Flash point: 14°C c.c.
Auto-ignition temperature: 460°C
Explosive limits, vol% in air: 1.4-7.5
Octanol/water partition coefficient as log Pow: 1.38

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and by ingestion.

Effects of short-term exposure
The substance and the vapour are irritating to the eyes, skin and respiratory tract. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system at high concentrations. This may result in narcosis.

Inhalation risk
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dermatitis.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 20 ppm as TWA; 75 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued.
MAK: 83 mg/m^3, 20 ppm; peak limitation category: I(2); skin absorption (H); pregnancy risk group: C.
EU-OEL: 83 mg/m^3, 20 ppm as TWA; 208 mg/m^3, 50 ppm as STEL

ENVIRONMENT

NOTES

Check for peroxides prior to distillation; eliminate if found.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, Xn; R: 11-20-36/37-66; S: (2)-9-16-29; Note: 6

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METHYL CHLORIDE **ICSC: 0419**

Chloromethane

Monochloromethane **June 2015**

CAS #: 74-87-3
UN #: 1063
EC Number: 200-817-4

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Heating will cause rise in pressure with risk of bursting. Gas/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Use non-sparking handtools.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with water spray. In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.

STRICT HYGIENE!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Staggering gait. Dizziness. Headache. Nausea. Vomiting. Convulsions. Unconsciousness. See Notes.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	MAY BE ABSORBED! ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves. Protective clothing.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .
Eyes	See Skin.	Wear safety goggles, face shield or eye protection in combination with breathing protection.	
Ingestion			

SPILLAGE DISPOSAL

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. NEVER direct water jet on liquid.

STORAGE

Fireproof. Ventilation along the floor.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Extremely flammable gas
Contains gas under pressure; may explode if heated
Suspected of damaging fertility or the unborn child
May cause damage to central nervous system if inhaled
May cause damage to central nervous system through prolonged or repeated exposure if inhaled

Transportation
UN Classification
UN Hazard Class: 2.1

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METHYL CHLORIDE **ICSC: 0419**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUEFIED GAS.

Physical dangers
The gas is heavier than air and may travel along the ground; distant ignition possible. The gas is heavier than air and may accumulate in lowered spaces causing a deficiency of oxygen. See Notes.

Chemical dangers
Decomposes on burning. This produces toxic and corrosive fumes including hydrogen chloride and phosgene. Reacts violently with powdered aluminium, powdered zinc, aluminium trichloride and ethylene. This generates fire and explosion hazard. Attacks many metals in the presence of moisture.

Formula: CH_3Cl
Molecular mass: 50.5
Boiling point: -23.7°C
Melting point: -97°C
Relative density (water = 1): 0.91
Solubility in water, g/100ml at 25°C: 0.5
Vapour pressure, kPa at 25°C: 573
Relative vapour density (air = 1): 2.47
Flash point: Flammable gas
Auto-ignition temperature: 632°C
Explosive limits, vol% in air: 8.1-17.4
Octanol/water partition coefficient as log Pow: 0.91
Viscosity: 0.1834 cP at 20°C

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation and through the skin.

Effects of short-term exposure
The liquid may cause frostbite. The substance may cause effects on the central nervous system. Exposure far above the OEL could cause liver, cardiovascular system and kidney damage. Exposure could cause unconsciousness. Medical observation is indicated. The effects may be delayed.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure
The substance may have effects on the central nervous system. This may result in effects measured using behavioural tests. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 50 ppm as TWA; 100 ppm as STEL; (skin); A4 (not classifiable as a human carcinogen).
MAK: 21 mg/m^3, 10 ppm; peak limitation category: II(1); pregnancy risk group: D.
EU-OEL: 42 mg/m^3, 20 ppm as TWA

ENVIRONMENT

NOTES

Following intoxication patient should be observed carefully for 48 hours.
Check oxygen content before entering area.

ADDITIONAL INFORMATION

EC Classification
Symbol: F+, Xn; R: 12-40-48/20; S: (2)-9-16-33

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ETHYL ACETATE **ICSC: 0367**

Acetic acid, ethyl ester
Acetic ether

April 2014

CAS #: 141-78-6
UN #: 1173
EC Number: 205-500-4

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive. Heating will cause rise in pressure with risk of bursting.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Use non-sparking handtools. Do NOT use compressed air for filling, discharging, or handling.	Use alcohol-resistant foam, foam, powder, carbon dioxide, fine water spray. In case of fire: keep drums, etc., cool by spraying with water.

PREVENT GENERATION OF MISTS!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Sore throat. Cough. Headache. Drowsiness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness. Dry skin.	Protective gloves.	Rinse contaminated clothes (fire hazard) with plenty of water. Remove contaminated clothes. Rinse skin with plenty of water or shower.
Eyes	Redness.	Wear safety spectacles or eye protection in combination with breathing protection.	Rinse with plenty of water for several minutes (remove contact lenses if easily possible).
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Seek medical attention if you feel unwell.

SPILLAGE DISPOSAL

Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT wash away into sewer. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants, strong bases and strong acids.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Highly flammable liquid and vapour
May cause drowsiness or dizziness

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

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ETHYL ACETATE **ICSC: 0367**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air and may travel along the ground; distant ignition possible.

Chemical dangers
Reacts with strong oxidants. This generates fire and explosion hazard. Reacts violently with strong bases and strong acids. Attacks rubber and some forms of plastic.

Formula: $C_4H_8O_2$ / $CH_3COOC_2H_5$
Molecular mass: 88.1
Boiling point: 77°C
Melting point: -84°C
Relative density (water = 1): 0.9
Solubility in water, g/100ml at 20°C: 8.7 (poor)
Vapour pressure, kPa at 20°C: 10
Relative vapour density (air = 1): 3.0
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2
Flash point: -4°C c.c.
Auto-ignition temperature: 427°C
Explosive limits, vol% in air: 2.0-12.8
Octanol/water partition coefficient as log Pow: 0.73

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour.

Effects of short-term exposure
The substance is mildly irritating to the eyes and respiratory tract. The substance may cause effects on the central nervous system. Exposure far above the OEL could cause lowering of consciousness.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 400 ppm as TWA.
MAK: 750 mg/m^3, 200 ppm; peak limitation category: I(2); pregnancy risk group: C.
EU-OEL: 734 mg/m^3, 200 ppm as TWA; 1468 mg/m^3, 400 ppm as STEL

ENVIRONMENT

NOTES

Do NOT take working clothes home.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, Xi; R: 11-36-66-67; S: (2)-16-26-33

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METHYL METHACRYLATE **ICSC: 0300**

Methacrylic acid methyl ester
Methyl 2-methylpropenoate

November 2003

CAS #: 80-62-6
UN #: 1247
EC Number: 201-297-1

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	Use foam, powder, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

AVOID ALL CONTACT!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Shortness of breath. Sore throat.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Nausea. Vomiting. Abdominal pain.	Do not eat, drink, or smoke during work.	Rinse mouth. Give one or two glasses of water to drink. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: chemical protection suit and filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Remove all ignition sources. Do NOT wash away into sewer. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants, strong bases and strong acids. Cool. Keep in the dark. Keep in a well-ventilated room. Store only if stabilized.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

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METHYL METHACRYLATE **ICSC: 0300**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour mixes well with air, explosive mixtures are easily formed. Vapours are uninhibited and may polymerize, causing blockage of vents.

Chemical dangers
The substance may polymerize due to warming or due to heating, under the influence of light, polymerization catalysts and strong oxidants. This generates fire or explosion hazard. Reacts with strong acids and strong bases.

Formula: $CH_2C(CH_3)COOCH_3$ / $C_5H_8O_2$
Molecular mass: 100.1
Boiling point: 100.5°C
Melting point: -48°C
Relative density (water = 1): 0.94
Solubility in water, g/100ml at 20°C: 1.6
Vapour pressure, kPa at 20°C: 3.9
Relative vapour density (air = 1): 3.5
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Flash point: 10°C o.c.
Auto-ignition temperature: 421°C
Explosive limits, vol% in air: 1.7-12.5
Octanol/water partition coefficient as log Pow: 1.38

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract.

Inhalation risk
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the peripheral nervous system.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 50 ppm as TWA; 100 ppm as STEL; (SEN); A4 (not classifiable as a human carcinogen).
MAK: 210 mg/m^3, 50 ppm; peak limitation category: I(2); sensitization of skin (SH); pregnancy risk group: C.
EU-OEL: 50 ppm as TWA; 100 ppm as STEL

ENVIRONMENT

The substance is harmful to aquatic organisms.

NOTES

Usually contains hydroquinone, hydroquinone methyl ether and dimethyl t-butylphenol as inhibitors of polymerization.
An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.
Do NOT take working clothes home.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, Xi; R: 11-37/38-43; S: (2)-24-37-46; Note: D

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n-HEXANE **ICSC: 0279**
Hexyl hydride **April 2000**

CAS #: 110-54-3
UN #: 1208
EC Number: 203-777-6

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	Use powder, AFFF, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Dizziness. Drowsiness. Lethargy. Headache. Nausea. Weakness. Unconsciousness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness. Pain.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention .
Eyes	Redness. Pain.	Wear safety goggles, face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Abdominal pain. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Rest. Refer for medical attention .

SPILLAGE DISPOSAL

Consult an expert! Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Remove all ignition sources. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants. Well closed.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

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n-HEXANE **ICSC: 0279**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
VOLATILE COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air and may travel along the ground; distant ignition possible.

Chemical dangers
Reacts with strong oxidants. This generates fire and explosion hazard. Attacks some plastics, rubber and coatings.

Formula: C_6H_{14}
Molecular mass: 86.2
Boiling point: 69°C
Melting point: -95°C
Relative density (water = 1): 0.7
Solubility in water, g/100ml at 20°C: 0.0013
Vapour pressure, kPa at 20°C: 17
Relative vapour density (air = 1): 3.0
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3
Flash point: -22°C c.c.
Auto-ignition temperature: 225°C
Explosive limits, vol% in air: 1.1-7.5
Octanol/water partition coefficient as log Pow: 3.9

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and by ingestion.

Effects of short-term exposure
The substance is irritating to the skin. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure at high levels could cause lowering of consciousness.

Inhalation risk
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system and peripheral nervous system. This may result in polyneuropathy. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 50 ppm as TWA; (skin); BEI issued.
MAK: 180 mg/m^3, 50 ppm; peak limitation category: II(8); pregnancy risk group: C.
EU-OEL: 72 mg/m^3, 20 ppm as TWA

ENVIRONMENT

The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, Xn, N; R: 11-38-48/20-62-65-67-51/53; S: (2)-9-16-29-33-36/37-61-62

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ETHYLBENZENE **ICSC: 0268**

Ethylbenzol
Phenylethane
EB

November 2007

CAS #: 100-41-4
UN #: 1175
EC Number: 202-849-4

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	Use dry powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

PREVENT GENERATION OF MISTS!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Sore throat. Dizziness. Drowsiness. Headache.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Burning sensation in the throat and chest. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Collect leaking and spilled liquid in covered containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants. Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Highly flammable liquid and vapour
Harmful if inhaled
May be harmful if swallowed
Causes mild skin irritation
Causes eye irritation
Suspected of causing cancer
May cause respiratory irritation
May cause drowsiness and dizziness
May be harmful if swallowed and enters airways
Toxic to aquatic life

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

International Labour Organization
World Health Organization

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ETHYLBENZENE **ICSC: 0268**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH AROMATIC ODOUR.

Physical dangers
The vapour mixes well with air, explosive mixtures are easily formed.

Chemical dangers
Reacts with strong oxidants. Attacks plastics and rubber.

Formula: $C_8H_{10}/C_6H_5C_2H_5$
Molecular mass: 106.2
Boiling point: 136°C
Melting point: -95°C
Relative density (water = 1): 0.9
Solubility in water, g/100ml at 20°C: 0.015
Vapour pressure, kPa at 20°C: 0.9
Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 18°C c.c.
Auto-ignition temperature: 432°C
Explosive limits, vol% in air: 1.0-6.7
Octanol/water partition coefficient as log Pow: 3.1
Viscosity: 0.6 mm²/s at 25°C

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure above the OEL could cause lowering of consciousness.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans. The substance may have effects on the kidneys and liver. This may result in impaired functions.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 20 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued.
MAK: 88 mg/m^3, 20 ppm; peak limitation category: II(2); skin absorption (H); carcinogen category: 4; pregnancy risk group: C.
EU-OEL: 442 mg/m^3, 100 ppm as TWA; 884 mg/m^3, 200 ppm as STEL; (skin)

ENVIRONMENT

The substance is toxic to aquatic organisms. It is strongly advised not to let the chemical enter into the environment.

NOTES

The odour warning when the exposure limit value is exceeded is insufficient.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, Xn; R: 11-20; S: (2)-16-24/25-29

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1,2-DICHLOROETHANE **ICSC: 0250**

Ethylene dichloride
1,2-Ethylene dichloride
Ethane dichloride

April 2013

CAS #: 107-06-2
UN #: 1184
EC Number: 203-458-1

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Gives off irritating or toxic fumes (or gases) in a fire. Vapour/air mixtures are explosive. Heating will cause rise in pressure with risk of bursting.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling.	Use water spray, foam, powder, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Sore throat. Nausea. Vomiting. Cough. Headache. Dizziness. Drowsiness. Unconsciousness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Half-upright position. Administration of oxygen may be needed. Artificial respiration may be needed. Refer immediately for medical attention.
Skin	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer immediately for medical attention.
Eyes	Redness. Pain.	Wear safety goggles, face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	See Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer immediately for medical attention.

SPILLAGE DISPOSAL

Evacuate danger area! Consult an expert! Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Cool. Dry. Well closed. Store in an area without drain or sewer access.

PACKAGING

Unbreakable packaging.
Put breakable packaging into closed unbreakable container.
Do not transport with food and feedstuffs.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Highly flammable liquid and vapour
Harmful if swallowed
May be harmful in contact with skin
Toxic if inhaled
Causes skin and eye irritation
Suspected of causing cancer
Causes damage to lungs, liver and kidneys
May cause drowsiness or dizziness
May cause damage to liver and kidneys through prolonged or repeated exposure
Harmful to aquatic life

Transportation
UN Classification
UN Hazard Class: 3; UN Subsidiary Risks: 6.1; UN Pack Group: II

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1,2-DICHLOROETHANE **ICSC: 0250**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS VISCOUS LIQUID WITH CHARACTERISTIC ODOUR. TURNS DARK ON EXPOSURE TO AIR, MOISTURE AND LIGHT.

Physical dangers
The vapour is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Decomposes on heating and on burning. This produces toxic and corrosive fumes including hydrogen chloride (see ICSC 0163) and phosgene (see ICSC 0007). Reacts with alkali metals, powdered metals, ammonia, bases and strong oxidants. This generates fire and explosion hazard. Attacks many metals in the presence of water.

Formula: $ClCH_2CH_2Cl$ / $C_2H_4Cl_2$
Molecular mass: 98.96
Boiling point: 83.5°C
Melting point: -35.7°C
Relative density (water = 1): 1.2
Solubility in water, g/100ml: 0.87
Vapour pressure, kPa at 20°C: 8.7
Relative vapour density (air = 1): 3.42
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2
Flash point: 13°C c.c.
Auto-ignition temperature: 440°C
Explosive limits, vol% in air: 4.2-16
Octanol/water partition coefficient as log Pow: 1.48

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion.

Effects of short-term exposure
The vapour is irritating to the eyes, skin and respiratory tract. Inhalation may cause lung oedema. See Notes. The substance may cause effects on the kidneys and liver. This may result in impaired functions, liver damage and kidney damage. Exposure at high concentrations could cause lowering of consciousness and death. The effects may be delayed.

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys, resulting in impaired functions. This substance is possibly carcinogenic to humans.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 10 ppm as TWA; A4 (not classifiable as a human carcinogen).
MAK: skin absorption (H); carcinogen category: 2.
EU-OEL: 8.2 mg/m^3, 2 ppm as TWA; (skin)

ENVIRONMENT

The substance is harmful to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, T; R: 45-11-22-36/37/38; S: 53-45; Note: E

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p-XYLENE
para-Xylene
1,4-Dimethylbenzene
p-Xylol
paraxylene

ICSC: 0086

August 2002

CAS #: 106-42-3
UN #: 1307
EC Number: 203-396-5

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Flammable. Above 27°C explosive vapour/air mixtures may be formed.	NO open flames, NO sparks and NO smoking. Above 27°C use a closed system, ventilation and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	Use water spray, powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Dizziness. Drowsiness. Headache. Nausea.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Burning sensation. Abdominal pain. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants and strong acids.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: III

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p-XYLENE **ICSC: 0086**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Reacts with strong acids and strong oxidants.

Formula: $C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2
Boiling point: 138°C
Melting point: 13°C
Relative density (water = 1): 0.86
Solubility in water: none
Vapour pressure, kPa at 20°C: 0.9
Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 27°C c.c.
Auto-ignition temperature: 528°C
Explosive limits, vol% in air: 1.1-7.0
Octanol/water partition coefficient as log Pow: 3.15

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes and skin. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 100 ppm as TWA; 150 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued.
MAK: 220 mg/m^3, 50 ppm; peak limitation category: II(2); skin absorption (H); pregnancy risk group: D.
EU-OEL: 221 mg/m^3, 50 ppm as TWA; 442 mg/m^3, 100 ppm as STEL; (skin)

ENVIRONMENT

The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
The recommendations on this Card also apply to technical xylene.
See ICSCs 0084 and 0085.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn; R: 10-20/21-38; S: (2)-25; Note: C

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m-XYLENE **ICSC: 0085**

meta-Xylene
1,3-Dimethylbenzene
m-Xylol

August 2002

CAS #: 108-38-3
UN #: 1307
EC Number: 203-576-3

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Flammable. Above 27°C explosive vapour/air mixtures may be formed.	NO open flames, NO sparks and NO smoking. Above 27°C use a closed system, ventilation and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	Use water spray, powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

STRICT HYGIENE!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Dizziness. Drowsiness. Headache. Nausea.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Burning sensation. Abdominal pain. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants and strong acids.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: III

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m-XYLENE **ICSC: 0085**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Reacts with strong acids and strong oxidants.

Formula: $C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2
Boiling point: 139°C
Melting point: -48°C
Relative density (water = 1): 0.86
Solubility in water: none
Vapour pressure, kPa at 20°C: 0.8
Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 27°C c.c.
Auto-ignition temperature: 527°C
Explosive limits, vol% in air: 1.1-7.0
Octanol/water partition coefficient as log Pow: 3.20

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes and skin. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 100 ppm as TWA; A4 (not classifiable as a human carcinogen); BEI issued.
EU-OEL: 150 ppm as STEL; 221 mg/m^3, 50 ppm as TWA; 442 mg/m^3, 100 ppm as STEL; (skin).
MAK: 220 mg/m^3, 50 ppm; peak limitation category: II(2); skin absorption (H); pregnancy risk group: D

ENVIRONMENT

The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
The recommendations on this Card also apply to technical xylene.
See ICSCs 0084 and 0086.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn; R: 10-20/21-38; S: (2)-25; Note: C

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o-XYLENE **ICSC: 0084**

ortho-Xylene
1,2-Dimethylbenzene
o-Xylol

August 2002

CAS #: 95-47-6
UN #: 1307
EC Number: 202-422-2

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Flammable. Above 32°C explosive vapour/air mixtures may be formed.	NO open flames, NO sparks and NO smoking. Above 32°C use a closed system, ventilation and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	Use water spray, powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Dizziness. Drowsiness. Headache. Nausea.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Burning sensation. Abdominal pain. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants and strong acids.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: III

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o-XYLENE **ICSC: 0084**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Reacts with strong acids and strong oxidants.

Formula: $C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2
Boiling point: 144°C
Melting point: -25°C
Relative density (water = 1): 0.88
Solubility in water: none
Vapour pressure, kPa at 20°C: 0.7
Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 32°C c.c.
Auto-ignition temperature: 463°C
Explosive limits, vol% in air: 0.9-6.7
Octanol/water partition coefficient as log Pow: 3.12

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes and skin. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 100 ppm as TWA; 150 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued.
MAK: 220 mg/m^3, 50 ppm; peak limitation category: II(2); skin absorption (H); pregnancy risk group: D.
EU-OEL: 221 mg/m^3, 50 ppm as TWA; 442 mg/m^3, 100 ppm as STEL; (skin)

ENVIRONMENT

The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
The recommendations on this Card also apply to technical xylene.
See ICSCs 0085 and 0086.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn; R: 10-20/21-38; S: (2)-25; Note: C

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TETRACHLOROETHYLENE **ICSC: 0076**

PER
Ethylene Tetrachloride
PERC
Tetracap
1,1,2,2-tetrachloroethene
1,1,2,2-Tetrachloroethylene
Perchloroethylene
Tetrachloroethene

April 2013

CAS #: 127-18-4
UN #: 1897
EC Number: 204-825-9

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. Risk of fire and explosion on contact with metals. See Chemical Dangers.	NO open flames, NO sparks and NO smoking. NO contact with hot surfaces or finely divided metals. NO contact with metals. See Chemical Dangers	In case of fire in the surroundings, use appropriate extinguishing media.

STRICT HYGIENE! PREVENT GENERATION OF MISTS!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Dizziness. Headache. Drowsiness. Nausea. Unconsciousness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer immediately for medical attention.
Skin	Dry skin. Redness. Burning sensation.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Burning sensation. Pain.	Wear safety goggles or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Sore throat. Aspiration hazard! See Inhalation. Cardiac dysrhythmia. Respiratory arrest.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer immediately for medical attention.

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance and complete protective clothing. Ventilation. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Separated from metals, ignition sources and food and feedstuffs. See Chemical Dangers. Keep in the dark. Keep in a well-ventilated room. Dry. Cool.

PACKAGING

Do not transport with food and feedstuffs.
Marine pollutant.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

WARNING

Causes skin irritation
Suspected of causing cancer
May be harmful if swallowed and enters airways
May cause drowsiness or dizziness
Toxic to aquatic life with long lasting effects

Transportation
UN Classification
UN Hazard Class: 6.1; UN Pack Group: III

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TETRACHLOROETHYLENE **ICSC: 0076**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air and may accumulate in lowered spaces causing a deficiency of oxygen.

Chemical dangers
Decomposes on contact with hot surfaces or flames. This produces toxic and corrosive fumes of hydrogen chloride, phosgene and chlorine. Decomposes slowly on contact with moisture. This produces trichloroacetic acid and hydrochloric acid. Reacts violently with finely divided metals. This generates fire and explosion hazard.

Formula: C_2Cl_4 / $Cl_2C=CCl_2$
Molecular mass: 165.8
Boiling point: 121°C
Melting point: -22°C
Density (at 20°C): 1.62 g/cm³
Solubility in water, g/100ml at 20°C: 0.015
Vapour pressure, kPa at 20°C: 1.9
Relative vapour density (air = 1): 5.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Octanol/water partition coefficient as log Pow: 3.4
Auto-ignition temperature: > 650°C

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, by ingestion and through the skin.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract. If swallowed the substance may cause vomiting and could result in aspiration pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels could cause unconsciousness.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver, kidneys and central nervous system. This substance is probably carcinogenic to humans.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 25 ppm as TWA; 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued.
MAK: 69 mg/m^3, 10 ppm; peak limitation category: II(2); skin absorption (H); carcinogen category: 3; pregnancy risk group: C.
EU-OEL: 138 mg/m^3, 20 ppm as TWA; 275 mg/m^3, 40 ppm as STEL; (skin)

ENVIRONMENT

The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised not to let the chemical enter into the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
The odour warning when the exposure limit value is exceeded is insufficient.
Do NOT use in the vicinity of a fire or a hot surface, or during welding.
Use of alcoholic beverages enhances the harmful effect.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn, N; R: 40-51/53; S: (2)-23-36/37-61

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STYRENE **ICSC: 0073**

Vinylbenzene
Phenylethylene
Ethenylbenzene

April 2006

CAS #: 100-42-5
UN #: 2055
EC Number: 202-851-5

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Flammable. Gives off irritating or toxic fumes (or gases) in a fire. Above 31°C explosive vapour/air mixtures may be formed. See Notes.	NO open flames, NO sparks and NO smoking. Above 31°C use a closed system, ventilation and explosion-proof electrical equipment.	Use dry powder. Use foam. Use carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

STRICT HYGIENE!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Dizziness. Drowsiness. Headache. Nausea. Vomiting. Weakness. Unconsciousness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness. Pain.	Protective clothing. Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest.

SPILLAGE DISPOSAL

Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Collect leaking and spilled liquid in covered containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from incompatible materials. See Chemical Dangers. Cool. Keep in the dark. Store only if stabilized. Store in an area without drain or sewer access.

PACKAGING

Airtight.
Marine pollutant.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Flammable liquid and vapour
Harmful if inhaled
Causes skin and eye irritation
Suspected of causing cancer
Causes damage to the central nervous system and the liver through prolonged or repeated exposure
Toxic to aquatic life

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: III

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STYRENE **ICSC: 0073**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS-TO-YELLOW OILY LIQUID.

Physical dangers

Chemical dangers
The substance can form explosive peroxides. The substance may polymerize due to warming, under the influence of light, oxidants, oxygen and peroxides. This generates fire and explosion hazard. Reacts violently with strong acids and strong oxidants. This generates fire and explosion hazard. Attacks rubber, copper and copper alloys.

Formula: C_8H_8 / $C_6H_5CHCH_2$
Molecular mass: 104.2
Boiling point: 145°C
Melting point: -30.6°C
Relative density (water = 1): 0.91
Solubility in water, g/100ml at 20°C: 0.03
Vapour pressure, kPa at 20°C: 0.67
Relative vapour density (air = 1): 3.6
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 31°C c.c.
Auto-ignition temperature: 490°C
Explosive limits, vol% in air: 0.9-6.8
Octanol/water partition coefficient as log Pow: 3.0

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels could cause unconsciousness.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. This substance is possibly carcinogenic to humans. See Notes.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 10 ppm as TWA; 20 ppm as STEL; (OTO); A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued.
MAK: 86 mg/m^3, 20 ppm; peak limitation category: II(2); carcinogen category: 5; pregnancy risk group: C

ENVIRONMENT

The substance is toxic to aquatic organisms. It is strongly advised not to let the chemical enter into the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
Check for peroxides prior to distillation; eliminate if found.
Styrene monomer vapours are uninhibited and may form polymers in vents or flame arresters of storage tanks, resulting in blockage of vents.
Do NOT take working clothes home.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn; R: 10-20-36/38; S: (2)-23; Note: D

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DICHLOROMETHANE
Methylene chloride
DCM

ICSC: 0058
April 2017

CAS #: 75-09-2
UN #: 1593
EC Number: 200-838-9

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Flammable under specific conditions. See Notes. Gives off irritating or toxic fumes (or gases) in a fire. Explosive under specific conditions. See Notes. Heating will cause rise in pressure with risk of bursting. Risk of fire and explosion.	NO contact with incompatible substances. See Chemical Dangers. See Notes.	In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Administration of oxygen may be needed. Artificial respiration may be needed. Refer immediately for medical attention.
Skin	MAY BE ABSORBED! Dry skin. Redness. Burning sensation.	Protective gloves. Protective clothing.	Wear protective gloves when administering first aid. Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Pain. Redness.	Wear safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Abdominal pain. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Administration of oxygen may be needed. Refer immediately for medical attention.

SPILLAGE DISPOSAL

Evacuate danger area! Consult an expert! Personal protection: self-contained breathing apparatus. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Well closed. Cool. Ventilation along the floor.

PACKAGING

Do not transport with food and feedstuffs.
Unbreakable packaging.
Put breakable packaging into closed unbreakable container.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Harmful if swallowed
Fatal if inhaled
Causes skin and eye irritation
May cause drowsiness or dizziness
Causes damage to central nervous system, blood, liver, the heart and lungs
May be harmful if swallowed and enters airways
Causes damage to the central nervous system through prolonged or repeated exposure if inhaled
May cause cancer

Transportation
UN Classification
UN Hazard Class: 6.1; UN Pack Group: III

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International
Labour
Organization
World Health
Organization

European
Commission

DICHLOROMETHANE **ICSC: 0058**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
VERY VOLATILE COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Decomposes on heating or on burning and on contact with hot surfaces. This produces toxic and corrosive fumes including hydrogen chloride (see ICSC 0163), phosgene (see ICSC 0007) and carbon monoxide (see ICSC 0023). Reacts violently with strong oxidants, strong bases and metals such as aluminium powder and magnesium powder. This generates fire and explosion hazard. Attacks some forms of plastic, rubber and coatings.

Formula: CH_2Cl_2
Molecular mass: 84.9
Boiling point: 40°C
Melting point: -97°C
Relative density (water = 1): 1.3 (20°C)
Solubility in water, g/100ml at 20°C: 1.3 (moderate)
Vapour pressure, kPa at 20°C: 47.4
Relative vapour density (air = 1): 2.9
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.9
Auto-ignition temperature: 605°C
Explosive limits, vol% in air: 13-22
See Notes.
Octanol/water partition coefficient as log Pow: 1.25
Viscosity: 0.32 mm²/s at 20°C

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, by ingestion and through the skin.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract. If swallowed the substance may cause vomiting and could result in aspiration pneumonitis. The substance may cause effects on the central nervous system, blood, liver, heart and lungs. Exposure could cause carbon monoxide poisoning. This may result in impaired functions. Exposure at high concentrations could cause lowering of consciousness and death. The effects may be delayed.

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance may have effects on the central nervous system. This substance is probably carcinogenic to humans.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 50 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); (skin).
MAK: 180 mg/m^3, 50 ppm; peak limitation category: II(2); skin absorption (H); carcinogen category: 5; pregnancy risk group: B.
EU-OEL: 353 mg/m^3, 100 ppm as TWA; 706 mg/m^3, 200 ppm as STEL; (skin)

ENVIRONMENT

NOTES

Do NOT use in the vicinity of a fire or a hot surface, or during welding.
The odour warning when the exposure limit value is exceeded is insufficient.
Depending on the degree of exposure, periodic medical examination is suggested.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn; R: 40; S: (2)-23-24/25-36/37

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TRICHLOROFLUOROMETHANE **ICSC: 0047**

Trichloromonofluoromethane
Fluorotrichloromethane
CFC 11
R 11

July 2002

CAS #: 75-69-4

EC Number: 200-892-3

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water.

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Irregular heartbeat. Confusion. Drowsiness. Unconsciousness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	ON CONTACT WITH LIQUID: FROSTBITE. Dry skin.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .
Eyes	Redness. Pain.	Wear safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	CLASSIFICATION & LABELLING
Ventilation.	**According to UN GHS Criteria**
STORAGE	
Separated from incompatible materials. See Chemical Dangers. Cool.	**Transportation** **UN Classification**
PACKAGING	

International Labour Organization
World Health Organization

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TRICHLOROFLUOROMETHANE **ICSC: 0047**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS GAS OR HIGHLY VOLATILE LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The gas is heavier than air. The vapour is heavier than air and may accumulate in lowered spaces causing a deficiency of oxygen.

Chemical dangers
Decomposes on contact with hot surfaces or flames. This produces toxic and corrosive gases of hydrogen chloride (see ICSC 0163), phosgene (see ICSC 0007), hydrogen fluoride (see ICSC 0283) and carbonyl fluoride (see ICSC 0633). Reacts with powdered aluminium, powdered zinc, magnesium shavings, lithium shavings and granular barium.

Formula: CCl_3F
Molecular mass: 137.4
Boiling point: 24°C
Melting point: -111°C
Relative density (water = 1): 1.49
Solubility in water, g/100ml at 20°C: 0.1
Vapour pressure, kPa at 20°C: 89.0
Relative vapour density (air = 1): 4.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 4.4
Octanol/water partition coefficient as log Pow: 2.53

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
The liquid may cause frostbite. The substance may cause effects on the cardiovascular system and central nervous system. This may result in cardiac disorders and central nervous system depression. Exposure could cause lowering of consciousness. See Notes.

Inhalation risk
On loss of containment this substance can cause suffocation by lowering the oxygen content of the air in confined areas.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 1000 ppm as STEL; A4 (not classifiable as a human carcinogen).
MAK: 5700 mg/m^3, 1000 ppm; peak limitation category: II(2); pregnancy risk group: C

ENVIRONMENT

Avoid release to the environment because of its impact on the ozone layer.

NOTES

High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death.
Check oxygen content before entering area.
The occupational exposure limit value should not be exceeded during any part of the working exposure.
The odour warning when the exposure limit value is exceeded is insufficient.
Do NOT use in the vicinity of a fire or a hot surface, or during welding.
Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

ADDITIONAL INFORMATION

EC Classification

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CHLOROFORM **ICSC: 0027**

Trichloromethane
Methane trichloride
Formyl trichloride

November 2000

CAS #: 67-66-3
UN #: 1888
EC Number: 200-663-8

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible. See Notes. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water.

STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	Redness. Pain. Dry skin.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .
Eyes	Redness. Pain.	Wear face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Abdominal pain. Vomiting. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Give one or two glasses of water to drink. Rest. Refer for medical attention .

SPILLAGE DISPOSAL

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Ventilation along the floor.

PACKAGING

Unbreakable packaging.
Put breakable packaging into closed unbreakable container.
Do not transport with food and feedstuffs.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 6.1; UN Pack Group: III

International Labour Organization
World Health Organization

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CHLOROFORM **ICSC: 0027**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
VOLATILE COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air.

Chemical dangers
Decomposes on contact with hot surfaces or flames. This produces toxic and corrosive fumes of hydrogen chloride (see ICSC 0163), phosgene (see ICSC 0007) and chlorine (see ICSC 0126). Reacts violently with strong bases, strong oxidants and some metals such as aluminium, magnesium and zinc. This generates fire and explosion hazard. Attacks plastics, rubber and coatings.

Formula: $CHCl_3$
Molecular mass: 119.4
Boiling point: 62°C
Melting point: -64°C
Solubility in water, g/100ml at 20°C: 0.8
Vapour pressure, kPa at 20°C: 212
Relative vapour density (air = 1): 4.12
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.7
Octanol/water partition coefficient as log Pow: 1.97

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes. The substance may cause effects on the central nervous system, liver and kidneys. The effects may be delayed. Medical observation is indicated.

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the liver and kidneys. This substance is possibly carcinogenic to humans.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 10 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans).
MAK: 2.5 mg/m^3, 0.5 ppm; peak limitation category: II(2); skin absorption (H); carcinogen category: 4; pregnancy risk group: C.
EU-OEL: 10 mg/m^3, 2 ppm as TWA; (skin)

ENVIRONMENT

The substance is toxic to aquatic organisms.

NOTES

Turns combustible on addition of small amounts of a flammable substance or an increase in the oxygen content of the air.
Use of alcoholic beverages enhances the harmful effect.
Depending on the degree of exposure, periodic medical examination is suggested.
The odour warning when the exposure limit value is exceeded is insufficient.
Do NOT use in the vicinity of a fire or a hot surface, or during welding.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn; R: 22-38-40-48/20/22; S: (2)-36/37

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CARBON TETRACHLORIDE **ICSC: 0024**

Tetrachloromethane
Tetrachlorocarbon
Tetra

November 2000

CAS #: 56-23-5
UN #: 1846
EC Number: 200-262-8

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep drums, etc., cool by spraying with water.

AVOID ALL CONTACT!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Dizziness. Drowsiness. Headache. Nausea. Vomiting.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	MAY BE ABSORBED! Redness. Pain.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .
Eyes	Redness. Pain.	Wear face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Abdominal pain. Diarrhoea. Further see Inhalation.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give one or two glasses of water to drink. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in covered containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Separated from food and feedstuffs and metals. See Chemical Dangers. Ventilation along the floor. Cool.

PACKAGING

Unbreakable packaging.
Put breakable packaging into closed unbreakable container.
Do not transport with food and feedstuffs.
Marine pollutant.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 6.1; UN Pack Group: II

International Labour Organization
World Health Organization

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CARBON TETRACHLORIDE **ICSC: 0024**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
The vapour is heavier than air.

Chemical dangers
Decomposes on contact with hot surfaces or flames. This produces toxic and corrosive fumes of hydrogen chloride (see ICSC 0163), chlorine (see ICSC 0126) and phosgene (see ICSC 0007). Reacts with some metals such as aluminium, magnesium and zinc. This generates fire and explosion hazard.

Formula: CCl_4
Molecular mass: 153.8
Boiling point: 76.5°C
Melting point: -23°C
Relative density (water = 1): 1.59
Solubility in water, g/100ml at 20°C: 0.1 (poor)
Vapour pressure, kPa at 20°C: 12.2
Relative vapour density (air = 1): 5.3
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.5
Octanol/water partition coefficient as log Pow: 2.64

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes. The substance may cause effects on the liver, kidneys and central nervous system. This may result in unconsciousness. Medical observation is indicated.

Inhalation risk
A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
Repeated or prolonged contact with skin may cause dermatitis. This substance is possibly carcinogenic to humans.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 5 ppm as TWA; 10 ppm as STEL; (skin); A2 (suspected human carcinogen).
MAK: 3.2 mg/m^3, 0.5 ppm; peak limitation category: II(2); skin absorption (H); carcinogen category: 4; pregnancy risk group: C.
EU-OEL: 6.4 mg/m^3, 1 ppm as TWA; 32 mg/m^3, 5 ppm as STEL; (skin)

ENVIRONMENT

The substance is harmful to aquatic organisms. Avoid release to the environment because of its impact on the ozone layer.

NOTES

Use of alcoholic beverages enhances the harmful effect.
Depending on the degree of exposure, periodic medical examination is suggested.
The odour warning when the exposure limit value is exceeded is insufficient.
Do NOT use in the vicinity of a fire or a hot surface, or during welding.

ADDITIONAL INFORMATION

EC Classification
Symbol: T, N; R: 23/24/25-40-48/23-52/53-59; S: (1/2)-23-36/37-45-59-61

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CHRYSENE

ICSC: 1672

Peer-Review Status: 12.10.2006 Validated

Benzo[a]phenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene

CAS #: 218-01-9 RTECS #: GC0700000
UN #: 3077
EC #: 601-048-00-0
EINECS #: 205-923-4

Formula: $C_{18}H_{12}$
Molecular mass: 228.3

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE-FIGHTING
FIRE	Combustible.	NO open flames.	Use water spray, dry powder, foam, carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent deposition of dust.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
Inhalation		Use local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Wear safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.	EC Classification Symbol: T, N; R: 45-68-50/53; S: 53-45-60-61 UN Classification UN Hazard Class: 9; UN Pack Group: III GHS Classification Signal: Warning Suspected of causing cancer Very toxic to aquatic life Toxic to aquatic life with long lasting effects

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-90GM7-III.	Separated from strong oxidants. Store in an area without drain or sewer access. Provision to contain effluent from fire extinguishing.

IMPORTANT DATA

Physical State; Appearance COLOURLESS-TO-BEIGE CRYSTALS OR POWDER. Physical dangers Dust explosion possible if in powder or granular form, mixed with air. Chemical dangers Decomposes on burning. This produces toxic fumes. Reacts violently with strong oxidants. Occupational exposure limits TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006). MAK: Carcinogen category: 2; Skin absorption (H); (DFG 2007).	Routes of exposure The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion. Inhalation risk A harmful concentration of airborne particles can be reached quickly when dispersed. Effects of short-term exposure Effects of long-term or repeated exposure This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES	ENVIRONMENTAL DATA
Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm³ Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised not to let the chemical enter into the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
Do NOT take working clothes home.
This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures.
Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.
TLV Note: Exposure by all routes should be carefully controlled to levels as low as possible.

ADDITIONAL INFORMATION

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PERFLUOROOCTANOIC ACID **ICSC: 1613**

Pentadecafluorooctanoic acid
Pentadecafluoro-n-octanoic acid
Perfluorocaprylic acid
PFOA

April 2017

CAS #: 335-67-1
UN #: 3261
EC Number: 206-397-9

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. Risk of fire and explosion on contact with bases, oxidants or reducing agents.	NO contact with incompatible substances. See Chemical Dangers.	Use water spray, carbon dioxide, dry powder, foam.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Sore throat.	Use local exhaust or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
Skin	MAY BE ABSORBED! Redness. Pain.	Protective gloves. Protective clothing.	Wear protective gloves when administering first aid. Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety goggles or eye protection in combination with breathing protection if powder.	Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.
Ingestion	Abdominal pain. Nausea. Vomiting. Diarrhoea.	Do not eat, drink, or smoke during work.	Rinse mouth. Give one or two glasses of water to drink. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Sweep spilled substance into covered non-metallic containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

STORAGE

Store only in original container. Separated from food and feedstuffs and incompatible materials. See Chemical Dangers.

PACKAGING

Do not transport with food and feedstuffs.
Unbreakable packaging.
Put breakable packaging into closed unbreakable container.

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Harmful if swallowed
Toxic if inhaled
Causes serious eye irritation
May cause damage to immune system and liver through prolonged or repeated exposure
May damage fertility or the unborn child
May cause harm to breast-fed children
Suspected of causing cancer

Transportation
UN Classification
UN Hazard Class: 8; UN Pack Group: III

International Labour Organization
World Health Organization

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PERFLUOROOCTANOIC ACID **ICSC: 1613**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
WHITE POWDER WITH PUNGENT ODOUR.

Physical dangers
No data.

Chemical dangers
Decomposes on heating above 300°C . This produces toxic and corrosive gases including hydrogen fluoride (See ICSC 0283). The solution is a weak acid. Reacts with bases, oxidants and reducing agents. This produces flammable/explosive gas (hydrogen - see ICSC 0001). Attacks many metals.

Formula: $C_8HF_{15}O_2$
Molecular mass: 414.1
Boiling point: 189°C
Melting point: 52-54°C
Density: 1.79 g/cm³
Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.3

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract.

Inhalation risk
A harmful concentration of airborne particles can be reached quickly when dispersed.

Effects of long-term or repeated exposure
The substance may have effects on the liver and immune system. This substance is possibly carcinogenic to humans. May cause toxicity to human reproduction or development.

OCCUPATIONAL EXPOSURE LIMITS

MAK: (inhalable fraction): 0.005 mg/m^3; peak limitation category: II(8); skin absorption (H); carcinogen category: 4; pregnancy risk group: C

ENVIRONMENT

NOTES

ADDITIONAL INFORMATION

EC Classification
Symbol: T, Xn; R: 40-61-48/23-48/21/22-41-64; S: 53-45

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BENZO(k)FLUORANTHENE

ICSC: 0721

Peer-Review Status: 25.03.1999 Validated

Dibenzo(b,jk)fluorene
8,9-Benzofluoranthene
11,12-Benzofluoranthene

CAS #: 207-08-9 RTECS #: DF6350000
EC #: 601-036-00-5
EINECS #: 205-916-6

Formula: $C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE-FIGHTING
FIRE			In case of fire in the surroundings, use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
Inhalation		Use local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Wear safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention .

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations. Do NOT let this chemical enter the environment.	EC Classification Symbol: T, N; R: 45-50/53; S: 53-45-60-61 UN Classification GHS Classification

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

IMPORTANT DATA

Physical State; Appearance
YELLOW CRYSTALS.

Physical dangers

Chemical dangers
Upon heating, toxic fumes are formed. Decomposes on heating. This produces toxic fumes.

Occupational exposure limits
TLV (NOT-ESTABLISHED):.
MAK: Carcinogen category: 2; Germ cell mutagen group: 3A; Skin absorption (H); (DFG 2007).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of short-term exposure

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 480°C
Melting point: 217°C
Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.84

ENVIRONMENTAL DATA

This substance may be hazardous to the environment. Special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and fish.

NOTES

Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.
ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m³.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Card has been partly updated in October 2005.
See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

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BENZO(b)FLUORANTHENE

ICSC: 0720

Peer-Review Status: 25.03.1999 Validated

Benz(e)acephenanthrylene
2,3-Benzofluoroanthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene

CAS #: 205-99-2 RTECS #: CU1400000
EC #: 601-034-00-4
EINECS #: 205-911-9

Formula: $C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE-FIGHTING
FIRE			In case of fire in the surroundings, use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
Inhalation		Use local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Wear safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention .

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations. Do NOT let this chemical enter the environment.	EC Classification Symbol: T, N; R: 45-50/53; S: 53-45-60-61 UN Classification GHS Classification

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Well closed.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS CRYSTALS.

Physical dangers

Chemical dangers
Upon heating, toxic fumes are formed. Decomposes on heating. This produces toxic fumes.

Occupational exposure limits
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK: Carcinogen category: 2; Germ cell mutagen group: 3A; Skin absorption (H); (DFG 2007).

Routes of exposure
The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

Inhalation risk
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of short-term exposure

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans. May cause genetic damage in humans.

PHYSICAL PROPERTIES

Boiling point: 481°C
Melting point: 168°C
Solubility in water: none
Octanol/water partition coefficient as log Pow: 6.12

ENVIRONMENTAL DATA

This substance may be hazardous to the environment. Special attention should be given to air quality and water quality.

NOTES

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.
ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m³.
TLV Note: Exposure by all routes should be carefully controlled to levels as low as possible.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

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DIBENZO(a,h)ANTHRACENE

ICSC: 0431

Peer-Review Status: 23.10.1995 Validated

1,2:5,6-Dibenzanthracene

CAS #: 53-70-3 RTECS #: HN2625000
EC #: 601-041-00-2
EINECS #: 200-181-8

Formula: $C_{22}H_{14}$
Molecular mass: 278.4

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE-FIGHTING
FIRE	Combustible.	NO open flames.	Use water spray, powder.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
Inhalation		Use local exhaust or breathing protection.	Fresh air, rest.
Skin	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness.	Wear face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

PACKAGING & LABELLING

EC Classification
Symbol: T, N; R: 45-50/53; S: 53-45-60-61
UN Classification

GHS Classification

EMERGENCY RESPONSE

SAFE STORAGE

Well closed.

IMPORTANT DATA

Physical State; Appearance
COLOURLESS CRYSTALLINE POWDER.

Routes of exposure
The substance can be absorbed into the body by inhalation,

Physical dangers	through the skin and by ingestion. Inhalation risk
Chemical dangers	Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
Occupational exposure limits TLV (NOT-ESTABLISHED):. MAK: Carcinogen category: 2; Germ cell mutagen group: 3A; Skin absorption (H); (DFG 2007).	Effects of short-term exposure Effects of long-term or repeated exposure The substance may have effects on the skin. This may result in photosensitization. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES	ENVIRONMENTAL DATA
Boiling point: 524°C Melting point: 267°C Relative density (water = 1): 1.28 Solubility in water: none Octanol/water partition coefficient as log Pow: 6.5	Bioaccumulation of this chemical may occur in seafood.

NOTES

This is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles.
However, it may be encountered as a laboratory chemical in its pure form.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Do NOT take working clothes home.
DBA is a commonly used name.
This substance is one of many polycyclic aromatic hydrocarbons (PAH).
Card has been partly updated in October 2005.
See section EU classification.

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BENZ(a)ANTHRACENE

ICSC: 0385

Peer-Review Status: 23.10.1995 Validated

1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene

CAS #: 56-55-3 RTECS #: CV9275000
EC #: 601-033-00-9
EINECS #: 200-280-6

Formula: $C_{18}H_{12}$
Molecular mass: 228.3

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE-FIGHTING
FIRE	Combustible.		Use water spray, powder. In case of fire in the surroundings, use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent deposition of dust.	
EXPOSURE		AVOID ALL CONTACT!	
Inhalation		Use local exhaust or breathing protection.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Wear safety goggles, face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	PACKAGING & LABELLING
Personal protection: complete protective clothing including self-contained breathing apparatus. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.	EC Classification Symbol: T, N; R: 45-50/53; S: 53-45-60-61 UN Classification GHS Classification

EMERGENCY RESPONSE	SAFE STORAGE
	Well closed.

IMPORTANT DATA

Physical State; Appearance COLOURLESS-TO-YELLOW-BROWN FLUORESCENT FLAKES OR POWDER. Physical dangers Dust explosion possible if in powder or granular form, mixed with air. Chemical dangers Occupational exposure limits TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2; Skin absorption (H); (DFG 2007).	Routes of exposure The substance can be absorbed into the body by inhalation, through the skin and by ingestion. Inhalation risk Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. Effects of short-term exposure Effects of long-term or repeated exposure This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES	ENVIRONMENTAL DATA
Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274 Solubility in water: none Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61	Bioaccumulation of this chemical may occur in seafood.

NOTES

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles.
However, it may be encountered as a laboratory chemical in its pure form.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Do NOT take working clothes home.
Tetraphene is a common name.
TLV Note: Exposure by all routes should be carefully controlled to levels as low as possible.

ADDITIONAL INFORMATION

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission
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BENZO(a)PYRENE

ICSC: 0104

Peer-Review Status: 11.04.2014 Validated

Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene

CAS #: 50-32-8 RTECS #: DJ3675000
UN #: 3077
EC #: 601-032-00-3
EINECS #: 200-028-5

Formula: $C_{20}H_{12}$
Molecular mass: 252.3

TYPES OF HAZARD / EXPOSURE	ACUTE HAZARDS / SYMPTOMS	PREVENTION	FIRST AID / FIRE-FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings, use appropriate extinguishing media.
EXPLOSION			
EXPOSURE	See Notes.	AVOID ALL CONTACT! PREVENT DISPERSION OF DUST!	
Inhalation		Use closed system and ventilation.	Fresh air, rest.
Skin		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes		Wear safety spectacles or eye protection in combination with breathing protection.	Rinse with plenty of water (remove contact lenses if easily possible).
Ingestion		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Sweep spilled substance into covered sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

PACKAGING & LABELLING

Marine pollutant.
EC Classification
Symbol: T, N; R: 45-46-60-61-43-50/53; S: 53-45-60-61
UN Classification
UN Hazard Class: 9; UN Pack Group: III
GHS Classification
Signal: Danger
May cause an allergic skin reaction
May cause cancer
May cause genetic defects
May damage fertility or the unborn child
Very toxic to aquatic life with long lasting effects

EMERGENCY RESPONSE	SAFE STORAGE
	Provision to contain effluent from fire extinguishing. Separated from strong oxidants. Store in an area without drain or sewer access. Cool. Dry.

IMPORTANT DATA

Physical State; Appearance PALE YELLOW CRYSTALS. Physical dangers Chemical dangers Reacts with strong oxidants. Decomposes on heating. This produces toxic fumes. Occupational exposure limits TLV (Exposure by all routes should be carefully controlled to levels as low as possible): A2 (suspected human carcinogen); BEI issued; (ACGIH 2014). MAK: Carcinogen category: 2; Germ cell mutagen group: 2; Skin absorption (H); (DFG 2014).	Routes of exposure Exposure mainly occurs via inhalation. Inhalation risk A harmful concentration of airborne particles can be reached quickly when dispersed. Effects of short-term exposure See Notes. Effects of long-term or repeated exposure Repeated or prolonged contact may cause skin sensitization. This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. May cause toxicity to human reproduction or development.

PHYSICAL PROPERTIES	ENVIRONMENTAL DATA
Boiling point: 496°C Melting point: 178.1°C Density (at 20°C): 1.4 g/cm³ Solubility in water, g/100ml at 20°C: < 0.1 (poor) Vapour pressure at 20°C: negligible Octanol/water partition coefficient as log Pow: 6.04	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, plants and molluscs. The substance may cause long-term effects in the aquatic environment. It is strongly advised not to let the chemical enter into the environment.

NOTES

Do NOT take working clothes home.
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.
Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

IPCS
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o-XYLENE **ICSC: 0084**

ortho-Xylene
1,2-Dimethylbenzene
o-Xylol

August 2002

CAS #: 95-47-6
UN #: 1307
EINECS #: 202-422-2

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Flammable. Above 32°C explosive vapour/air mixtures may be formed.	NO open flames, NO sparks and NO smoking. Above 32°C use a closed system, ventilation and explosion-proof electrical equipment. Prevent build-up of electrostatic charges (e.g., by grounding).	Use water spray, powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Dizziness. Drowsiness. Headache. Nausea.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Burning sensation. Abdominal pain. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants and strong acids.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: III

International Labour Organization
World Health Organization

Prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.
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European Commission

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

Physical dangers
As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Reacts with strong acids and strong oxidants.

Formula: $C_6H_4(CH_3)_2$ / C_8H_{10}
Molecular mass: 106.2
Boiling point: 144°C
Melting point: -25°C
Relative density (water = 1): 0.88
Solubility in water: none
Vapour pressure, kPa at 20°C: 0.7
Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 32°C c.c.
Auto-ignition temperature: 463°C
Explosive limits, vol% in air: 0.9-6.7
Octanol/water partition coefficient as log Pow: 3.12

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes and skin. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 100 ppm as TWA; 150 ppm as STEL; A4 (not classifiable as a human carcinogen).
MAK: 440 mg/m^3, 100 ppm; peak limitation category: II(2); skin absorption (H); pregnancy risk group: D.
BEI issued.
EU-OEL: 221 mg/m^3, 50 ppm as TWA; 442 mg/m^3, 100 ppm as STEL; (skin)

ENVIRONMENT

The substance is toxic to aquatic organisms.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested.
The recommendations on this Card also apply to technical xylene.
See ICSCs 0085 and 0086.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn; R: 10-20/21-38; S: (2)-25; Note: C

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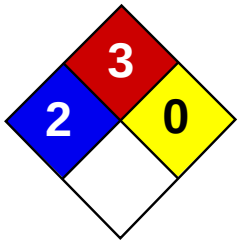

Health	2
Fire	3
Reactivity	0
Personal Protection	J

Material Safety Data Sheet
m-Xylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: m-Xylene

Catalog Codes: SLX1066

CAS#: 108-38-3

RTECS: ZE2275000

TSCA: TSCA 8(b) inventory: m-Xylene

CI#: Not applicable.

Synonym: m-Methyltoluene

Chemical Name: 1,3-Dimethylbenzene

Chemical Formula: C6H4(CH3)2

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{m-}Xylene	108-38-3	100

Toxicological Data on Ingredients: m-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit.].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, the nervous system, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 527°C (980.6°F)

Flash Points: CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

Flammable Limits: LOWER: 1.1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

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

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

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid, insoluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) TWA: 434 STEL: 651 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless.

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

Boiling Point: 139.3°C (282.7°F)

Melting Point: -47.87°C (-54.2°F)

Critical Temperature: Not available.

Specific Gravity: 0.86 (Water = 1)

Vapor Pressure: 6 mm of Hg (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.62 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:
Easily soluble in methanol, diethyl ether. Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:
Acute oral toxicity (LD50): 5000 mg/kg [Rat.]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit.].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, the nervous system, liver.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier. 0900 Detected in maternal milk in human. Narcotic effect; may cause nervous system disturbances.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

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

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Xylene : UN1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: m-Xylene Massachusetts RTK: m-Xylene TSCA 8(b) inventory: m-Xylene SARA 313 toxic chemical notification and release reporting: m-Xylene CERCLA: Hazardous substances.: m-Xylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R10- Flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: j

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du rÃ¨glement sur le transport des marchandises dangeureuses au canada. Centre de conformitÃ© internatinal LtÃ©e. 1986.

Other Special Considerations: Not available.

Created: 10/10/2005 08:33 PM

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

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ETHYLBENZENE **ICSC: 0268**

Ethylbenzol
Phenylethane
EB

November 2007

CAS #: 100-41-4
UN #: 1175
EINECS #: 202-849-4

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Highly flammable. Vapour/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	Use dry powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

PREVENT GENERATION OF MISTS!

	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Cough. Sore throat. Dizziness. Drowsiness. Headache.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
Eyes	Redness. Pain.	Wear safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion	Burning sensation in the throat and chest. Further see Inhalation.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

SPILLAGE DISPOSAL

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Ventilation. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Collect leaking and spilled liquid in covered containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

STORAGE

Fireproof. Separated from strong oxidants. Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.

PACKAGING

CLASSIFICATION & LABELLING

According to UN GHS Criteria

DANGER

Highly flammable liquid and vapour
Harmful if inhaled
May be harmful if swallowed
Causes mild skin irritation
Causes eye irritation
Suspected of causing cancer
May cause respiratory irritation
May cause drowsiness and dizziness
May be harmful if swallowed and enters airways
Toxic to aquatic life

Transportation
UN Classification
UN Hazard Class: 3; UN Pack Group: II

International Labour Organization
World Health Organization

Prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.
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European Commission

ETHYLBENZENE **ICSC: 0268**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS LIQUID WITH AROMATIC ODOUR.

Physical dangers
The vapour mixes well with air, explosive mixtures are easily formed.

Chemical dangers
Reacts with strong oxidants. Attacks plastics and rubber.

Formula: $C_8H_{10}/C_6H_5C_2H_5$
Molecular mass: 106.2
Boiling point: 136°C
Melting point: -95°C
Relative density (water = 1): 0.9
Solubility in water, g/100ml at 20°C: 0.015
Vapour pressure, kPa at 20°C: 0.9
Relative vapour density (air = 1): 3.7
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02
Flash point: 18°C c.c.
Auto-ignition temperature: 432°C
Explosive limits, vol% in air: 1.0-6.7
Octanol/water partition coefficient as log Pow: 3.1
Viscosity: 0.6 mm²/s at 25°C

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour and by ingestion.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure above the OEL could cause lowering of consciousness.

Inhalation risk
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

Effects of long-term or repeated exposure
This substance is possibly carcinogenic to humans. The substance may have effects on the kidneys and liver. This may result in impaired functions.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 20 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued.
MAK: 88 mg/m^3, 20 ppm; peak limitation category: II(2); skin absorption (H); carcinogen category: 4; pregnancy risk group: C.
EU-OEL: 442 mg/m^3, 100 ppm as TWA; 884 mg/m^3, 200 ppm as STEL; (skin)

ENVIRONMENT

The substance is toxic to aquatic organisms. It is strongly advised not to let the chemical enter into the environment.

NOTES

The odour warning when the exposure limit value is exceeded is insufficient.

ADDITIONAL INFORMATION

EC Classification
Symbol: F, Xn; R: 11-20; S: (2)-16-24/25-29

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 5.0 Revision Date 29.10.2012
Print Date 19.04.2017
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifiers

Product name : Arsenic

Product Number : 267961
Brand : Aldrich
Index-No. : 033-001-00-X
CAS-No. : 7440-38-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Israel Ltd.
3 PARK RABIN, PLAUT
7670603 REHOVOT
ISRAEL

Telephone : +972 8948-4222
Fax : +972 8948-4200

1.4 Emergency telephone number

Emergency Phone # : +972 (8) 948-4222

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP]
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)
Acute toxicity, Inhalation (Category 3)
Acute toxicity, Oral (Category 3)

Classification according to EU Directives 67/548/EEC or 1999/45/EC
Toxic by inhalation and if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008 [CLP]
Pictogram

Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H331 Toxic if inhaled.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273 Avoid release to the environment.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/

physician.

P311	Call a POISON CENTER or doctor/ physician.
P501	Dispose of contents/ container to an approved waste disposal plant.

Supplemental Hazard Statements: none

According to European Directive 67/548/EEC as amended.

Hazard symbol(s)

R-phrase(s)

R23/25	Toxic by inhalation and if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrase(s)

S20/21	When using do not eat, drink or smoke.
S28	After contact with skin, wash immediately with plenty of soap and water.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions/ Safety data sheets.

2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : As
Molecular Weight : 74,92 g/mol

Component	Concentration
Arsenic	
CAS-No. 7440-38-2 EC-No. 231-148-6 Index-No. 033-001-00-X	-

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Arsenic oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end uses
no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Immersion protection
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 480 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0,11 mm
Break through time: > 30 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 817 °C - lit.
f)	Initial boiling point and boiling range	613 °C - lit.
g)	Flash point	not applicable
h)	Evaporation rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	5,727 g/mL at 25 °C
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available

p)	Autoignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
no data available

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
Heat. Exposure to air may affect product quality.

10.5 Incompatible materials
Oxidizing agents, Halogens, Palladium undergoes a violent reaction with arsenic, Zinc, Platinum oxide, Nitrogen trichloride, Bromine azide

10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 763 mg/kg
Remarks: Behavioral:Ataxia. Diarrhoea

LD50 Oral - mouse - 145 mg/kg
Remarks: Behavioral:Ataxia. Diarrhoea

Inhalation: no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

IARC: 1 - Group 1: Carcinogenic to humans (Arsenic)

Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	Toxic if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer.

Additional Information
RTECS: CG0525000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 9,9 mg/l - 96,0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 3,8 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
no data available

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number
ADR/RID: 1558 IMDG: 1558 IATA: 1558

14.2 UN proper shipping name
ADR/RID: ARSENIC
IMDG: ARSENIC
IATA: Arsenic

14.3 Transport hazard class(es)

ADR/RID: 6.1	IMDG: 6.1	IATA: 6.1

14.4 Packaging group

ADR/RID: II	IMDG: II	IATA: II

14.5 Environmental hazards

ADR/RID: yes	IMDG Marine pollutant: yes	IATA: no

14.6 Special precautions for user

no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

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

no data available

15.2 Chemical Safety Assessment

no data available

16. OTHER INFORMATION

Further information

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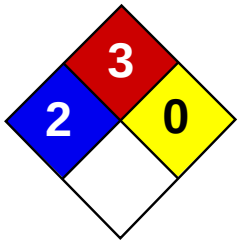
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Toluene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Toluene

Catalog Codes: SLT2857, SLT3277

CAS#: 108-88-3

RTECS: XS5250000

TSCA: TSCA 8(b) inventory: Toluene

CI#: Not available.

Synonym: Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

Chemical Name: Toluene

Chemical Formula: C6-H5-CH3 or C7-H8

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Toluene	108-88-3	100

Toxicological Data on Ingredients: Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

Section 3: Hazards Identification

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

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

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

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

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

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 480°C (896°F)

Flash Points: CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

Flammable Limits: LOWER: 1.1% UPPER: 7.1%

Products of Combustion: These products are carbon oxides (CO, CO2).

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

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

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N2O4; AgClO4; BrF3; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m3) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Sweet, pungent, Benzene-like.

Taste: Not available.

Molecular Weight: 92.14 g/mole

Color: Colorless.

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

Boiling Point: 110.6°C (231.1°F)

Melting Point: -95°C (-139°F)

Critical Temperature: 318.6°C (605.5°F)

Specific Gravity: 0.8636 (Water = 1)

Vapor Pressure: 3.8 kPa (@ 25°C)

Vapor Density: 3.1 (Air = 1)

Volatility: Not available.

Odor Threshold: 1.6 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.7

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

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

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

Special Remarks on Chronic Effects on Humans:
Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Cauess mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abraisons. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia,), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophostatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

BOD5 and COD: Not available.

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

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

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

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

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Toluene UNNA: 1294 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

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

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

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

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:30 PM

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

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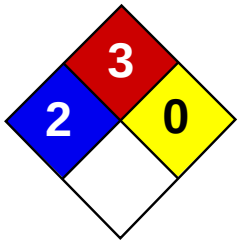

Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
p-Xylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: p-Xylene

Catalog Codes: SLX1120

CAS#: 106-42-3

RTECS: ZE2625000

TSCA: TSCA 8(b) inventory: p-Xylene

CI#: Not applicable.

Synonym: p-Methyltoluene

Chemical Name: 1,4-Dimethylbenzene

Chemical Formula: C6H4(CH3)2

Contact Information:

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

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

Order Online: ScienceLab.com

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

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

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

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{p-}Xylene	106-42-3	100

Toxicological Data on Ingredients: p-Xylene: ORAL (LD50): Acute: 5000 mg/kg [Rat.]. DERMAL (LD50): Acute: 12400 mg/kg [Rabbit.]. VAPOR (LC50): Acute: 4550 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant). Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to blood, kidneys, the nervous system, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 527°C (980.6°F)

Flash Points: CLOSED CUP: 25°C (77°F). OPEN CUP: 28.9°C (84°F) (Cleveland).

Flammable Limits: LOWER: 1.1% UPPER: 7%

Products of Combustion: These products are carbon oxides (CO, CO2).

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

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

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

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

Exposure Limits:
TWA: 100 STEL: 150 (ppm) from ACGIH (TLV) TWA: 434 STEL: 651 (mg/m3) from ACGIHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 106.17 g/mole

Color: Colorless.

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

Boiling Point: 138°C (280.4°F)

Melting Point: 12°C (53.6°F)

Critical Temperature: Not available.

Specific Gravity: 0.86 (Water = 1)

Vapor Pressure: 9 mm of Hg (@ 20°C)

Vapor Density: 3.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.62 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether.

Solubility:
Easily soluble in methanol, diethyl ether. Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 5000 mg/kg [Rat.]. Acute dermal toxicity (LD50): 12400 mg/kg [Rabbit.]. Acute toxicity of the vapor (LC50): 4550 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to blood, kidneys, the nervous system, liver.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
0347 Animal: embryotoxic, foetotoxic, passes through the placental barrier. 0900 Detected in maternal milk in human. Narcotic effect; may cause nervous system disturbances.

Special Remarks on other Toxic Effects on Humans: Material is irritating to mucous membranes and upper respiratory tract.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

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

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Class 3: Flammable liquid.

Identification: : Xylene : UN1307 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: p-Xylene Florida: p-Xylene Massachusetts RTK: p-Xylene New Jersey: p-Xylene TSCA 8(b) inventory: p-Xylene SARA 313 toxic chemical notification and release reporting: p-Xylene CERCLA: Hazardous substances.: p-Xylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R10- Flammable. R38- Irritating to skin. R41- Risk of serious damage to eyes. R48/20- Harmful: danger of serious damage to health by prolonged exposure through inhalation.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

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

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Material safety data sheet emitted by: la Commission de la SantÃ© et de la SÃ©curitÃ© du Travail du QuÃ©bec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du rÃ¨glement sur le transport des marchandises dangeureuses au canada. Centre de conformitÃ© internatinal LtÃ©e. 1986.

Other Special Considerations: Not available.

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Perfluoropentanoic acid

sc-250679

Material Safety Data Sheet

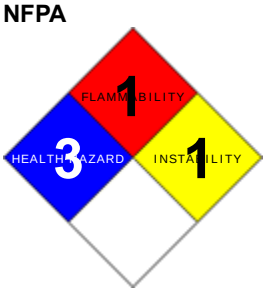
Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Perfluoropentanoic acid

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C5HF9O2, CF3(CF2)3CO2H

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	0		
Body Contact:	4		
Reactivity:	1		
Chronic:	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Causes severe burns.
Risk of serious damage to eyes.
Harmful to aquatic organisms.
Vapours potentially cause drowsiness and dizziness*.
Cumulative effects may result following exposure*.
Limited evidence of a carcinogenic effect*.
* (limited evidence).

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

! Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus.
Immediate pain and difficulties in swallowing and speaking may also be evident.
! The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion".
This is because of the lack of corroborating animal or human evidence.

EYE

! The material can produce severe chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.
! If applied to the eyes, this material causes severe eye damage.
! Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.
Mild burns of the epithelia generally recover rapidly and completely.

SKIN

! The material can produce severe chemical burns following direct contactwith the skin.
! Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.
! Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.
! Open cuts, abraded or irritated skin should not be exposed to this material.
! Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

! The material can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
! Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.
There may be dizziness, headache, nausea and weakness.
! Inhalation of vapours may cause drowsiness and dizziness.
This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.
! Inhalation hazard is increased at higher temperatures.
! The material has NOT been classified by EC Directives or other classification systems as "harmful by inhalation".
This is because of the lack of corroborating animal or human evidence.
! Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.

CHRONIC HEALTH EFFECTS

! Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Chronic exposure may inflame the skin or conjunctiva.
Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
Long chain PCFAs are present in the environment of most developed countries, and have the potential to adversely affect animal and human health. In tests on laboratory animals, one PFCA (perfluorooctanoic acid, PFOA) has been shown to cause tumours and damage the immune system, and cause moderate to high toxicity in the medium term if given by mouth. Because they are cleared more slowly and have more potential to accumulate in the body, longer chain PFCAs are expected to be of greater concern than PFOA.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
nonafluoropentanoic acid	2706-90-3	>98

Section 4 - FIRST AID MEASURES

SWALLOWED
- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE
If this product comes in contact with the eyes:
- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.

SKIN
If skin or hair contact occurs:
- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
- Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
- As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
- Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.

NOTES TO PHYSICIAN
! Treat symptomatically.
For acute or short term repeated exposures to strong acids:
- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not Available
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	1.713
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.

When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
- Heating may cause expansion or decomposition leading to violent rupture of containers.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO_2), hydrogen fluoride, other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.

RECOMMENDED STORAGE METHODS

- DO NOT use aluminium or galvanised containers
- Check regularly for spills and leaks
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

<.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m!	STEL ppm	STEL mg/m!	Peak ppm	Peak mg/m!	TWA F/CC	Notes
US ACGIH Threshold Limit Values (TLV)	nonafluoropentanoic acid (Fluorides, as F)		2.5						TLV® Basis: Bone dam; fluorosis ; BEI

PERSONAL PROTECTION

RESPIRATOR

- Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure
- Chemical goggles.whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted
- Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection.
- Alternatively a gas mask may replace splash goggles and face shields.

HANDS/FEET

- Elbow length PVC gloves
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity
- Neoprene gloves

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

ENGINEERING CONTROLS

! Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Does not mix with water.
Sinks in water.
Corrosive.
Acid.

State	LIQUID	Molecular Weight	264.05
Melting Range (°F)	Not available	Viscosity	Not Available
Boiling Range (°F)	284	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	None	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not Available
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	1.713
Lower Explosive Limit (%)	Not available	Relative Vapour Density (air=1)	>1
Volatile Component (%vol)	Not Available	Evaporation Rate	Not applicable

APPEARANCE

Liquid; does not mix well with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Contact with alkaline material liberates heat
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

STORAGE INCOMPATIBILITY

- Avoid strong bases.
- Segregate from alkalies, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.
- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

nonafluoropentanoic acid

TOXICITY AND IRRITATION

! Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound.
No significant acute toxicological data identified in literature search.

CARCINOGEN

Fluorides, as F	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4

Section 12 - ECOLOGICAL INFORMATION

Harmful to aquatic organisms.
This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
nonafluoropentanoic acid	HIGH	No Data Available	LOW	MED

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus
- Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	8
Identification Numbers:	UN3265	PG:	II
Label Codes:	8	Special provisions:	B2, IB2, T11, TP2, TP27
Packaging: Exceptions:	154	Packaging: Non-bulk:	202
Packaging: Exceptions:	154	Quantity limitations: Passenger aircraft/rail:	1 L
Quantity Limitations: Cargo aircraft only:	30 L	Vessel stowage: Location:	B
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:
Corrosive liquid, acidic, organic, n.o.s.

Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	None
UN/ID Number:	3265	Packing Group:	II
Special provisions:	A3		
Cargo Only			
Packing Instructions:	855	Maximum Qty/Pack:	30 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	851	Maximum Qty/Pack:	1 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y840	Maximum Qty/Pack:	0.5 L

Shipping name:CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(contains nonafluoropentanoic acid)

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	3265	Packing Group:	II
EMS Number:	F-A,S-B	Special provisions:	274
Limited Quantities:	1 L		

Shipping name:CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(contains nonafluoropentanoic acid)

Section 15 - REGULATORY INFORMATION

nonafluoropentanoic acid (CAS: 2706-90-3) is found on the following regulatory lists;
"Canada - Alberta Ambient Air Quality Guidelines","Canada - Alberta Ambient Air Quality Objectives","Canada - Prince Edward Island Occupational Exposure Limits","Canada List of Prohibited and Restricted Cosmetic Ingredients (The Cosmetic Ingredient ""Hotlist"")","Canada Non-Domestic Substances List (NDSL)","International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for Which Emissions Must Be Quantified","US - Georgia Primary Maximum Contaminant Levels for Drinking Water - Inorganics","US - Hawaii Air Contaminant Limits","US - Massachusetts Drinking Water - Inorganic Maximum Contaminant Levels (MCLs)","US - Massachusetts Drinking Water - Secondary Contaminants Maximum Contaminant Levels (MCLs)","US - North Dakota Air Pollutants - Guideline Concentrations","US - South Dakota Drinking Water Standards - Inorganic Chemicals","US - Utah Primary Drinking Water Standards - Inorganic Contaminants","US - Utah Secondary Drinking Water Standards - Inorganic Contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

! Cumulative effects may result following exposure*.
! Limited evidence of a carcinogenic effect*.
! Vapours potentially cause drowsiness and dizziness*.
* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes
nonafluoropentanoic acid	2706- 90- 3	Xn; R22

! Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

! The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

! For detailed advice on Personal Protective Equipment, refer to the following U.S. Regulations and Standards:
OSHA Standards - 29 CFR:
1910.132 - Personal Protective Equipment - General requirements
1910.133 - Eye and face protection
1910.134 - Respiratory Protection
1910.136 - Occupational foot protection
1910.138 - Hand Protection
Eye and face protection - ANSI Z87.1
Foot protection - ANSI Z41
Respirators must be NIOSH approved.

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www.Chemwatch.net

Issue Date: Jan-28-2009

Print Date:Mar-20-2012

Perfluorooctanesulfonic acid

Safety Data Sheet 6164308

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 12/10/2015 Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form	:	Substance
Substance name	:	Perfluorooctanesulfonic acid
CAS No	:	1763-23-1
Product code	:	6164-3-08
Formula	:	C8HF17O3S
Synonyms	:	1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8-Heptadecafluorooctane-1-sulfonic acid
Other means of identification	:	MFCD00042454

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Laboratory chemicals Manufacture of substances Scientific research and development

1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.
P.O. Box 309
Alachua, FL 32615 - United States of America
T (386) 462-0788 - F (386) 462-7097
info@synquestlabs.com - www.synquestlabs.com

1.4. Emergency telephone number

Emergency number	:	(844) 523-4086 (3E Company - Account 10069)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Acute Tox. 4 (Oral)	H302 -	Harmful if swallowed
Skin Corr. 1B	H314 -	Causes severe skin burns and eye damage
Eye Dam. 1	H318 -	Causes serious eye damage
STOT SE 3	H335 -	May cause respiratory irritation

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS05 GHS07

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) :
H302 - Harmful if swallowed
H314 - Causes severe skin burns and eye damage
H335 - May cause respiratory irritation

Precautionary statements (GHS-US) :
P260 - Do not breathe dust, mist, spray
P264 - Wash skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301+P312 - If swallowed: Call a POISON CENTER or doctor/ physician if you feel unwell
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/ physician
P321 - Specific treatment (see supplemental first aid instructions on this label)
P330 - Rinse mouth

P363 - Wash contaminated clothing before reuse
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container to an approved waste disposal plant

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type : Mono-constituent

Name	Product identifier	%	Classification (GHS-US)
Perfluorooctanesulfonic acid (Main constituent)	(CAS No) 1763-23-1	<= 100	Acute Tox. 4 (Oral), H302 Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.

First-aid measures after skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

Symptoms/injuries after inhalation : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Thermal decomposition generates: Carbon oxides. Hydrogen fluoride. Sulfur oxides.

5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area.

Protection during firefighting : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate unnecessary personnel. Ensure adequate air ventilation. Do not breathe dust.

6.1.1. For non-emergency personnel

Emergency procedures : Only qualified personnel equipped with suitable protective equipment may intervene.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Stop leak if safe to do so.
Methods for cleaning up	:	Sweep or shovel spills into appropriate container for disposal. Minimize generation of dust.
Other information	:	For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe dust, mist, spray. Wear personal protective equipment. Avoid contact with skin and eyes.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Comply with applicable regulations.
Storage conditions	:	Keep container closed when not in use. Hygroscopic. Keep contents under inert gas.
Incompatible materials	:	Refer to Section 10 on Incompatible Materials.
Storage area	:	Store in dry, cool, well-ventilated area.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls	:	Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Hand protection	:	Protective gloves. 29 CFR 1910.138: Hand Protection.
Eye protection	:	Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.
Skin and body protection	:	Wear suitable protective clothing.
Respiratory protection	:	In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection.
Other information	:	Safety shoes. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Color	:	No data available
Odor	:	No data available
Odor threshold	:	No data available
pH	:	No data available
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	145 °C (@ 10 mm Hg)
Flash point	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	No data available
Explosion limits	:	No data available
Explosive properties	:	No data available

Oxidizing properties	:	No data available
Vapor pressure	:	No data available
Relative density	:	1.25 (@ 25 °C)
Relative vapor density at 20 °C	:	No data available
Molecular mass	:	500.13 g/mol
Solubility	:	No data available
Log Pow	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Keep away from heat, sparks and flame.

10.5. Incompatible materials

Strong bases. Strong oxidizing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	:	Oral: Harmful if swallowed.
Skin corrosion/irritation	:	Causes severe skin burns and eye damage.
Serious eye damage/irritation	:	Causes serious eye damage.
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	May cause respiratory irritation.
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified
Symptoms/injuries after inhalation	:	Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.

Waste disposal recommendations : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Additional information : Recycle the material as far as possible.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN3261 Corrosive solid, acidic, organic, n.o.s., 8, II

UN-No.(DOT) : UN3261

Proper Shipping Name (DOT) : Corrosive solid, acidic, organic, n.o.s.

Transport hazard class(es) (DOT) : 8 - Class 8 - Corrosive material 49 CFR 173.136

Hazard labels (DOT) : 8 - Corrosive

Packing group (DOT) : II - Medium Danger

DOT Packaging Non Bulk (49 CFR 173.xxx) : 212

DOT Packaging Bulk (49 CFR 173.xxx) : 240

DOT Symbols : G - Identifies PSN requiring a technical name

DOT Special Provisions (49 CFR 172.102) : IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).
IP2 - When IBCs other than metal or rigid plastics IBCs are used, they must be offered for transportation in a closed freight container or a closed transport vehicle.
IP4 - Flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.
T3 - 2.65 178.274(d)(2) Normal..... 178.275(d)(2)
TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.

DOT Packaging Exceptions (49 CFR 173.xxx) : 154

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 15 kg

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 50 kg

DOT Vessel Stowage Location	:	B - (i) The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) ‘‘On deck only’’ on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
Other information	:	No supplementary information available.

TDG

No additional information available

Transport by sea

UN-No. (IMDG)	:	3261
Proper Shipping Name (IMDG)	:	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
Class (IMDG)	:	8 - Corrosive substances
Packing group (IMDG)	:	II - substances presenting medium danger

Air transport

UN-No. (IATA)	:	3261
Proper Shipping Name (IATA)	:	Corrosive solid, acidic, organic, n.o.s.
Class (IATA)	:	8 - Corrosives
Packing group (IATA)	:	II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Perfluorooctanesulfonic acid (1763-23-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
EPA TSCA Regulatory Flag	S - S - indicates a substance that is identified in a proposed or final Significant New Uses Rule.

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA

Perfluorooctanesulfonic acid (1763-23-1)
Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Perfluorooctanesulfonic acid (1763-23-1)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Japanese Pollutant Release and Transfer Register Law (PRTR Law) Listed on INSQ (Mexican national Inventory of Chemical Substances)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

SECTION 16: Other information

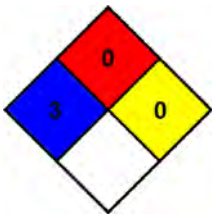
Full text of H-phrases:

Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Skin Corr. 1B	Skin corrosion/irritation Category 1B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H335	May cause respiratory irritation

NFPA health hazard : 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable or any damage resulting from handling or from contact with the above product.

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/23/2019 Version Number 2 Reviewed on 03/23/2019

*
1 Identification

· **Product identifier**

· **Trade name: Perfluorooctanoic Acid (PFOA)**

· **Part number:** N-1588
· **CAS Number:**
335-67-1
· **EC number:**
206-397-9
· **Index number:**
607-704-00-2
· **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA

· **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
· **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

*
2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.
Repr. 1B H360 May damage fertility or the unborn child.
STOT RE 1 H372 Causes damage to the liver through prolonged or repeated exposure.

GHS05 Corrosion

Eye Dam. 1 H318 Causes serious eye damage.

GHS07

Acute Tox. 4 H302 Harmful if swallowed.
Acute Tox. 4 H332 Harmful if inhaled.

· **Label elements**
· **GHS label elements** The substance is classified and labeled according to the Globally Harmonized System (GHS).

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/23/2019 Version Number 2 Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 1)

· **Hazard pictograms**

GHS05 GHS07 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
perfluorooctanoic acid (PFOA)
· **Hazard statements**
Harmful if swallowed or if inhaled.
Causes serious eye damage.
Suspected of causing cancer.
May damage fertility or the unborn child.
Causes damage to the liver through prolonged or repeated exposure.
· **Precautionary statements**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
If swallowed: Call a poison center/doctor if you feel unwell.
Rinse mouth.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Immediately call a poison center/doctor.
IF exposed or concerned: Get medical advice/attention.
Get medical advice/attention if you feel unwell.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**

Health = 3
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = *3
Fire = 0
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 2)

· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Substances**
· **CAS No. Description**
335-67-1 perfluorooctanoic acid (PFOA)
· **Identification number(s)**
· **EC number:** 206-397-9
· **Index number:** 607-704-00-2

4 First-aid measures

· **Description of first aid measures**
· **General information:**
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
· **After inhalation:**
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:** Generally the product does not irritate the skin.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Immediately call a doctor.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
· **Advice for firefighters**
· **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 3)

· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**
1.1 mg/m³

· **PAC-2:**
12 mg/m³

· **PAC-3:**
75 mg/m³

7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Thorough dedusting.
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
· **Information about protection against explosions and fires:** Keep respiratory protective device available.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Keep receptacle tightly sealed.
· **Specific end use(s)** No further relevant information available.

*
8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· **Breathing equipment:**
When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.
Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.

(Contd. on page 5)

(Contd. of page 4)

· **Protection of hands:**
Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.
· **Material of gloves**
For normal use: nitrile rubber, 11-13 mil thickness
For direct contact with the chemical: butyl rubber, 12-15 mil thickness
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
For normal use: nitrile rubber: 1 hour
For direct contact with the chemical: butyl rubber: >4 hours
· **Eye protection:**

Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Solid
Color:	Not determined.
· **Odor:**	Characteristic
· **Odor threshold:**	Not determined.
· **pH-value:**	Not applicable.
· **Change in condition**	
Melting point/Melting range:	55-56 °C (131-132.8 °F)
Boiling point/Boiling range:	190 °C (374 °F)
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Product is not flammable.
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure at 20 °C (68 °F):**	0.69 hPa (0.5 mm Hg)
· **Density at 20 °C (68 °F):**	0.9 g/cm³ (7.5105 lbs/gal)
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.

(Contd. on page 6)

(Contd. of page 5)

· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with Water at 20 °C (68 °F):**	3.4 g/l
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	100.0 %
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

ATE (Acute Toxicity Estimate)

Oral	LD50	500 mg/kg
Inhalative	LC50/4 h	1.5 mg/L

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** Strong irritant with the danger of severe eye injury.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**

2B

· **NTP (National Toxicology Program)**

Substance is not listed.

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Safety Data Sheet
acc. to OSHA HCS

Trade name: Perfluorooctanoic Acid (PFOA)

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· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 2 (Assessment by list): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Must not reach bodies of water or drainage ditch undiluted or unneutralized.
Danger to drinking water if even small quantities leak into the ground.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	
· **DOT, IMDG, IATA**	UN3261
· **UN proper shipping name**	
· **DOT**	Corrosive solid, acidic, organic, n.o.s. (perfluorooctanoic acid (PFOA))
· **IMDG, IATA**	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (perfluorooctanoic acid (PFOA))

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Safety Data Sheet
acc. to OSHA HCS

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 7)

· **Transport hazard class(es)**

· **IATA**

· **Class**	8 Corrosive substances
· **Label**	8
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Corrosive substances
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Quantity limitations**	On passenger aircraft/rail: 25 kg On cargo aircraft only: 100 kg
· **IMDG**	
· **Limited quantities (LQ)**	5 kg
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 g Maximum net quantity per outer packaging: 1000 g
· **UN "Model Regulation":**	UN 3261 CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (PERFLUOROOCTANOIC ACID (PFOA)), 8, III

15 Regulatory information

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

· **Sara**

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

· **Section 313 (Specific toxic chemical listings):**

Substance is not listed.

· **TSCA (Toxic Substances Control Act):**

Substance is listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**

Substance is not listed.

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Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 8)

· **Chemicals known to cause reproductive toxicity for males:**
Substance is not listed.

· **Chemicals known to cause developmental toxicity:**
Substance is listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**
Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**
Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
Substance is not listed.

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

*
16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· **Date of preparation / last revision** 03/23/2019 / 1

· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Acute Tox. 4: Acute toxicity – Category 4
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Carc. 2: Carcinogenicity – Category 2
Repr. 1B: Reproductive toxicity – Category 1B
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1

· *** Data compared to the previous version altered.**

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 13.02.2020 *Version number 1* *Revision: 13.02.2020*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Product name:** **1H,1H,2H,2H-Perfluorohexanesulfonic acid**

· **Part number:** DRE-C15986903
· **CAS Number:**
757124-72-4
· **EC number:**
816-391-3
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Reference material for laboratory use only

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**

LGC Limited
Queens Road
Teddington
Middlesex TW11 0LY
UNITED KINGDOM

Tel :+44 (0) 20 8943 7000
Fax :+44 (0) 20 8943 2767
eMail : gb@lgcstandards.com
Web : www.lgcstandards.com

· **Further information obtainable from:**
Product safety department
eMail : sds-request@lgcgroup.com
· **1.4 Emergency telephone number:**
For Hazardous Materials or Dangerous Goods Incident
Spill, Leak, Fire Exposure, or Accident
Call CHEMTREC:
USA & Canada 1-800-424-9300
Rest of the world +1 703-741-5970

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

GHS07

Acute Tox. 4 H302 Harmful if swallowed.
STOT SE 3 H335 May cause respiratory irritation.

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Safety data sheet
according to 1907/2006/EC, Article 31

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Product name: 1H,1H,2H,2H-Perfluorohexanesulfonic acid

(Contd. from page 1)

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The substance is classified and labelled according to the CLP regulation.
· **Hazard pictograms**

GHS05 GHS07

· **Signal word** Danger
· **Hazard statements**
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
· **Precautionary statements**
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· **3.1 Chemical characterisation: Substances**
· **CAS No. Description**
757124-72-4 1H,1H,2H,2H-Perfluorohexanesulfonic acid
· **Identification number(s)** None
· **EC number:** 816-391-3
· **RTECS:** -
· **Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· **4.1 Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.

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Safety data sheet
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Product name: 1H,1H,2H,2H-Perfluorohexanesulfonic acid

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Symptoms of poisoning may occur even after several hours; therefore medical observation for at least 48 hours after the accident is recommended.

· **After inhalation:** *Supply fresh air; consult doctor in case of complaints.*
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.
· **After eye contact:** *Rinse opened eye for several minutes under running water. Then consult a doctor.*
· **After swallowing:**
Rinse mouth. Do not induce vomiting.
Seek medical treatment.
· **4.2 Most important symptoms and effects, both acute and delayed** *No further relevant information available.*
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:** *Use fire extinguishing methods suitable for surrounding conditions.*
· **5.2 Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
· **5.3 Advice for firefighters**
· **Protective equipment:** *Wear self-contained respiratory protective device.*

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Avoid formation of dust.
· **6.2 Environmental precautions:** *Do not allow to enter sewers/ surface or ground water.*
· **6.3 Methods and material for containment and cleaning up:**
Use neutralising agent.
Dispose of contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling**
Remove dust thoroughly.
Store in cool, dry place in tightly closed receptacles.
· **Information about fire - and explosion protection:** *No special measures required.*

(Contd. on page 4)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 13.02.2020 *Version number 1* *Revision: 13.02.2020*

Product name: **1H,1H,2H,2H-Perfluorohexanesulfonic acid**

(Contd. from page 3)

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage:***
· ***Requirements to be met by storerooms and receptacles:***
Please refer to the manufacturer's certificate for specific storage and transport temperature conditions.
Store only in the original receptacle unless other advice is given on the CoA.
Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
· ***Information about storage in one common storage facility:*** *Store away from foodstuffs.*
· ***Further information about storage conditions:*** *Keep container tightly sealed.*
· ***7.3 Specific end use(s)*** *No further relevant information available.*

SECTION 8: Exposure controls/personal protection

· ***Additional information about design of technical facilities:*** *No further data; see item 7.*

· ***8.1 Control parameters***
· ***Ingredients with limit values that require monitoring at the workplace:*** *Not required.*
· ***Additional information:*** *Lists used were valid at the time of SDS preparation.*

· ***8.2 Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· ***Respiratory protection:***
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
· ***Protection of hands:***
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374

Protective gloves

· ***Material of gloves*** *Fluorocarbon rubber (Viton)*
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

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Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 13.02.2020 *Version number 1* *Revision: 13.02.2020*

***Product name:* 1H,1H,2H,2H-Perfluorohexanesulfonic acid**

(Contd. from page 4)

· ***Eye protection:***

Tightly sealed goggles

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***	
· ***General Information***	
· ***Appearance:***	
Form:	*Solid*
Colour:	*Off white*
· ***Odour:***	*Odourless*
· ***Odour threshold:***	*Not determined.*
· ***pH-value:***	*Not applicable.*
· ***Change in condition***	
Melting point/freezing point:	*Not determined.*
	Not determined.
Initial boiling point and boiling range:	*Not determined.*
· ***Flash point:***	*Not applicable.*
· ***Flammability (solid, gas):***	*Not determined.*
· ***Ignition temperature:***	*Not determined*
· ***Decomposition temperature:***	*Not determined.*
· ***Auto-ignition temperature:***	*Not determined.*
· ***Explosive properties:***	*Not determined.*
· ***Explosion limits:***	
Lower:	*Not determined.*
Upper:	*Not determined.*
· ***Vapour pressure:***	*Not applicable.*
· ***Density:***	*Not determined.*
· ***Relative density***	*Not determined.*
· ***Vapour density***	*Not applicable.*
· ***Evaporation rate***	*Not applicable.*
· ***Solubility in / Miscibility with water:***	*Not determined.*
· ***Partition coefficient: n-octanol/water:***	*Not determined.*

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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 13.02.2020 *Version number 1* *Revision: 13.02.2020*

Product name: 1H,1H,2H,2H-Perfluorohexanesulfonic acid

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· **Viscosity:**
Dynamic: Not applicable.
Kinematic: Not applicable.
· **9.2 Other information** No further relevant information available.

SECTION 10: Stability and reactivity

· **10.1 Reactivity**
Stable under normal conditions.
No further relevant information available.
· **10.2 Chemical stability** Stable under normal conditions.
· **Thermal decomposition / conditions to be avoided:**
Formation of toxic gases is possible during heating or in case of fire.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** Heat.
· **10.5 Incompatible materials:** Strong oxidizing agents.
· **10.6 Hazardous decomposition products:**
Formation of toxic gases is possible during heating or in case of fire.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if swallowed.
· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.
· **STOT-single exposure**
May cause respiratory irritation.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.

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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 13.02.2020 *Version number 1* *Revision: 13.02.2020*

Product name: 1H,1H,2H,2H-Perfluorohexanesulfonic acid

(Contd. from page 6)

· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
· **European waste catalogue**
Waste disposal key numbers from EWC have to be assigned depending on origin and processing.

· **Uncleaned packaging:**
· **Recommendation:** Dispose of in accordance with national regulations.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN3261
· **ADR**	3261 CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (1H,1H,2H,2H-Perfluorohexanesulfonic acid)
· **IMDG, IATA**	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (1H,1H,2H,2H-Perfluorohexanesulfonic acid)
· **14.3 Transport hazard class(es)**	
· **ADR, IMDG, IATA**	

· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	II
· **14.5 Environmental hazards:**	Not applicable.
· **14.6 Special precautions for user**	Warning: Corrosive substances.

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Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 13.02.2020 *Version number 1* *Revision: 13.02.2020*

Product name: 1H,1H,2H,2H-Perfluorohexanesulfonic acid

(Contd. from page 7)

· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	B
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	1 kg
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 g Maximum net quantity per outer packaging: 500 g
· **Transport category**	2
· **Tunnel restriction code**	E
· **UN "Model Regulation":**	UN 3261 CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (1H,1H,2H,2H-PERFLUOROHEXANESULFONIC ACID), 8, II

SECTION 15: Regulatory information

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

· **Directive 2012/18/EU**
· **Named dangerous substances - ANNEX I** Substance is not listed.
· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

The information in this safety data sheet (SDS) has been prepared with due care and is true and accurate to the best of our knowledge. The user must determine the suitability of the information for its particular purpose, ensure compliance with existing laws and regulations, and be aware that other or additional safety or performance considerations may arise when using, handling and/ or storing the material. The information in this SDS does not purport to be all inclusive or a guarantee as to the properties of the material supplied, and should be used only as a guide. LGC makes no warranties or representations as to the accuracy and completeness of the information contained herein, shall not be held responsible for the suitability of this information for the user's intended purposes or the consequences of such use, and shall not be liable for any damage or loss, howsoever arising, direct or otherwise.

· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)

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Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 13.02.2020 *Version number 1* *Revision: 13.02.2020*

Product name: **1H,1H,2H,2H-Perfluorohexanesulfonic acid**

(Contd. from page 8)

PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

· ***Sources***

Tables 3.1 and 3.2 from Annex 6 of EC 1272/2008, EC 1907/2006, EH40/2005 as amended 2011, Registry of Toxic Effects of Chemical Substances (RTECS), The Dictionary of Substances and their Effects, 1st Edition, IUCLID.

· ***Data compared to the previous version altered.*** *All sections have been updated.*

Perfluorohexanoic acid

Safety Data Sheet 2121339

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 11/18/2015 Revision date: 12/06/2018 Version: 1.1

SECTION 1: Identification

1.1. Identification

Product form	:	Substance
Substance name	:	Perfluorohexanoic acid
CAS No	:	307-24-4
Product code	:	2121-3-39
Formula	:	C6HF11O2
Synonyms	:	Undecafluorohexanoic acid
Other means of identification	:	2121-3-39

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Laboratory chemicals Manufacture of substances Scientific research and development

1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.
P.O. Box 309
Alachua, FL 32615 - United States of America
T (386) 462-0788 - F (386) 462-7097
info@synquestlabs.com - www.synquestlabs.com

1.4. Emergency telephone number

Emergency number	:	(844) 523-4086 (3E Company - Account 10069)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Skin Corr. 1B	H314 -	Causes severe skin burns and eye damage
Eye Dam. 1	H318 -	Causes serious eye damage
STOT SE 3	H335 -	May cause respiratory irritation

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS05 GHS07

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H314 - Causes severe skin burns and eye damage
H335 - May cause respiratory irritation

Precautionary statements (GHS-US) : P260 - Do not breathe fumes, mist, spray, vapors
P264 - Wash skin thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/ physician
P321 - Specific treatment (see supplemental first aid instructions on this label)
P363 - Wash contaminated clothing before reuse
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container to an approved waste disposal plant

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type : Mono-constituent

Name	Product identifier	%	Classification (GHS-US)
Perfluorohexanoic acid (Main constituent)	(CAS No) 307-24-4	<= 100	Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.

First-aid measures after skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

Symptoms/injuries after inhalation : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Thermal decomposition generates: Carbon oxides. Hydrogen fluoride.

Explosion hazard : Risk of explosion if heated under confinement. Use water spray or fog for cooling exposed containers.

5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection during firefighting : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

No additional information available

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Comply with applicable regulations.
Storage conditions	:	Keep container closed when not in use.
Incompatible materials	:	Refer to Section 10 on Incompatible Materials.
Storage area	:	Store in dry, cool, well-ventilated area.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls	:	Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Hand protection	:	Protective gloves. 29 CFR 1910.138: Hand Protection.
Eye protection	:	Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.
Skin and body protection	:	Wear suitable protective clothing.
Respiratory protection	:	In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection.
Other information	:	Safety shoes. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Appearance	:	Low melting solid.
Color	:	No data available
Odor	:	No data available
Odor threshold	:	No data available
pH	:	No data available
Melting point	:	12 - 14 °C
Freezing point	:	No data available
Boiling point	:	157 °C
Flash point	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability (solid, gas)	:	No data available
Explosion limits	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available
Vapor pressure	:	No data available
Relative density	:	No data available
Relative vapor density at 20 °C	:	No data available
Specific gravity / density	:	1.762 g/ml (@ 20 °C)
Molecular mass	:	314.05 g/mol

Solubility	:	No data available
Log Pow	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available

9.2. Other information

Refractive index : 1.298 (@ 20 °C)

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Bases. Oxidizing agents. Reducing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	:	Not classified
Skin corrosion/irritation	:	Causes severe skin burns and eye damage.
Serious eye damage/irritation	:	Causes serious eye damage.
Respiratory or skin sensitization	:	Not classified
Germ cell mutagenicity	:	Not classified
Carcinogenicity	:	Not classified
Reproductive toxicity	:	Not classified
Specific target organ toxicity (single exposure)	:	May cause respiratory irritation.
Specific target organ toxicity (repeated exposure)	:	Not classified
Aspiration hazard	:	Not classified
Symptoms/injuries after inhalation	:	Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.

Waste disposal recommendations : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Additional information : Recycle the material as far as possible.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN3265 Corrosive liquid, acidic, organic, n.o.s., 8, II

UN-No.(DOT) : UN3265

Proper Shipping Name (DOT) : Corrosive liquid, acidic, organic, n.o.s.

Transport hazard class(es) (DOT) : 8 - Class 8 - Corrosive material 49 CFR 173.136

Hazard labels (DOT) : 8 - Corrosive

Packing group (DOT) : II - Medium Danger

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202

DOT Packaging Bulk (49 CFR 173.xxx) : 242

DOT Symbols : G - Identifies PSN requiring a technical name

DOT Special Provisions (49 CFR 172.102) : B2 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized.
IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.
T11 - 6 178.274(d)(2) Normal..... 178.275(d)(3)
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.
TP27 - A portable tank having a minimum test pressure of 4 bar (400 kPa) may be used provided the calculated test pressure is 4 bar or less based on the MAWP of the hazardous material, as defined in 178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

DOT Packaging Exceptions (49 CFR 173.xxx) : 154

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 1 L

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 30 L

DOT Vessel Stowage Location : B - (i) The material may be stowed ''on deck'' or ''under deck'' on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) ''On deck only'' on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

DOT Vessel Stowage Other : 40 - Stow ''clear of living quarters''

Other information : No supplementary information available.

TDG

No additional information available

Transport by sea

UN-No. (IMDG)	:	3265
Proper Shipping Name (IMDG)	:	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Class (IMDG)	:	8 - Corrosive substances
Packing group (IMDG)	:	II - substances presenting medium danger

Air transport

UN-No. (IATA)	:	3265
Proper Shipping Name (IATA)	:	Corrosive liquid, acidic, organic, n.o.s.
Class (IATA)	:	8 - Corrosives
Packing group (IATA)	:	II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Perfluorohexanoic acid (307-24-4)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA

Perfluorohexanoic acid (307-24-4)
Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Perfluorohexanoic acid (307-24-4)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

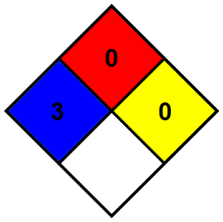
SECTION 16: Other information

Revision date : 12/06/2018

Full text of H-phrases:

Eye Dam. 1	Serious eye damage/eye irritation Category 1
Skin Corr. 1B	Skin corrosion/irritation Category 1B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H335	May cause respiratory irritation

NFPA health hazard	:	3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard	:	0 - Materials that will not burn.
NFPA reactivity	:	0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health	:	3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	:	0 Minimal Hazard - Materials that will not burn
Physical	:	0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable or any damage resulting from handling or from contact with the above product.

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 19.10.2020 *Version number 1* *Revision: 19.10.2020*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Product name:** **Perfluorobutanesulfonic acid**

· **Part number:** DRE-C15986515
· **CAS Number:**
375-73-5
· **EC number:**
206-793-1
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Reference material for laboratory use only

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**

LGC Limited
Queens Road
Teddington
Middlesex TW11 0LY
UNITED KINGDOM

Tel :+44 (0) 20 8943 7000
Fax :+44 (0) 20 8943 2767
eMail : gb@lgcstandards.com
Web : www.lgcstandards.com

· **Further information obtainable from:**
Product safety department
eMail : sds-request@lgcgroup.com
· **1.4 Emergency telephone number:**
For Hazardous Materials or Dangerous Goods Incident
Spill, Leak, Fire Exposure, or Accident
Call CHEMTREC:
USA & Canada 1-800-424-9300
Rest of the world +1 703-741-5970

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Met. Corr.1 H290 May be corrosive to metals.
Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

GHS07

Acute Tox. 4 H302 Harmful if swallowed.

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Product name: **Perfluorobutanesulfonic acid**

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· ***2.2 Label elements***
· ***Labelling according to Regulation (EC) No 1272/2008***
The substance is classified and labelled according to the CLP regulation.
· ***Hazard pictograms***

GHS05 GHS07

· ***Signal word*** *Danger*
· ***Hazard statements***
H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
· ***Precautionary statements***
P280 *Wear protective gloves/protective clothing/eye protection/face protection.*
P303+P361+P353 *IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].*
P305+P351+P338 *IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
P310 *Immediately call a POISON CENTER/doctor.*
P405 *Store locked up.*
P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*
· ***Additional information:***
EUH014 Reacts violently with water.
· ***2.3 Other hazards***
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*

SECTION 3: Composition/information on ingredients

· ***3.1 Chemical characterisation: Substances***
· ***CAS No. Description***
375-73-5 Perfluoro-1-butanesulfonic acid
· ***Identification number(s)*** *None*
· ***EC number:*** *206-793-1*
· ***RTECS:*** *EK5930000*
· ***Additional information:*** *For the wording of the listed hazard phrases refer to section 16.*

· ***SVHC***	
CAS: 375-73-5	*Perfluoro-1-butanesulfonic acid*

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SECTION 4: First aid measures

· ***4.1 Description of first aid measures***
· ***General information:***
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may occur even after several hours; therefore medical observation for at least 48 hours after the accident is recommended.
· ***After inhalation:*** *Supply fresh air; consult doctor in case of complaints.*
· ***After skin contact:***
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.
· ***After eye contact:*** *Rinse opened eye for several minutes under running water. Then consult a doctor.*
· ***After swallowing:***
Rinse mouth. Do not induce vomiting.
Seek medical treatment.
· ***4.2 Most important symptoms and effects, both acute and delayed*** *No further relevant information available.*
· ***4.3 Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***
· ***Suitable extinguishing agents:*** *Use fire extinguishing methods suitable for surrounding conditions.*
· ***For safety reasons unsuitable extinguishing agents:*** *Water*
· ***5.2 Special hazards arising from the substance or mixture***
Formation of toxic gases is possible during heating or in case of fire.
· ***5.3 Advice for firefighters***
· ***Protective equipment:*** *Wear self-contained respiratory protective device.*

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures***
Wear protective equipment. Keep unprotected persons away.
· ***6.2 Environmental precautions:*** *Do not allow to enter sewers/ surface or ground water.*
· ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose of contaminated material as waste according to item 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.

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See Section 13 for disposal information.

SECTION 7: Handling and storage

· **7.1 Precautions for safe handling** Store in cool, dry place in tightly closed receptacles.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Please refer to the manufacturer's certificate for specific storage and transport temperature conditions.
Store only in the original receptacle unless other advice is given on the CoA.
Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
· **Information about storage in one common storage facility:** Store away from foodstuffs.
· **Further information about storage conditions:**
Keep container tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
· **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**
· **Ingredients with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** Lists used were valid at the time of SDS preparation.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Not required.
Use suitable respiratory protective device in case of insufficient ventilation.
· **Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374

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Protective gloves

· ***Material of gloves*** *Fluorocarbon rubber (Viton)*
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· ***Eye protection:***

Tightly sealed goggles

SECTION 9: Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Liquid
Colour:	Colourless
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/freezing point:	-21 °C
Initial boiling point and boiling range:	198 °C
· **Flash point:**	177 °C
· **Flammability (solid, gas):**	Not determined.
· **Ignition temperature:**	649 °C
· **Decomposition temperature:**	Not determined.
· **Auto-ignition temperature:**	Not determined.
· **Explosive properties:**	Not determined.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure:**	Not determined.
· **Density at 20 °C:**	1.824 g/cm³
· **Relative density**	Not determined.

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· **Vapour density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	Acetonitrile (Slightly), DMSO (Slightly), Methanol (Slightly)
· **water at 20 °C:**	1000 g/l
· **Partition coefficient: n-octanol/water:**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **9.2 Other information**	No further relevant information available.

SECTION 10: Stability and reactivity

· **10.1 Reactivity**
Stable under normal conditions.
No further relevant information available.
· **10.2 Chemical stability** Stable under normal conditions.
· **Thermal decomposition / conditions to be avoided:**
Formation of toxic gases is possible during heating or in case of fire.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** Heat.
· **10.5 Incompatible materials:**
Strong oxidizing agents.
Metals.
· **10.6 Hazardous decomposition products:**
Formation of toxic gases is possible during heating or in case of fire.

SECTION 11: Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity**
Harmful if swallowed.

· **LD/LC50 values relevant for classification:**		
Oral	LD50	430 mg/kg (rat)

· **Primary irritant effect:**
· **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
· **Serious eye damage/irritation**
Causes serious eye damage.
· **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
· **CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
· **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
· **Carcinogenicity** Based on available data, the classification criteria are not met.
· **Reproductive toxicity** Based on available data, the classification criteria are not met.

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· **STOT-single exposure** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure** Based on available data, the classification criteria are not met.
· **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
· **European waste catalogue**
Waste disposal key numbers from EWC have to be assigned depending on origin and processing.

· **Uncleaned packaging:**
· **Recommendation:** Dispose of in accordance with national regulations.

SECTION 14: Transport information

· **14.1 UN-Number**	
· **ADR, IMDG, IATA**	UN3265
· **ADR**	3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Perfluoro-1-butanesulfonic acid)
· **IMDG, IATA**	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Perfluoro-1-butanesulfonic acid)

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· **14.3 Transport hazard class(es)**

· **ADR, IMDG, IATA**

· **Class**	8 Corrosive substances.
· **Label**	8
· **14.4 Packing group**	
· **ADR, IMDG, IATA**	II
· **14.5 Environmental hazards:**	Not applicable.
· **14.6 Special precautions for user**	Warning: Corrosive substances.
· **Danger code (Kemler):**	80
· **EMS Number:**	F-A,S-B
· **Segregation groups**	Acids
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **ADR**	
· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **Transport category**	2
· **Tunnel restriction code**	E
· **UN "Model Regulation":**	UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (PERFLUORO-1-BUTANESULFONIC ACID), 8, II

SECTION 15: Regulatory information

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

· **Directive 2012/18/EU**
· **Named dangerous substances - ANNEX I** Substance is not listed.
· **Seveso category** O1 Substances or mixtures with hazard statement EUH014
· **Qualifying quantity (tonnes) for the application of lower-tier requirements** 100 t
· **Qualifying quantity (tonnes) for the application of upper-tier requirements** 500 t
· **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3

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· ***National regulations:***

· ***Other regulations, limitations and prohibitive regulations***

· ***Substances of very high concern (SVHC) according to REACH, Article 57***	
CAS: 375-73-5	*Perfluoro-1-butanesulfonic acid*

· ***15.2 Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

SECTION 16: Other information

The information in this safety data sheet (SDS) has been prepared with due care and is true and accurate to the best of our knowledge. The user must determine the suitability of the information for its particular purpose, ensure compliance with existing laws and regulations, and be aware that other or additional safety or performance considerations may arise when using, handling and/ or storing the material. The information in this SDS does not purport to be all inclusive or a guarantee as to the properties of the material supplied, and should be used only as a guide. LGC makes no warranties or representations as to the accuracy and completeness of the information contained herein, shall not be held responsible for the suitability of this information for the user's intended purposes or the consequences of such use, and shall not be liable for any damage or loss, howsoever arising, direct or otherwise.

· ***Abbreviations and acronyms:***

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern
vPvB: very Persistent and very Bioaccumulative
Met. Corr.1: Corrosive to metals – Category 1
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

· ***Sources***

Tables 3.1 and 3.2 from Annex 6 of EC 1272/2008, EC 1907/2006, EH40/2005 as amended 2011, Registry of Toxic Effects of Chemical Substances (RTECS), The Dictionary of Substances and their Effects, 1st Edition, IUCLID.

· ***Data compared to the previous version altered.*** *All sections have been updated.*

Waters
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SAFETY DATA SHEET

Issuing Date 20-Dec-2016 **Revision Date** 20-Dec-2016 **Revision Number** 1

This safety data sheet was created pursuant to the requirements of 29 CFR 1910.1200

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name PFAS Drinking Water
Product Number 960
Synonyms None

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory use only
Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier Waters Corporation
Supplier Address 34 Maple St, Milford, MA 01757 USA
Non-Emergency Telephone Number +1-508-482-2000
E-mail address sdsinfo@waters.com

Emergency telephone number

Company Emergency Phone Number In case of EMERGENCY call CHEMTREC Day or Night
Within USA and Canada: 800-424-9300
International Call Collect: +1-703-527-3887

2. HAZARDS IDENTIFICATION

Classification

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

Acute toxicity - Oral	Category 3
Acute toxicity - Dermal	Category 3
Acute toxicity - Inhalation (Vapors)	Category 3
Acute toxicity - Inhalation (Dusts/Mists)	Category 3
Specific target organ toxicity (single exposure)	Category 1
Flammable Liquids	Category 2

GHS Label elements, including precautionary statements

Emergency Overview

Signal word **Danger**

Hazard Statements
Toxic if inhaled
Causes damage to organs
Highly flammable liquid and vapor

Appearance Clear, colorless **Physical state** Solid containing liquid **Odor** Alcohol

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ ventilating/ lighting/ equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool

Precautionary Statements - Response
IF exposed: Call a POISON CENTER or doctor/physician
Specific treatment (see supplemental first aid instructions on this label)

Skin
Call a POISON CENTER or doctor/physician if you feel unwell
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower

Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician

Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth

Fire
In case of fire: Use CO2, dry chemical, or foam for extinction

Precautionary Statements - Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable

Unknown Toxicity
0 % of the mixture consists of ingredient(s) of unknown toxicity

Other information

PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION

Interactions with Other Chemicals
Use of alcoholic beverages may enhance toxic effects.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Note: only the components contributing to the product's GHS hazard classification are listed in this section.

Chemical name	CAS No	weight-%
Methanol	67-56-1	99.3 - 100

4. FIRST AID MEASURES

First aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Seek immediate medical attention/advice. Remove contact lenses, if present and easy to do. Continue rinsing.

Skin contact Immediate medical attention is required. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

Inhalation Remove to fresh air.

Ingestion Do NOT induce vomiting. Rinse mouth immediately and drink plenty of water. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

Self-protection of the first aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Most important symptoms and effects, both acute and delayed

Most Important Symptoms and Effects Coughing and/ or wheezing. Difficulty in breathing.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Dry chemical. Carbon dioxide (CO2). Water spray. Alcohol resistant foam.

Unsuitable extinguishing media
CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical
No information available.

Uniform Fire Code	Highly Toxic: Liquid Flammable Liquid: I-B

Hazardous Combustion Products
Carbon oxides.

Explosion Data

Sensitivity to Mechanical Impact	No.
Sensitivity to Static Discharge	Yes.

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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material.

Environmental precautions

Environmental precautions	See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment	A vapor suppressing foam may be used to reduce vapors.
Methods for cleaning up	Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. In case of insufficient ventilation, wear suitable respiratory equipment. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Do not breathe vapor or mist. Use only with adequate ventilation and in closed systems. Use personal protection equipment. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Use grounding and bonding connection when transferring this material to prevent static discharge, fire or explosion. Use spark-proof tools and explosion-proof equipment. Keep in an area equipped with sprinklers. Use according to package label instructions.

Conditions for safe storage, including any incompatibilities

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Protect from moisture. Store away from other materials. Store locked up. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep in properly labeled containers. Do not store near combustible materials. Keep in an area equipped with sprinklers. Store in accordance with the particular national regulations. Store in accordance with local regulations.

Incompatible Products

None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Methanol 67-56-1	STEL: 250 ppm TWA: 200 ppm S*	TWA: 200 ppm TWA: 260 mg/m^3 (vacated) TWA: 200 ppm (vacated) TWA: 260 mg/m^3 (vacated) STEL: 250 ppm (vacated) STEL: 325 mg/m^3 (vacated) S*	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m^3 STEL: 250 ppm STEL: 325 mg/m^3

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits Immediately Dangerous to Life or Health

Other Exposure Guidelines

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992) See section 15 for national exposure control parameters

Appropriate engineering controls

Engineering Measures

Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face protection

No special protective equipment required.

Skin and body protection

Wear protective gloves and protective clothing. Long sleeved clothing. Chemical resistant apron. Impervious gloves. Antistatic boots.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. No information available. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. Do not breathe vapor or mist. Contaminated work clothing should not be allowed out of the workplace.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical state	Solid containing liquid		
Appearance	Clear, colorless	**Odor**	Alcohol
Color	No information available	**Odor Threshold**	No information available

Property	Values	Remarks Method
pH	UNKNOWN	
Melting / freezing point	no data available	None known
Boiling point / boiling range	> 37.7 °C / 99.9 °F	
Flash Point	< 22 C / 72 F	
Evaporation Rate	no data available	None known
Flammability (solid, gas)	no data available	None known
Flammability Limit in Air		
Upper flammability limit	no data available	
Lower flammability limit	no data available	
Vapor pressure	no data available	None known
Vapor density	no data available	None known
Specific Gravity	0.79	
Water Solubility	Soluble in water	
Solubility in other solvents	no data available	None known
Partition coefficient: n-octanol/water	no data available	None known
Autoignition temperature	no data available	None known
Decomposition temperature	no data available	None known
Kinematic viscosity	no data available	None known
Dynamic viscosity	no data available	None known
Explosive properties	no data available	
Oxidizing properties	no data available	

Other Information

Softening Point	no data available
VOC Content (%)	no data available
Particle Size	no data available
Particle Size Distribution	

10. STABILITY AND REACTIVITY

Reactivity

no data available.

Chemical stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
None under normal processing.

Hazardous Polymerization
Hazardous polymerization does not occur.

Conditions to avoid
Excessive heat. Heat, flames and sparks.

Incompatible materials
None known based on information supplied.

Hazardous Decomposition Products
Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information .

Inhalation Specific test data for the substance or mixture is not available. Toxic by inhalation. (based on components).

Eye contact Specific test data for the substance or mixture is not available.

Skin contact Specific test data for the substance or mixture is not available. Toxic in contact with skin. May be absorbed through the skin in harmful amounts. (based on components).

Ingestion Specific test data for the substance or mixture is not available. (based on components).

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Methanol 67-56-1	= 6200 mg/kg (Rat)	= 15800 mg/kg (Rabbit)	= 64000 ppm (Rat) 4 h = 22500 ppm (Rat) 8 h

Information on toxicological effects

Symptoms Coughing and/ or wheezing. Difficulty in breathing.

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

Sensitization No information available.

Carcinogenicity Contains no ingredient listed as a carcinogen.

Reproductive toxicity No information available.

STOT - single exposure Based on classification criteria from the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200), this product has been determined to cause systemic target organ toxicity from acute exposure. (STOT SE). If this product is a mixture, the classification is not based on toxicology studies for this product, but is based solely on toxicology studies for ingredients found within this product. Detailed substance and/or ingredient information may be provided in other sections of this SDS. Target organs effects listed in this document may result from a single overexposure to this product. Causes damage to organs if swallowed. Causes damage to organs in contact with skin.

STOT - repeated exposure No information available.

Chronic Toxicity Effects from this product caused by acute exposure may cause permanent damage to target organs and/or may cause chronic conditions.

Target Organ Effects Respiratory system. Systemic Toxicity.

Aspiration Hazard No information available.

Numerical measures of toxicity Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)
100.00 mg/kg
ATEmix (dermal)
300.00 mg/kg (ATE)
ATEmix (inhalation-dust/mist)
0.50 mg/L
ATEmix (inhalation-vapor)
3.00 ATEmix

12. ECOLOGICAL INFORMATION

Ecotoxicity
The environmental impact of this product has not been fully investigated.

Chemical name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Methanol 67-56-1		96h LC50: = 28200 mg/L (Pimephales promelas) 96h LC50: > 100 mg/L (Pimephales promelas) 96h LC50: 19500 - 20700 mg/L (Oncorhynchus mykiss) 96h LC50: 18 - 20 mL/L (Oncorhynchus mykiss) 96h LC50: 13500 - 17600 mg/L (Lepomis macrochirus)	EC50 = 39000 mg/L 25 min EC50 = 40000 mg/L 15 min EC50 = 43000 mg/L 5 min	

Persistence and Degradability
No information available.

Bioaccumulation

Chemical name	Log Pow
Methanol 67-56-1	-0.77

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal methods This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261).

Contaminated Packaging Dispose of contents/containers in accordance with local regulations.

US EPA Waste Number D001 U154

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical name	California Hazardous Waste
Methanol 67-56-1	Toxic Ignitable

14. TRANSPORT INFORMATION

Transportation classifications may vary depending on the quantity per package and may be influenced by regional or country variations in regulations.

DOT

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3
Packing Group	II
Description	UN1230, METHANOL, 3, II
Emergency Response Guide Number	131

TDG

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3, (6.1)
Subsidiary class	6.1
Packing Group	II
Description	UN1230, METHANOL, 3 (6.1), II

MEX

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3
Subsidiary class	6.1
Packing Group	II
Description	UN1230, METHANOL, 3 (6.1), II

ICAO

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3
Subsidiary class	6.1
Packing Group	II
Description	UN1230, METHANOL, 3 (6.1), II

IATA

UN-No.	UN1230
Proper Shipping Name	METHANOL

Hazard Class	3
Subsidiary class	6.1
Packing Group	II
Special Provisions	None
Description	UN1230, METHANOL, 3 (6.1), II

IMDG/IMO

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3
Subsidiary class	6.1
Packing Group	II
EmS-No.	F-E, S-D
Special Provisions	None
Marine Pollutant	Not applicable
Description	UN1230, METHANOL, 3 (6.1), II

RID

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3
Packing Group	II
Classification code	FT1
Special Provisions	None
Description	UN1230, METHANOL, 3 (6.1), II
ADR/RID-Labels	6.1

ADR

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3
Packing Group	II
Classification code	FT1
Tunnel restriction code	(D/E)
Special Provisions	None
Description	UN1230, METHANOL, 3 (6.1), II
ADR/RID-Labels	3 6.1

ADN

UN-No.	UN1230
Proper Shipping Name	METHANOL
Hazard Class	3
Packing Group	II
Classification code	FT1
Special Provisions	279, 802
Description	UN1230, METHANOL, 3 (6.1), II
Hazard Labels	3 + 6.1
Limited Quantity	1 L
Ventilation	VE01, VE02

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	All components are listed either on the DSL or NDSL.
IECSC	-

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	CAS No	weight-%	SARA 313 - Threshold Values %
Methanol - 67-56-1	67-56-1	99.3 - 100	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

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)

Chemical name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Methanol 67-56-1	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals.

Chemical name	California Proposition 65
Methanol - 67-56-1	Developmental

U.S. State Right-to-Know Regulations

.

Chemical name	New Jersey	Massachusetts	Pennsylvania	Rhode Island	Illinois
Methanol 67-56-1	X	X	X	X	X
Sodium Hydroxide 1310-73-2	X	X	X	X	

International Regulations

Mexico

National occupational exposure limits

Component	Carcinogen Status	Exposure Limits
Methanol 67-56-1 (99.3 - 100)		Mexico: TWA 200 ppm Mexico: TWA 260 mg/m^3 Mexico: STEL 250 ppm Mexico: STEL 310 mg/m^3

Mexico - Occupational Exposure Limits - Carcinogens

Canada

WHMIS Hazard Class

Not determined

16. OTHER INFORMATION

NFPA	**Health Hazards** 0	**Flammability** 3	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazards** 0	**Flammability** 3	**Physical Hazard** 0	**Personal Protection** X

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 20-Dec-2016
Revision Date 20-Dec-2016
Revision Note No information available

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

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End of Safety Data Sheet

SAFETY DATA SHEET

1. Identification

Product identifier	**Dieldrin**
Other means of identification	
Item	N-11688
CAS number	60-57-1
Synonyms	(1a.alpha.,2.beta.,2a.alpha.,3.beta.,6.beta.,6a.alpha .,7.beta.,7a.alpha.)-3,4,5,6,9,9-Hexachloro-1a,2,2a,3 ,6,6a,7,7a-octahydro-2,7 : 3,6-dimethanonaphth[2,3-b]oxirene
Recommended use	For Laboratory Use Only
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name	Chem Service, Inc.	
Address	660 Tower Lane West Chester, PA 19380 United States	
Telephone	Toll Free	800-452-9994
	Direct	610-692-3026
Website	www.chemservice.com	
E-mail	info@chemservice.com	
Emergency phone number	Chemtrec US	800-424-9300
	Chemtrec outside US	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 2
	Acute toxicity, dermal	Category 1
	Acute toxicity, inhalation	Category 1
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Carcinogenicity	Category 1B
	Reproductive toxicity	Category 1
	Specific target organ toxicity, repeated exposure	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1
	Hazardous to the aquatic environment, long-term hazard	Category 1
OSHA defined hazards	Not classified.	

Label elements

Signal word	Danger
Hazard statement	Fatal if swallowed. Fatal in contact with skin. Causes severe skin burns and eye damage. Causes serious eye damage. Fatal if inhaled. May cause cancer. May damage fertility or the unborn child. Causes damage to organs through prolonged or repeated exposure. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection.
Response	If swallowed: Immediately call a poison center/doctor. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Take off immediately all contaminated clothing and wash it before reuse. Collect spillage.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
Dieldrin	(1a.alpha.,2.beta.,2a.alpha.,3.beta.,6.beta.,6a.alpha.,7.beta.,7a.alpha.)-3,4,5,6,9,9-Hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-2,7 : 3,6-dimethanonaphth[2,3-b]oxirene	60-57-1	100

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms/effects, acute and delayed Convulsions. Headache. Dizziness. Nausea, vomiting. Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information Take off immediately all contaminated clothing. IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Discard any shoes or clothing items that cannot be decontaminated.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Use water spray to cool unopened containers.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe dust. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Prevent entry into waterways, sewer, basements or confined areas. Stop the flow of material, if this is without risk .

Large Spills: Wet down with water and dike for later disposal. Absorb in vermiculite, dry sand or earth and place into containers. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize dust generation and accumulation. Do not breathe dust. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid prolonged exposure. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store locked up. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
Dieldrin (CAS 60-57-1)	PEL	0.25 mg/m3

US. ACGIH Threshold Limit Values

Material	Type	Value	Form
Dieldrin (CAS 60-57-1)	TWA	0.1 mg/m3	Inhalable fraction and vapor.

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
Dieldrin (CAS 60-57-1)	TWA	0.25 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines

US - California OELs: Skin designation

Dieldrin (CAS 60-57-1) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Dieldrin (CAS 60-57-1)	Skin designation applies.

US - Tennessee OELs: Skin designation

Dieldrin (CAS 60-57-1)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Dieldrin (CAS 60-57-1)	Can be absorbed through the skin.

US NIOSH Pocket Guide to Chemical Hazards: Skin designation

Dieldrin (CAS 60-57-1)	Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Dieldrin (CAS 60-57-1)	Can be absorbed through the skin.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection Wear positive pressure self-contained breathing apparatus (SCBA).

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Solid.

Form Crystalline.

Color Colorless to light tan

Odor Not available.

Odor threshold Not available.

pH Not available.

Melting point/freezing point 347.9 °F (175.5 °C)

Initial boiling point and boiling range Not available.

Flash point Not available.

Evaporation rate Not available.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not available.

Flammability limit - upper (%) Not available.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure 0.000001 kPa (77 °F (25 °C))

Vapor density 13.2

Relative density Not available.

Solubility(ies)

Solubility (water) 0.2 mg/l

Partition coefficient (n-octanol/water)	5.4
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

Other information

Density	1.75 g/cm3
Explosive properties	Not explosive.
Molecular formula	C12-H8-Cl6-O
Molecular weight	380.91 g/mol
Oxidizing properties	Not oxidizing.
Specific gravity	1.75

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong acids. Strong oxidizing agents. Phenols.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Fatal if inhaled.
Skin contact	Fatal in contact with skin. Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Fatal if swallowed. Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	Convulsions. Headache. Dizziness. Nausea, vomiting. Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity	Fatal if inhaled. Fatal in contact with skin. Fatal if swallowed.
Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Dieldrin (CAS 60-57-1) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	May damage fertility or the unborn child.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard Not an aspiration hazard.

Chronic effects Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Product		Species	Test Results
Dieldrin (CAS 60-57-1)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.074 - 0.0854 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.001 - 0.0013 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)
5.4

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste P List: Reference

Dieldrin (CAS 60-57-1) P037

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN2811
UN proper shipping name Toxic solids, organic, n.o.s. (Dieldrin RQ = 1 LBS)
Transport hazard class(es)
Class 6.1(PGI, II)
Subsidiary risk -
Label(s) 6.1
Packing group II
Special precautions for user Read safety instructions, SDS and emergency procedures before handling.
Special provisions IB8, IP2, IP4, T3, TP33
Packaging exceptions 153
Packaging non bulk 212
Packaging bulk 242

IATA

UN number UN2811
UN proper shipping name Toxic solid, organic, n.o.s. (Dieldrin)
Transport hazard class(es)
Class 6.1(PGI, II)
Subsidiary risk -

Packing group	II
Environmental hazards	No.
ERG Code	6L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN2811
UN proper shipping name	TOXIC SOLID, ORGANIC, N.O.S. (Dieldrin)
Transport hazard class(es)	
Class	6.1(PGI, II)
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-A
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

DOT

IATA; IMDG

General information IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Dieldrin (CAS 60-57-1) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)
Hazardous substance
Priority pollutant
Bioaccumulative chemical of concern
Toxic pollutant

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Dieldrin (CAS 60-57-1) Listed: July 1, 1988

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 09-27-2014

Revision date 08-30-2019

Version # 02

NFPA ratings
Health: 4
Flammability: 0
Instability: 0

Disclaimer

Chem Service, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded SDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Safety Data Sheet (SDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an SDS for a solution or mixture the user should refer to the SDS for every component of the solution or mixture. Chem Service warrants that this SDS is based upon the most current information available to Chem Service at the time it was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. This SDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES.

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This product is furnished FOR LABORATORY USE ONLY.

Revision information

This document has undergone significant changes and should be reviewed in its entirety.

SAFETY DATA SHEET

CHEMSERVICE INC

1. Identification

Product identifier **Chlordane**

Other means of identification

Item N-11425

CAS number 12789-03-6

Recommended use Not available.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name Chem Service, Inc.

Address 660 Tower Lane
West Chester, PA 19380
United States

Telephone Toll Free 800-452-9994
Direct 610-692-3026

Website www.chemservice.com

E-mail info@chemservice.com

Emergency phone number Chemtrec US 800-424-9300
Chemtrec outside US +1 703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Acute toxicity, oral	Category 4
Acute toxicity, dermal	Category 4
Carcinogenicity	Category 2

Environmental hazards

Hazardous to the aquatic environment, acute hazard	Category 1
Hazardous to the aquatic environment, long-term hazard	Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Warning

Hazard statement Harmful if swallowed. Harmful in contact with skin. Suspected of causing cancer. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. If on skin: Wash with plenty of water. If exposed or concerned: Get medical advice/attention. Call a poison center/doctor if you feel unwell. Take off contaminated clothing and wash before reuse. Collect spillage.

Storage Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information 100% of the mixture consists of component(s) of unknown acute inhalation toxicity.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
Chlordane		12789-03-6	100

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical advice/attention if you feel unwell. Get medical attention if irritation develops and persists. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell.

Most important symptoms/effects, acute and delayed Direct contact with eyes may cause temporary irritation.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Move containers from fire area if you can do so without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not taste or swallow. Avoid contact with eyes, skin, and clothing. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits	This substance has no PEL, TLV, or other recommended exposure limit.
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Chemical respirator with organic vapor cartridge and full facepiece.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves.
Other	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
Respiratory protection	Chemical respirator with organic vapor cartridge and full facepiece.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Observe any medical surveillance requirements. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Liquid
Color	Amber
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	219.2 - 221 °F (104 - 105 °C) trans isomer 222.8 - 224.6 °F (106 - 107 °C) cis isomer
Initial boiling point and boiling range	347 °F (175 °C) at 1mm Hg
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	0.000001 kPa (77 °F (25 °C))
Vapor density	Not available.
Relative density	Not available.

Solubility(ies)

Solubility (water)	0.1 mg/l at 25 °C
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

Other information

Density	1.59 - 1.63 at 25 °C
Explosive properties	Not explosive.
Molecular formula	C10H6Cl8
Molecular weight	409.8
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected.
Skin contact	Harmful in contact with skin.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity	Harmful in contact with skin. Harmful if swallowed.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Product		Species	Test Results
Chlordane (CAS 12789-03-6)			
Aquatic			
Crustacea	EC50	Water flea (Simocephalus serrulatus)	0.012 - 0.032 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.0048 - 0.017 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN2810

UN proper shipping name Toxic, liquids, organic, n.o.s., MARINE POLLUTANT

Transport hazard class(es)

Class 6.1(PGIII)

Subsidiary risk -

Label(s) 6.1

Packing group III

Environmental hazards

Marine pollutant Yes

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Special provisions IB3, T7, TP1, TP28

Packaging exceptions 153

Packaging non bulk 203

Packaging bulk 241

IATA

UN number UN2810

UN proper shipping name Toxic liquid, organic, n.o.s.

Transport hazard class(es)

Class 6.1(PGIII)

Subsidiary risk -

Packing group III

Environmental hazards No.

ERG Code	6L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN2810
UN proper shipping name	TOXIC LIQUID, ORGANIC, N.O.S., MARINE POLLUTANT
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-A, S-A
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

DOT

IATA; IMDG

Marine pollutant

General information IMDG Regulated Marine Pollutant. DOT Regulated Marine Pollutant.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical

Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)

Priority pollutant
Bioaccumulative chemical of concern
Toxic pollutant

Safe Drinking Water Act (SDWA)

Not regulated.

US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 10-08-2014

Revision date 09-09-2019

Version # 04

NFPA ratings

Health: 2
Flammability: 0
Instability: 0

Disclaimer

Chem Service, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded SDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

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Revision information

Physical & Chemical Properties: Multiple Properties
GHS: Classification

SAFETY DATA SHEET

1. Identification

Product identifier **4,4'-DDT**

Other means of identification

Item N-10876

CAS number 50-29-3

Synonyms 1,1,1-TRICHLORO-2,2-BIS(4-CHLOROPHENYL)ETHANE * 4,4'-Dichlorodiphenyl trichloroethane

Recommended use For Laboratory Use Only

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name Chem Service, Inc.

Address 660 Tower Lane
West Chester, PA 19380
United States

Telephone Toll Free 800-452-9994
Direct 610-692-3026

Website www.chemservice.com

E-mail info@chemservice.com

Emergency phone number Chemtrec US 800-424-9300
Chemtrec outside US +1 703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Acute toxicity, oral	Category 3
Acute toxicity, dermal	Category 3
Carcinogenicity	Category 2
Specific target organ toxicity, repeated exposure	Category 1

Environmental hazards

Hazardous to the aquatic environment, acute hazard	Category 1
Hazardous to the aquatic environment, long-term hazard	Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Toxic if swallowed. Toxic in contact with skin. Suspected of causing cancer. Causes damage to organs through prolonged or repeated exposure. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Immediately call a poison center/doctor. Rinse mouth. If on skin: Wash with plenty of water. If exposed or concerned: Get medical advice/attention. Call a poison center/doctor if you feel unwell. Take off immediately all contaminated clothing and wash it before reuse. Collect spillage.

Storage	Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
4,4'-DDT	1,1,1-TRICHLORO-2,2-BIS(4-CHLOROPHENYL)ETHANE 4,4'-Dichlorodiphenyl trichloroethane	50-29-3	100

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Take off immediately all contaminated clothing. Wash off with soap and water. Get medical advice/attention if you feel unwell. Get medical attention if irritation develops and persists. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Most important symptoms/effects, acute and delayed	Convulsions. Headache. Dizziness. Nausea, vomiting. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Take off immediately all contaminated clothing. IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Water spray. Foam. Powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

The product is immiscible with water and will spread on the water surface. Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not taste or swallow. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
4,4'-DDT (CAS 50-29-3)	PEL	1 mg/m3

US. ACGIH Threshold Limit Values

Material	Type	Value
4,4'-DDT (CAS 50-29-3)	TWA	1 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
4,4'-DDT (CAS 50-29-3)	TWA	0.5 mg/m3

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

US - California OELs: Skin designation

4,4'-DDT (CAS 50-29-3) Can be absorbed through the skin.

US - Tennessee OELs: Skin designation

4,4'-DDT (CAS 50-29-3) Can be absorbed through the skin.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

4,4'-DDT (CAS 50-29-3) Can be absorbed through the skin.

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection

Wear appropriate chemical resistant gloves.

Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations	Observe any medical surveillance requirements. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Crystalline Solid
Color	Colorless
Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	227.3 °F (108.5 °C)
Initial boiling point and boiling range	500 °F (260 °C) 366.8 °F (186 °C) 0.006666 kPa
Flash point	162.0 - 171.0 °F (72.2 - 77.2 °C) Closed Cup
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	< 0.0000001 kPa (68 °F (20 °C))
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	6.91
Auto-ignition temperature	Not available.
Decomposition temperature	230 °F (110 °C)
Viscosity	Not available.
Other information	
Density	1.56 g/cm3 at 15 °C
Explosive properties	Not explosive.
Molecular formula	C14-H9-Cl5
Molecular weight	354.49 g/mol
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid temperatures exceeding the decomposition temperature. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation Prolonged inhalation may be harmful.

Skin contact Toxic in contact with skin.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion Toxic if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics Convulsions. Headache. Dizziness. Nausea, vomiting.

Information on toxicological effects

Acute toxicity Toxic in contact with skin. Toxic if swallowed.

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

4,4'-DDT (CAS 50-29-3) 2A Probably carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

4,4'-DDT (CAS 50-29-3) Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard Not an aspiration hazard.

Chronic effects Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Very toxic to aquatic life with long lasting effects.

Product		Species	Test Results
4,4'-DDT (CAS 50-29-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.0005 - 0.001 mg/l, 48 hours
Fish	LC50	Bluegill (Lepomis macrochirus)	0.0013 - 0.002 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)
6.91

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste U List: Reference

4,4'-DDT (CAS 50-29-3)	U061

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

UN number	UN2811
UN proper shipping name	Toxic solid, organic, n.o.s. (4,4'-DDT)
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	6L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN2811
UN proper shipping name	TOXIC SOLID, ORGANIC, N.O.S. (4,4'-DDT)
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-A
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

IATA; IMDG

General information	IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

4,4'-DDT (CAS 50-29-3) 0.1 % One-Time Export Notification only.

CERCLA Hazardous Substance List (40 CFR 302.4)

4,4'-DDT (CAS 50-29-3) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

4,4'-DDT (CAS 50-29-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130) Hazardous substance
Priority pollutant
Bioaccumulative chemical of concern
Toxic pollutant

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

4,4'-DDT (CAS 50-29-3) Listed: October 1, 1987

US - California Proposition 65 - CRT: Listed date/Developmental toxin

4,4'-DDT (CAS 50-29-3) Listed: May 15, 1998

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

4,4'-DDT (CAS 50-29-3) Listed: May 15, 1998

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

4,4'-DDT (CAS 50-29-3) Listed: May 15, 1998

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

4,4'-DDT (CAS 50-29-3)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 06-09-2014

Revision date 02-25-2020

Version # 02

NFPA ratings Health: 3
Flammability: 0
Instability: 0

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Revision information This document has undergone significant changes and should be reviewed in its entirety.

SAFETY DATA SHEET

1. Identification

Product identifier	**4,4'-DDE Solution**	
Other means of identification		
Item	S-10875M1	
Recommended use	Not available.	
Recommended restrictions	None known.	
Manufacturer/Importer/Supplier/Distributor information		
Manufacturer		
Company name	Chem Service, Inc.	
Address	660 Tower Lane West Chester, PA 19380 United States	
Telephone	Toll Free	800-452-9994
	Direct	610-692-3026
Website	www.chemservice.com	
E-mail	info@chemservice.com	
Emergency phone number	Chemtrec US	800-424-9300
	Chemtrec outside US	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 2
Health hazards	Acute toxicity, oral	Category 3
	Acute toxicity, dermal	Category 3
	Acute toxicity, inhalation	Category 3
	Serious eye damage/eye irritation	Category 2A
	Reproductive toxicity	Category 1
	Specific target organ toxicity, single exposure	Category 1
	Specific target organ toxicity, repeated exposure	Category 1
Environmental hazards	Not classified.	
OSHA defined hazards	Not classified.	

Label elements

Signal word	Danger
Hazard statement	Highly flammable liquid and vapor. Toxic if swallowed. Toxic in contact with skin. Causes serious eye irritation. Toxic if inhaled. May damage fertility or the unborn child. Causes damage to organs. Causes damage to organs through prolonged or repeated exposure.
Precautionary statement	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

Response	If swallowed: Immediately call a poison center/doctor. Rinse mouth. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center/doctor. If eye irritation persists: Get medical advice/attention. Take off immediately all contaminated clothing and wash it before reuse. In case of fire: Use appropriate media to extinguish.
Storage	Keep cool. Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment. Sparks may ignite liquid and vapor. May cause flash fire or explosion.
Supplemental information	99.99% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 99.99% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Methanol		67-56-1	99.99
4,4'-DDE		72-55-9	0.01

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a POISON CENTER or doctor/physician.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Get medical advice/attention if you feel unwell. Get medical attention if irritation develops and persists. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. If swallowed, induce vomiting immediately as directed by medical personnel. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Most important symptoms/effects, acute and delayed	Headache. Dizziness. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Take off immediately all contaminated clothing. IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Alcohol resistant foam. Carbon dioxide (CO2). Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. This product is a poor conductor of electricity and can become electrostatically charged. If sufficient charge is accumulated, ignition of flammable mixtures can occur. To reduce potential for static discharge, use proper bonding and grounding procedures. This liquid may accumulate static electricity when filling properly grounded containers. Static electricity accumulation may be significantly increased by the presence of small quantities of water or other contaminants. Material will float and may ignite on surface of water. During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Highly flammable liquid and vapor.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Use appropriate containment to avoid environmental contamination. Transfer by mechanical means such as vacuum truck to a salvage tank or other suitable container for recovery or safe disposal. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground. Use appropriate containment to avoid environmental contamination.

7. Handling and storage

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Minimize fire risks from flammable and combustible materials (including combustible dust and static accumulating liquids) or dangerous reactions with incompatible materials. Handling operations that can promote accumulation of static charges include but are not limited to: mixing, filtering, pumping at high flow rates, splash filling, creating mists or sprays, tank and container filling, tank cleaning, sampling, gauging, switch loading, vacuum truck operations. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not breathe mist or vapor. Do not taste or swallow. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Wash contaminated clothing before reuse. Observe good industrial hygiene practices. For additional information on equipment bonding and grounding, refer to the Canadian Electrical Code in Canada, (CSA C22.1), or the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity" or National Fire Protection Association (NFPA) 70, "National Electrical Code".
Conditions for safe storage, including any incompatibilities	Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Methanol (CAS 67-56-1)	PEL	260 mg/m3 200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Methanol (CAS 67-56-1)	STEL	250 ppm
	TWA	200 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Methanol (CAS 67-56-1)	STEL	325 mg/m3 250 ppm
	TWA	260 mg/m3 200 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Methanol (CAS 67-56-1)	15 mg/l	Methanol	Urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Methanol (CAS 67-56-1) Skin designation applies.

US - Tennessee OELs: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

US NIOSH Pocket Guide to Chemical Hazards: Skin designation

Methanol (CAS 67-56-1) Can be absorbed through the skin.

Appropriate engineering controls Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station. Eye wash fountain and emergency showers are recommended.

Individual protection measures, such as personal protective equipment

Eye/face protection Chemical respirator with organic vapor cartridge and full facepiece.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection Chemical respirator with organic vapor cartridge and full facepiece.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Observe any medical surveillance requirements. When using do not smoke. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid.

Color Not available.

Odor Not available.

Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	-144.04 °F (-97.8 °C) estimated
Initial boiling point and boiling range	148.46 °F (64.7 °C) estimated
Flash point	53.6 °F (12.0 °C) estimated
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	7.3 % estimated
Flammability limit - upper (%)	36 % estimated
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	169.3 hPa estimated
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	867.2 °F (464 °C) estimated
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	0.7865 g/cm3 estimated
Explosive properties	Not explosive.
Flammability class	Flammable IB estimated
Oxidizing properties	Not oxidizing.
Percent volatile	99.99 % estimated
Specific gravity	0.79 estimated
VOC	99.99 % estimated

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Toxic if inhaled. May cause damage to organs by inhalation. May cause damage to organs through prolonged or repeated exposure by inhalation.
Skin contact	Toxic in contact with skin.
Eye contact	Causes serious eye irritation.
Ingestion	Toxic if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics Headache. Dizziness. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

Information on toxicological effects

Acute toxicity Toxic if inhaled. Toxic in contact with skin. Toxic if swallowed.

Components	Species	Test Results
4,4'-DDE (CAS 72-55-9)		
Acute		
Oral		
LD50	Rat	880 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity May damage fertility or the unborn child.

Specific target organ toxicity - single exposure Causes damage to organs.

Specific target organ toxicity - repeated exposure Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard Not an aspiration hazard.

Chronic effects Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
4,4'-DDE (CAS 72-55-9)			
Aquatic			
Crustacea	EC50	Brown shrimp (Penaeus aztecus)	0.028 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.026 - 0.04 mg/l, 96 hours
Methanol (CAS 67-56-1)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	> 10000 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	> 100 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)	
4,4'-DDE	6.51
Methanol	-0.77

Mobility in soil No data available.

Other adverse effects The product contains volatile organic compounds which have a photochemical ozone creation potential.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN1230
UN proper shipping name	Methanol, solution (Methanol RQ = 5001 LBS)
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	IB2, T7, TP2
Packaging exceptions	150
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1230
UN proper shipping name	Methanol solution (Methanol)
Transport hazard class(es)	
Class	3
Subsidiary risk	6.1(PGI, II)
Packing group	II
Environmental hazards	No.
ERG Code	3L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN1230
UN proper shipping name	METHANOL SOLUTION (Methanol)
Transport hazard class(es)	
Class	3
Subsidiary risk	6.1(PGI, II)
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-E, S-D
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

DOT

IATA; IMDG

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

4,4'-DDE (CAS 72-55-9)	Listed.
Methanol (CAS 67-56-1)	Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Methanol	67-56-1	99.99

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

4,4'-DDE (CAS 72-55-9)
Methanol (CAS 67-56-1)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

4,4'-DDE (CAS 72-55-9) Listed: January 1, 1989

US - California Proposition 65 - CRT: Listed date/Developmental toxin

4,4'-DDE (CAS 72-55-9) Listed: March 30, 2010
Methanol (CAS 67-56-1) Listed: March 16, 2012

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

4,4'-DDE (CAS 72-55-9) Listed: March 30, 2010

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

4,4'-DDE (CAS 72-55-9)
Methanol (CAS 67-56-1)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 08-21-2014

Revision date 07-03-2019

Version # 03

NFPA ratings Health: 4
Flammability: 3
Instability: 0

Disclaimer

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Revision information

This document has undergone significant changes and should be reviewed in its entirety.

APPENDIX E

HOSPITAL INFORMATION, MAP AND FIELD ACCIDENT REPORT

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME_____ PROJECT. NO._____

Date of Accident_____ Time _____ Report By_____

Type of Accident (Check One):

() Vehicular () Personal () Property

Name of Injured_____ DOB or Age_____

How Long Employed_____

Names of Witnesses _____

_____

_____

Description of Accident_____

_____

_____

_____

Action Taken_____

_____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)?_____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)?_____

_____

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

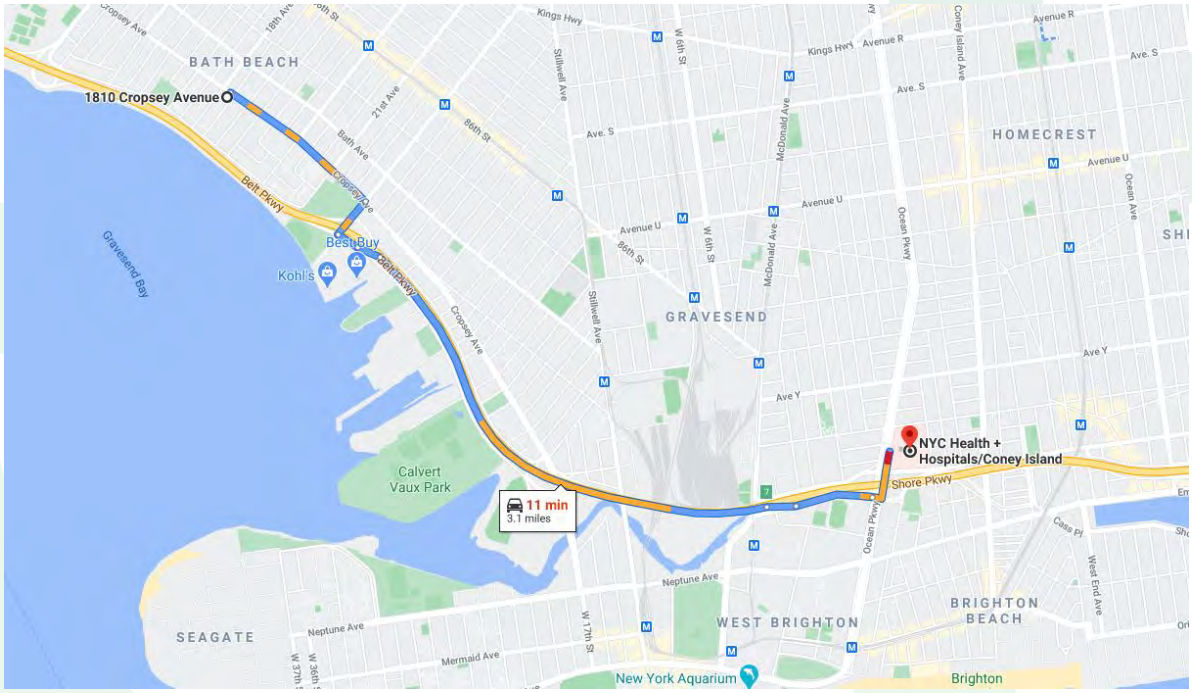
INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

NYC Health + Hospitals/Coney Island
2601 Ocean Parkway, Brooklyn, NY 11235
(718) 616-3000
Emergency Room
2601 Ocean Parkway, Brooklyn, NY 11235
(718) 616-3000

Figure 1 – Directions



START

1. Head southeast on Cropsey Avenue/Victor V. Allegretti Way toward Bay 19th Street.
2. Turn right onto Bay Parkway
3. Turn left onto Shore Parkway
4. Take the Belt Parkway E ramp on the left to Kennedy Airport
5. Follow Belt Parkway/Leif Ericson Drive to Shore Parkway.
6. Take Exit 7 from Belt Parkway/Leif Ericson Drive/Shore Parkway
7. Merge onto Belt Parkway/Leif Ericson Drive/Shore Parkway
8. Take Exit 7 toward Ocean Parkway
9. Continue on Shore Parkway. Drive to Ocean Parkway Service Road
10. Merge onto Shore Parkway
11. Turn left onto Ocean Parkway Service Road
12. NYC Health + Hospitals/Coney Island **Emergency Room – 2601 Ocean Parkway, Brooklyn, NY 11235**

END

Appendix D – Community Air Monitoring Plan

Community Air Monitoring Plan
1810-1818 Cropsey Avenue, Brooklyn, NY 11214
Order of Consent Index # CO2-20210315-158
NYSDEC Spill # 2007751

1.0 INTRODUCTION

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for total organic vapors and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The intent of this CAMP 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 Site activities) from potential airborne contaminant releases as a direct result of remedial construction work activities and monitoring activities. The action levels specified herein require increased monitoring, corrective actions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities do not spread contamination off-site through the air.

Depending upon the nature of contamination, chemical- specific monitoring with appropriately sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring, or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH. Therefore, the monitoring of VOCs will be performed as described below; however, monitoring for particulates (i.e., dust) will not be performed unless a more obtrusive drilling technique is used. In that case, particulates will be monitored as discussed below.

Continuous Monitoring

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

Periodic Monitoring

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil samples, groundwater samples, and sub-slab vapor samples. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/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.

1.1 PARTICULATE MONITORING

When deemed by RSK to be applicable, particulate (e.g., “dust”) emissions will be measured continuously at the upwind and downwind work zone boundaries. Real time monitoring equipment (e.g., Trak TSI Dust monitors or equivalent), with audible alarms and capable of measuring particulate matter less than 10 micrometers in size (PM-10), will be used. If the wind is calm, the monitors should be placed between each work area and the nearest sensitive receptors. If the wind is variable, the monitors must be placed accordingly to ensure there is a monitor downwind of each work area at all times. Air monitoring locations

will be selected daily based on prevailing wind conditions and specific locations where field-work is to be conducted.

- If the downwind particulate level is 100 micrograms per cubic meter (ug/m3) greater than background (upwind) for a 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression provided that downwind particulate levels do not exceed 150 ug/m3 above upwind levels and provided that no visible dust is migrating from the work area.
- If, after dust suppression techniques, downwind particulate levels are greater than 150 ug/m3 above upwind levels, work will be stopped and a re-evaluation of activities will be initiated. Work will resume, provided that dust suppression measures and other controls are successful in reducing downwind particulate concentrations to within 150 ug/m3 of the upwind level and in preventing visible dust migration.
- All readings must be recorded and be available for State (NYSDEC and NYSDOH) and County Health personnel to review.

1.2 VOC MONITORING

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

- 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 State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

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

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

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work with Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under "Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, the planned work will be implemented during hours (e.g., weekends or evenings) when building occupancy is at a minimum.

Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

- Reasonable fugitive dust suppression techniques must be employed during all site activities
- which may generate fugitive dust.
- Particulate monitoring must be employed during the handling of waste or contaminated soil or

- when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.
- Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:
    - Objects to be measured: Dust, mists, or aerosols.
    - Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000: ug/m3);
    - Precision (2-sigma) at constant temperature: +/- 10: g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging.
    - Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3: m, g= 2.5, as aerosolized).
    - Resolution: 0.1% of reading or 1g/m3, whichever is larger.
    - Particle Size Range of Maximum Response: 0.1-10.
    - Total Number of Data Points in Memory: 10,000.
    - Logged Data: Each data point with average concentration, time/date, and data point number
    - Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number.
    - Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required
    - Operating Time: 48 hours (fully charged Ni-Cd battery); continuously with charger.
    - Operating Temperature: -10 to 50o C (14 to 122o F).
    - Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.
- In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.
- The action level will be established at 150 ug/m3 (15 minutes average). While conservative, Final DER-10 Page 208 of 226 Technical Guidance for Site Investigation and Remediation May 2010 this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.
- It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed

leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential-- such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

- The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:
    - Applying water on haul roads.
    - Wetting equipment and excavation faces.
    - Spraying water on buckets during excavation and dumping.
    - Hauling materials in properly tarped or watertight containers.
    - Restricting vehicle speeds to 10 mph.
    - Covering excavated areas and material after excavation activity ceases; and
    - Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

- The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Appendix E – Soil/Materials Management Plan

Soil/Materials Management Plan
1810-1818 Cropsey Avenue, Brooklyn, NY 11214
Order of Consent Index # CO2-20210315-158
NYSDEC Spill # 2007751

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional during the scope of work for the IRM.

1.2 Stockpile Methods

Soil excavated will be segregated and stockpiled on, at minimum, double layers of 6-mil minimum poly-sheeting, will be kept covered at all times (except when material is being added or removed) with appropriately anchored polyethylene sheeting, and will be routinely inspected. Broken or ripped sheeting will be promptly replaced. If used, roll-off containers for saturated materials will be lined. While stockpiles are in place, they will be inspected at a minimum each week. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. Stockpile activities will be compliant with applicable laws and regulations. Stockpiles of excavated soils and other materials will be stored inside of the building. Stockpiles of contaminated soils are not anticipated to remain onsite for longer than 60 days. In the event that stockpiles will need to remain onsite longer than 60 days, RSK will coordinate with NYSDEC. Silt fencing and hay bales will be used as needed near catch basins, surface waters and other discharge points.

1.3 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. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 Materials Excavation, Load-Out, and Departure

The PE/QEP overseeing the remedial measure will:

- oversee remedial 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 Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this IRMWP;
- 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. Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior NYSDEC approval.

1.5 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 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible, in order to minimize off Site disturbance. Off-Site queuing will be minimized. Outbound truck transport routes are described in the remedial report. This routing takes into account the following factors: (a) limiting transport through residential areas and past sensitive sites; (b) use of mapped truck routes; (c) minimizing off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport. To the extent possible, all trucks loaded with Site materials will travel from the Site using these truck routes. Trucks will not stop or idle in the neighborhood after leaving the project Site.

1.6 Materials Disposal Off-Site

All soil/fill/solid waste excavated and removed from the Site will be disposed of in accordance with regulatory requirements based on the levels of contamination found to be present in waste characterization samples collected.

The following documentation will be obtained and reported for each disposal location used in this project to demonstrate and document that the disposal of material derived from the Site conforms with all applicable laws: (1) a letter or facility-specific waste profile/application from RSK or 1810 Cropsey Ave LLC to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter/profile/application will state that material to be disposed is contaminated material generated at an environmental remediation Site in New York State. The letter will provide the project identity and the name and phone number of the RSK or 1810 Cropsey Ave LLC. The letter will include as an attachment a summary of all chemical data for the material being transported (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the IRMCR.

The IRMCR will include an accounting of the destination of all material removed from the Site during this IRM.

A non-hazardous waste manifest or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the IRMCR.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable local, State, and Federal regulations. Appropriately licensed haulers will be used for material removed from this Site and will be in compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

1.7 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the Soil Cleanup Objectives (SCOs) established in this plan may be reused on-Site. ‘Reuse on-Site’ means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on land with

comparable levels of contaminants in soil/fill material, compliant with applicable laws and regulations. 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 remedial plan are followed. Excavated material that is acceptable for re-use on-Site will be backfilled above a demarcation layer. The demarcation layer will be placed as a visual reference to easily identify the extent of excavation and backfilled materials from the IRM.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site.

1.8 Fluids Management

It is not anticipated that groundwater will be encountered as part of this IRM; however, if encountered, all liquids to be removed from the Site will be handled, transported, and disposed in accordance with applicable laws and regulations. Liquid waste manifests will be reported to NYSDEC in the IRMCR. Dewatering is not expected to be necessary during the IRM activities.

1.9 Import of Backfill Soil From Off-Site Sources

All materials proposed for import onto the Site will be approved by RSK and will be in compliance with provisions in this IRM prior to receipt at the Site. Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site. Solid waste will not be imported onto the Site.

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved IRM or its approval by NYSDEC should be construed as an approval for this purpose. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC.

In accordance with DER-10, the following material may be imported, without chemical testing, to be used as backfill beneath pavement, buildings or as part of the final site cover, provided that it contains less than 10% by weight material which would pass through a size 80 sieve and consists of:

- gravel, rock or stone, consisting of virgin material from a NYSDEC permitted mine or quarry; or
- recycled concrete or brick from a NYSDEC registered construction and demolition debris processing facility if the material conforms to the requirements of Section 304 of the New York State Department of Transportation Standard Specifications Construction and Materials Volume 1 (2002).

1.11 Contingency Plan for Unknown Contamination Sources

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during implementation of the IRM. If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation, sampling will be performed on potentially contaminated source material and surrounding soils and reported to NYSDEC. Chemical analytical work will be for NYSDEC CP-51 Soil Cleanup Guidance Tables 2 and 3, Soil Cleanup Levels for Gas and Fuel Oil Contaminated Soil (CP-51) parameters. In areas where samples will be collected in close proximity to the location of a soil sample in the RI, the full suite of parameters (TCL VOCs, TCL SVOCs, TAL metals, PCBs, pesticides and herbicides) will be analyzed. Analyses will not be otherwise limited without NYSDEC approval. Identification of unknown or unexpected contaminated

media identified by screening during invasive Site work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will be also included in daily and periodic electronic media reports

1.12 Odor, Dust, and Nuisance Control

Odor 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. NYSDEC will be notified of all odor complaint events. Implementation of all odor controls, including halt of work, will be the responsibility of the PE/QEP's certifying this remedial plan.

Dust Control

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. NYSDEC will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying this remedial plan.

Other Nuisances

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided during Site clearing and grubbing and during the remedial program, as necessary, to prevent nuisances.

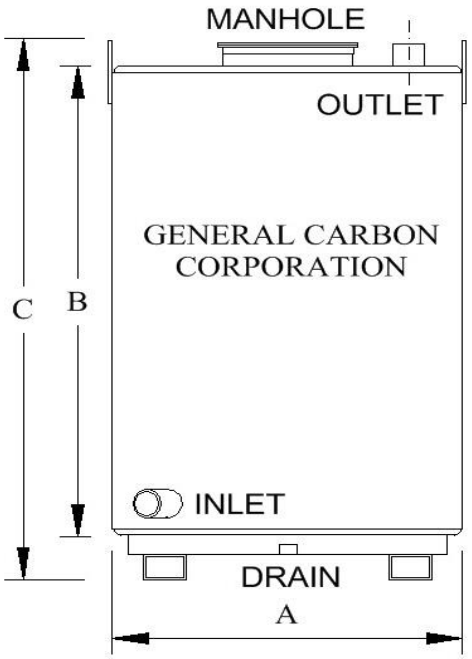
Appendix F – Product Specification Sheets

GENERAL CARBON CORP.

TV-ADSORBERS

vapor phase 1000, 2000, 3000

THE TRANPORTABLE VAPOR PHASE adsorbers are fabricated from mild steel and are tested to DOT shipping standards. All units have two-part epoxy coatings on the inside and industrial enamel on the outside to give a long service life. Inlet/outlet fittings are connected to PVC internals for corrosion resistance. The units have 4-way forklift access, a screened drain and 16-inch top manhole. GC C-40 pelletized virgin, bituminous coal base carbon is standard. Other virgin coal, coconut shell, reactivated or impregnated carbons are available.



	TV 500	TV 1000	TV 2000	TV 3000	TV 5000	TV 10000
Height	5'3"	6'5"	7'7"	7'10"	9'	9'4"
Diameter	30'	36"	48"	60"	72"	96"
Lbs of Carbon	500	1000	2000	3000	5000	10000
CFM	50 – 300	70 – 420	125 – 750	200 – 1200	280 – 1680	500 - 3000
PSIG	10	10	10	10	10	10
Bed Volume FT^3	19.5	35	75	117	196	400
Maximum Vacuum HG	28"	28"	28"	28"	28"	28"

33 Paterson Street, Paterson, New Jersey 07501 Tel: 973 523 2223 Fax: 973 523 1494
www.generalcarbon.com email:sales@generalcarbon.com

Installation & Start Up - TV Series adsorbers require no special procedure for start up. Remove the shipping plugs from the inlet and outlet and make the proper connections to your system. The unit is now ready for service. Unions or quick connect fittings are recommended if the unit will be disconnected frequently.

Maintenance - When in use, the only maintenance the TV Series adsorbers require is testing for contaminants in the influent and effluent vapor stream, and checking the operating pressure of the system. Monitoring the influent and effluent vapor streams is recommended. If multiple adsorbers are staged in series, it is suggested to monitor the vapor stream between the adsorbers When the concentration of contaminants in the effluent is exceeding treatment objectives, the Vapor Box should be removed from service and the activated carbon replaced. The working life of each adsorber is dependent upon the type of contaminants in the vapor stream as well as its concentration and the air flow rate.

Replacing the Spent Carbon **–** Once the carbon is no longer meeting treatment objectives, the adsorber should be removed from service and the spent carbon replaced. To purchase replacement carbon or to arrange for a carbon change-out, please contact our office.

Disposal **–** Dispose of the spent carbon in accordance with Federal, State and Local regulations.

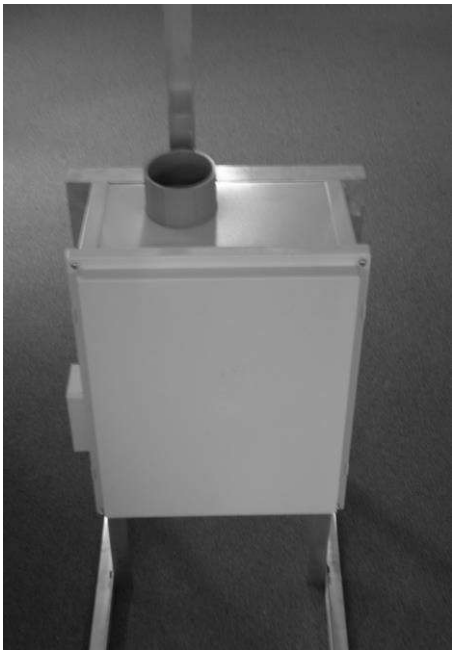
WARNING!

Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels. Confined space/low oxygen procedures should be put in place before any entry is made. Such procedures should comply with all applicable local, state and federal guidelines.

33 Paterson Street, Paterson, New Jersey 07501 Tel: 973 523 2223 Fax: 973 523 1494
www.generalcarbon.com email: sales@generalcarbon.com

THE OBAR GBR76
COMPACT RADIAL BLOWER

Based on 25 years of experience and 2 years of research and development, the patent pending GBR series of compact radial blowers provide the perfect combination of performance and design.



GBR76 WITH ROOF MOUNT

PERFORMANCE

- GBR76 SOE 16" WC @ 0 Max flow 155 CFM.
- GBR76 UD 40" WC @ 0 Max flow 195 CFM.
- Built in speed control to customize performance.
- Condensate bypass built in.
- 12 month warranty - 40,000 hr sealed bearings.

DESIGN

- Our modular design means the blower and manifold assembly can be removed and replaced as a unit. This makes repairs cost effective and easy and allows contractors to upgrade systems simply by swapping assemblies.
- The GBR series is based on a bypass blower designed to handle combustible materials.
- The housing is not required to be air tight, so you can add gauges and alarms without compromising the system.
- Built in condensate bypass.
- Built in speed control.
- Quick disconnect electrical harness.
- All UL listed components including UL listed enclosure for outside use.
- Wall fastening lugs included.
- GBR series roof and wall mounts available to quickly configure the blowers for your installation while providing a custom built look.
- Compact design 16"x 14"x 8" weighing only 18 lbs.
- 3" schedule 40 inlet and exhaust.
- Universal Drive model accepts voltage from 120-240V without alteration

OBAR SYSTEMS INC 2969 ROUTE 23 SOUTH NEWFOUNDLAND NJ 07435 800 949 6227

GBR76 SOE	0”	2”	4”	6”	8”	10”	12”	16”	Wattage
SOE 16	150	140	129	118	105	90	75	35	150-320
SOE 12	125	115	100	83	62	39	0		110-200
SOE 8	105	90	70	42	0				60-120
SOE 4	75	50	0						37-50

GBR SOE performance using built in potentiometer set at sealed vacuums of 16, 12, 8, and 4” WC

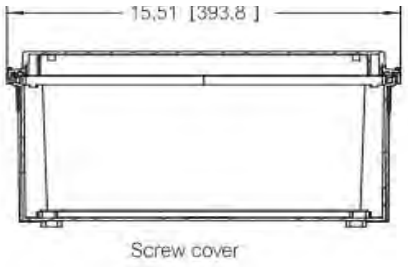
GBR76 UD	0”	10”	20”	30”	37”	Wattage
110V	195	158	118	63	20	700-870
220V	197	162	130	89	50	800-1100

Blower Specifications

Notes:

- **Input Voltage Range:** 108-132 Volts AC RMS, 50/60 Hz, single phase.
- **Input Current:** 6 amps AC RMS
- **Operating Temperature (Ambient Air and Working Air):** 0°C to 50°C
- **Storage Temperature:** -40°C to 85°C
- **Dielectric Testing:** 1500 Volts AC RMS 60 Hz applied for one second between input pins and ground, 3mA leakage maximum.
- **Speed Control Methods:** PWM (Pulse Width Modulation) (1 kHz to 10 kHz)
  0 to 10 VDC speed control.
  Mechanical: A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access for speed adjustment located in motor housing.
- **Approximate Weight:** 4.8 Lbs. / 2.2 Kg
- **Regulatory Agency Certification:** Underwriters Laboratories Inc. UL507 Recognized under File E94403 and compliant under the CE Low Voltage Directive 2006/95/EC.
- **Design Features:** Designed to provide variable airflow for low NOx & CO emission in high efficiency gas fired combustion systems. Built with non-sparking materials. Blower housing assembly constructed of die cast aluminum. Impeller constructed from hardened aluminum. Rubber isolation mounts built into blower construction to dampen vibration within the motor. Two piece blower housing assembly sealed with O-ring gasket for combustion applications. Customer is responsible to check for any leakage once the blower is installed into the final application.
- **Miscellaneous:** Blower inlet, discharge, and all motor cooling inlet and discharge vents must not be obstructed. Motor ventilation air to be free of oils and other foreign particles, (i.e. breathing quality air). Blower is to be mounted so ventilation air cannot be re-circulated.
  POWER CONNECTION: Blower connector, AMP Universal MATE-N-LOK, part no. 1-350943-0.
  SPEED CONNECTION: Blower connector, Molex Mini-Fit Jr., part no. 39-30-3056.
  Mating harnesses available upon request.

Enclosure Specifications



Screw cover

Ratings:

Ingress Protection (EN 60529): 66/67

Electrical insulation: Totally insulated

Halogen free (DIN/VDE 0472, Part 815): yes

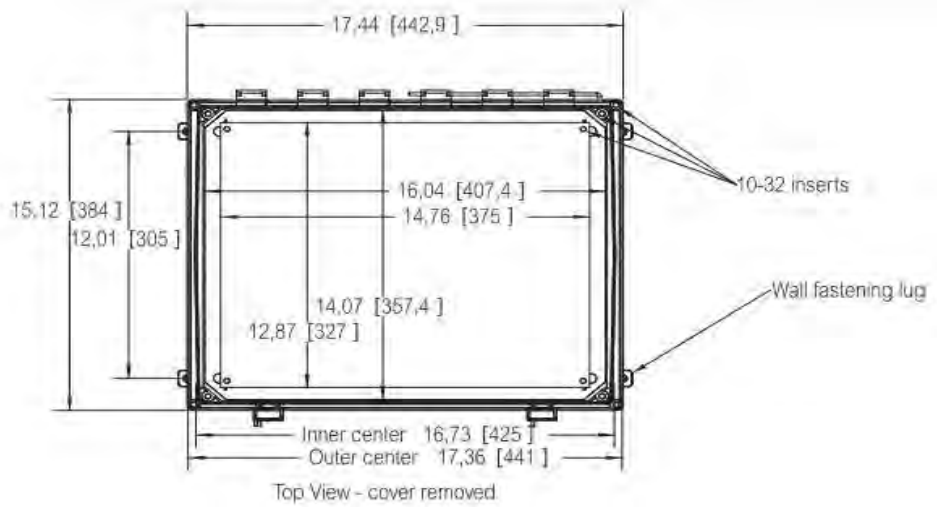
UV resistance: UL 508

Flammability Rating (UL 746 C 5): complies with UL 508

Glow Wire Test (IEC 695-2-1) °C: 960

NEMA Class: UL Type 4, 4X, 6, 6P, 12 and 13

Certificates: Underwriters Laboratories



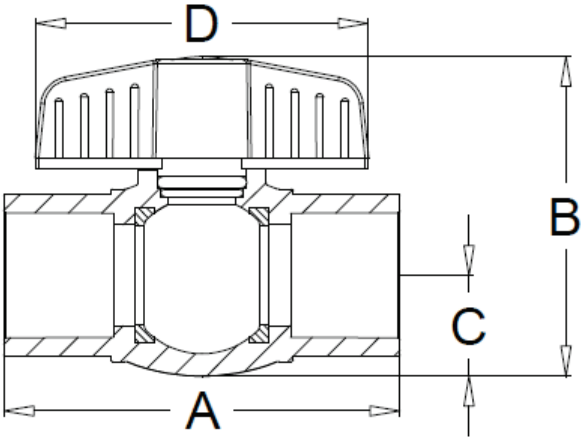
Top View - cover removed

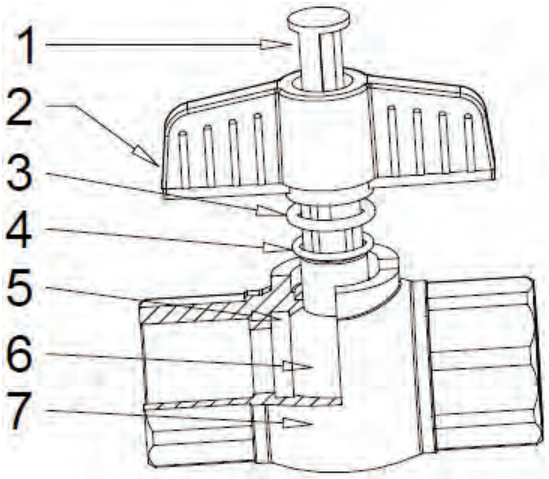
770 White PVC Ball Valve • Spec Sheet

Sizes 1/2” - 2”

FEATURES & BENEFITS

- ISO 9002
- 150 PSI @ 73 Deg. F.
- White Color
- NSF Approved
- Fits Sch. 40 & Sch. 80 Pipe
- Threaded or Solvent Ends
- Threaded Ends Comply With ANSI B1.20.1
- Solvent Ends Comply With ASTM D2466





DIMENSIONS

Part # Threaded	Part # Solvent	Size	A	B	C	D
770T03	770S03	1/2”	3.16	2.46	0.71	2.74
770T04	770S04	3/4”	3.61	2.98	0.87	3.01
770T05	770S05	1”	4.19	3.39	1.06	3.53
770T06	770S06	1-1/4”	4.76	3.80	1.21	3.54
770T07	770S07	1-1/2”	5.13	4.32	1.46	4.42
770T08	770S08	2”	5.93	5.36	1.83	5.53

MATERIAL SPECIFICATIONS

No.	Part	Material
1	Cap	ABS
2	Handle	ABS
3	O-Ring	EPDM
4	O-Ring	EPDM
5	Seat (2)	PTFE
6	Ball	PC + ABS
7	Body	PVC

MATCO-NORCA
Global sourcing. National compliance. Local service.

CALIFORNIA 5593 Fresca Dr., La Palma CA 90623 • Toll Free: 866-532-8306 • Fax: 866-532-8307
TEXAS 1150 Silber Rd., Houston TX 77055 • Toll Free: 800-935-5456 • Fax: 713-680-2999
NEW YORK PO Box 27, Rt. 22, Brewster NY 10509 • Toll Free: 800-431-2082 • Fax: 845-278-9056
WEB: **www.matco-norca.com** EMAIL: **mail@matco-norca.com**

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Sizes 2-1/2" - 4"

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- White Color
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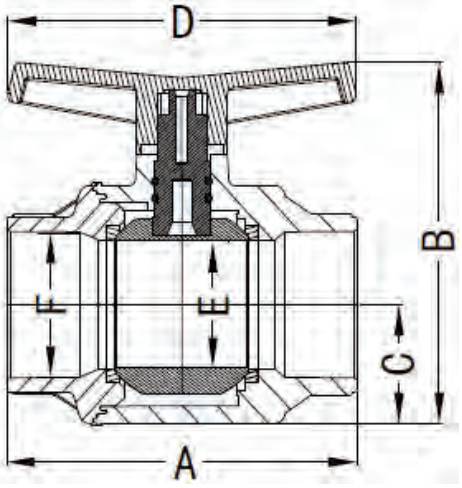

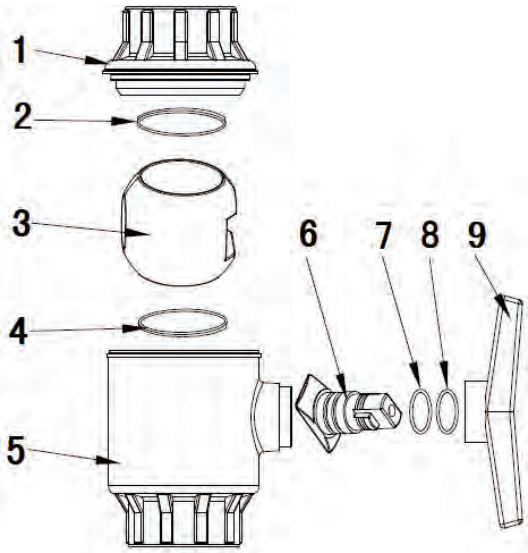

DIMENSIONS

Part # Threaded	Part # Solvent	Size	A	B	C	D	E	F
770T09	770S09	2-1/2"	7.48	7.68	2.26	7.09	2.62	2.87
770T10	770S10	3"	8.66	8.86	2.66	9.05	3.06	3.49
770T11	770S11	4"	10.24	10.24	3.35	10.04	4.03	4.49

MATERIAL SPECIFICATIONS

No.	Part	Material
1	Nut	PVC
2, 4	Seat (2)	PTFE
3	Ball	PVC
5	Body	PVC
6	Stem	PVC
7, 8	O-Ring (2)	EPDM
9	Handle	ABS

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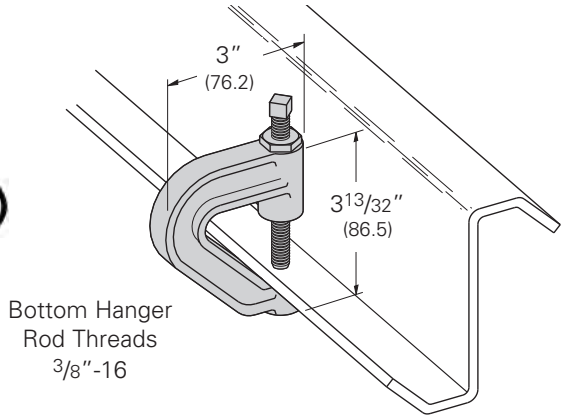
WEB: **www.matco-norca.com** EMAIL: **mail@matco-norca.com**

Beam Clamps

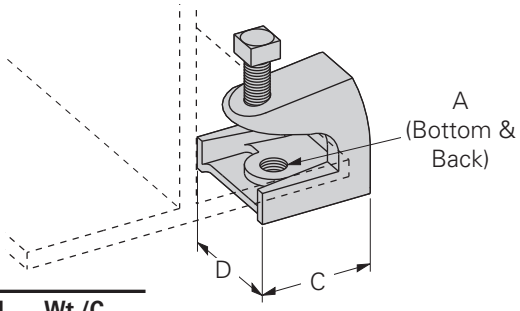
B3037Z
Z-Purlin C-Clamp

- Design Load 500 Lbs. (2.22 kN)
- Safety Factor of 5
- Designed for attaching a 3/8"-16 hanger rod to the bottom flange of a Z-purlin
- Setscrew and locknut included
- Material: Malleable iron
- Standard finishes: ZN, PLN



B444
Series Rod Support

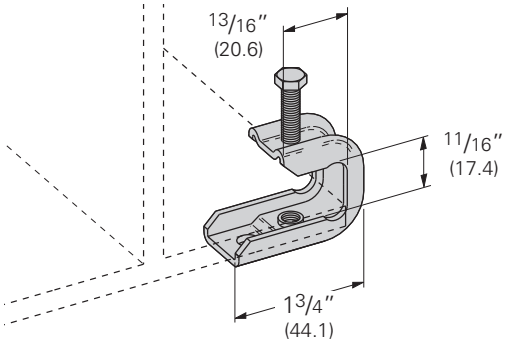
- Safety Factor of 5
- Max. Flange Thickness
  3/4" (19.0) for 1/4 & 5/16 sizes
  1" (25.4) for 3/8 & 1/2 sizes
- Setscrew included
- Material: Malleable iron
- Standard finish: ZN, available in HDG with CZ Hardware



Part No.	Thread Size A	Set Screw	C In.	C mm	D In.	D mm	Design Load Lbs.	Design Load kN	Wt./C Lbs.	Wt./C kg
B444-1/4	1/4"-20	1/4"-20	1 3/8"	(34.9)	1 3/16"	(30.1)	150	(.66)	24	(10.9)
B444-5/16	5/16"-18	1/4"-20	1 3/8"	(34.9)	1 3/16"	(30.1)	150	(.66)	23	(10.4)
B444-3/8	3/8"-16	1/2"-13	1 7/8"	(47.6)	2"	(50.8)	350	(7.12)	65	(29.5)
B444-1/2	1/2"-13	5/8"-11	2 3/8"	(60.3)	2 1/2"	(63.5)	1000	(4.45)	132	(59.9)

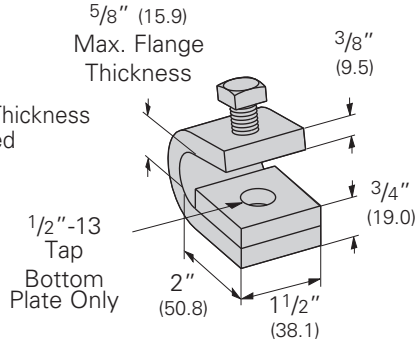
BC442
Light Duty Beam Clamp

- Design Load 75 Lbs. (.33 kN)
- Safety Factor of 5
- 11/16" (17.5) Max. Flange Thickness
- Setscrew included
- Holes tapped 1/4"-20 (Bottom & Back)
- Material: 13 Gauge (2.3)
- Standard finish: ZN
- Wt./C 13 Lbs. (3.9 kg)



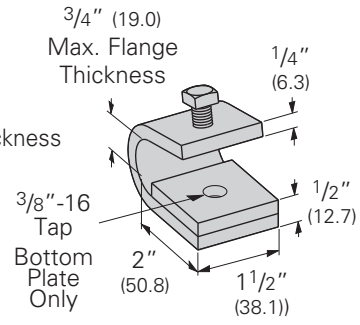
B210
Beam Clamp

- Design Load 800 Lbs. (3.56 kN)
- Safety Factor of 5
- 5/8" (15.9) Max. Flange Thickness
- 1/2"-13 Setscrew included
- Standard finish: ZN
- Wt./C 100 Lbs. (45.3 kg)



B210A
Beam Clamp

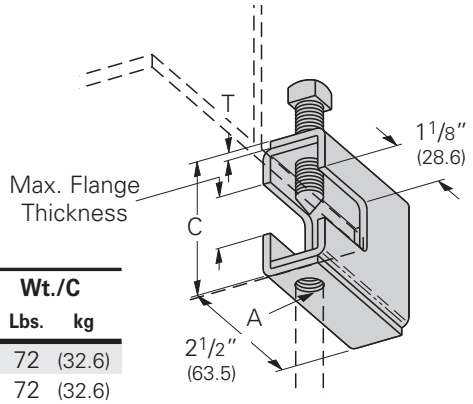
- Design Load 300 Lbs. (1.33 kN)
- Safety Factor of 5
- 3/4" (19.0) Max. Flange Thickness
- 3/8"-16 Setscrew included
- Standard finish: ZN
- Wt./C 60 Lbs. (27.2 kg)



Reference page 113 for general fitting and standard finish specifications.

B303 thru B309 Beam Clamps

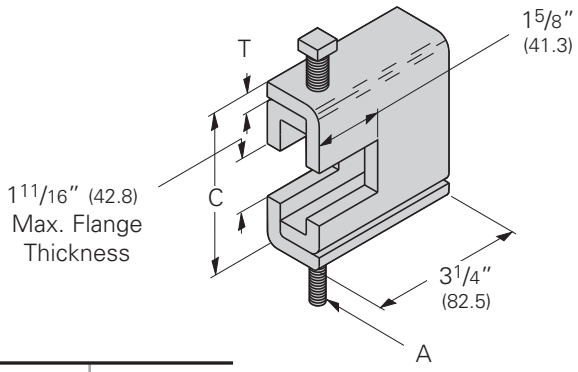
- Safety Factor of 5
- Max. Flange Thickness 1/16" (1.6) thru 7/8" (22.2)
- Setscrew included
- When Retaining Strap is required, order B312 separately
- Recommended Setscrew Torque: 3/8"-16 150 in-lbs. (16.9 N•m)
  1/2"-13 350 in-lbs. (39.5 N•m)
- Standard finishes: ZN, HDG



Part No.	Thread Size A	Set Screw	C In.	C mm	D In.	D mm	Design Load Lbs.	Design Load kN	Wt./C Lbs.	Wt./C kg
B303	1/4"-20	3/8"-16	2 5/16"	(58.7)	11 Ga.	(3.0)	400	(1.78)	72	(32.6)
B304	5/16"-18	3/8"-16	2 5/16"	(58.7)	11 Ga.	(3.0)	600	(2.67)	72	(32.6)
B305	3/8"-16	3/8"-16	2 5/16"	(58.7)	11 Ga.	(3.0)	600	(2.67)	72	(32.6)
B306	3/8"-16	1/2"-13	2 7/16"	(61.9)	7 Ga.	(4.5)	1100	(4.89)	97	(44.0)
B307	1/2"-13	1/2"-13	2 7/16"	(61.9)	7 Ga.	(4.5)	1100	(4.89)	97	(44.0)
B308	1/2"-13	1/2"-13	2 9/16"	(65.1)	1/4"	(6.3)	1500	(6.67)	133	(60.3)
B309	5/8"-11	1/2"-13	2 9/16"	(65.1)	1/4"	(6.3)	1500	(6.67)	133	(60.3)

B321 Series Beam Clamps

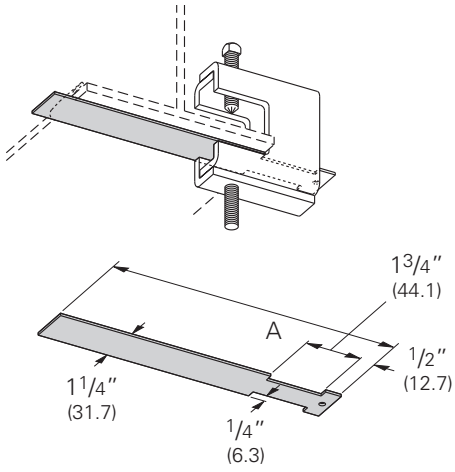
- Safety Factor of 5
- 1 11/16" (42.8) Max. Flange Thickness
- Setscrew included
- When Retaining Strap is required, order B312 separately
- Recommended Setscrew Torque: 1/2"-13 350 in-lbs. (39.5 N•m)
  5/8"-11 700 in-lbs. (79.0 N•m)
- Minimum flange thickness: B321-1 thru B321-3 1/4" (6.3)
  B321-4 and B321-5 3/8" (9.5)
- Standard finishes: ZN, HDG



Part No.	Thread Size A	Setscrew Size	C In.	C mm	D In.	D mm	Design Load Lbs.	Design Load kN	Wt./C Lbs.	Wt./C kg
B321-1	3/8"-16	1/2"-13	3 9/16"	(92.1)	1/4"	(6.3)	1300	(5.78)	187	(84.8)
B321-2	1/2"-13	1/2"-13	3 9/16"	(92.1)	1/4"	(6.3)	1400	(6.23)	186	(84.3)
B321-3	5/8"-11	1/2"-13	3 9/16"	(92.1)	1/4"	(6.3)	1600	(7.12)	185	(83.9)
B321-4	5/8"-11	5/8"-11	3 23/32"	(94.4)	5/16"	(7.9)	1800	(8.00)	239	(108.4)
B321-5	3/4"-10	5/8"-11	3 23/32"	(94.4)	5/16"	(7.9)	2000	(8.89)	238	(107.9)

B312 Series Retaining Strap for use with B303 thru B309 and B321 Series

- 3/4" (19.0) Max. Flange Thickness
- For thicker beams, step up one flange width size
- Material: 14 Gauge (1.9)
- Standard finishes: GALV, HDG

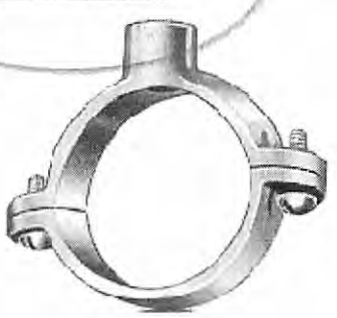


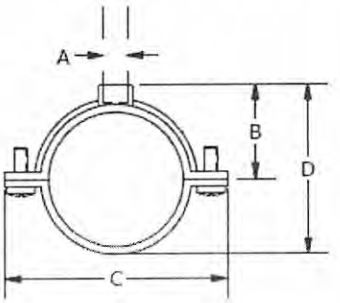
Part No.	For Flange Width In.	For Flange Width mm	A In.	A mm	Wt./C Lbs.	Wt./C kg
B312-6	6"	(152.4)	9"	(228.6)	22	(10.0)
B312-9	9"	(228.6)	12"	(304.8)	30	(13.6)
B312-12	12"	(304.8)	15"	(381.0)	40	(18.1)
B312-15	15"	(381.0)	18"	(457.2)	49	(22.2)

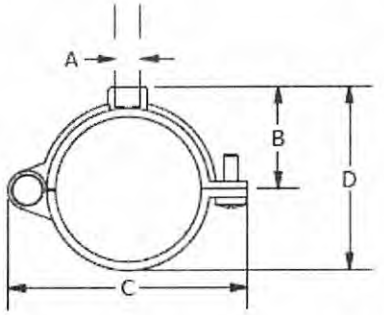
Reference page 113 for general fitting and standard finish specifications.

FIG. 100

SPLIT RING EXTENSION HANGER







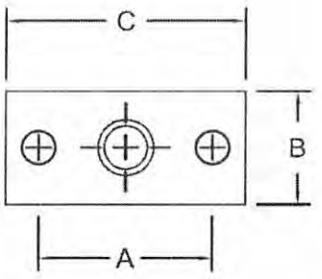
MATERIAL: Malleable iron, stainless steel.
FINISH: Black or electro galvanized.
SERVICE: For suspension of non-insulated stationary pipe lines.
ORDERING: Specify pipe size, figure number and finish.
APPROVALS: Complies with Federal Specification WW-H-171E Type 25 and Manufacturers' Standardization Society SP-58 & SP-69 Type 12.

PIPE SIZE	A	B	WEIGHT/C APPROX.	MAX REC. LOAD, LB.
3/8*	3/8	11/16	16	180
1/2	3/8	13/16	17	180
3/4	3/8	15/16	20	180
1	3/8	1 1/16	21	180
1 1/4	3/8	1 1/4	29	180
1 1/2	3/8	1 5/16	31	180
2	3/8	1 5/8	35	180
2 1/2*	1/2	1 15/16	57	300
3*	1/2	2 3/8	72	300
4*	1/2	2 7/8	116	300

*Sizes 3/8, 2 1/2, 3 and 4 are hinged style

FIG. 105

HANGER FLANGE



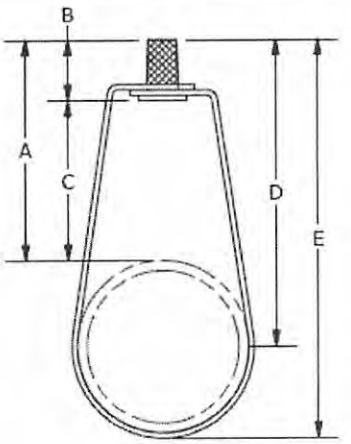
MATERIAL: Malleable iron, stainless steel.
FINISH: Black or electro-galvanized.
SERVICE: For attachment to wood beams, ceilings or floors.
ORDERING: Specify tap size, figure number and finish.

BOLT TAP	A	B	C	WEIGHT (APPROX.) PER 100
3/8	1 15/16	1 15/16	2 1/4	18
1/2	1 15/16	1 15/16	2 1/4	17

FIG. 110

ADJUSTABLE SWIVEL RING HANGER, STD. & NFPA

MATERIAL: Carbon steel.
FINISH: Electro-galvanized.
SERVICE: Recommended for suspension of non-insulated, stationary pipe lines and conduit. Approved for use without additional locking nuts normally required with pipe hangers.
ORDERING: Specify pipe size and figure number.
APPROVALS: Underwriter's Laboratories Listed for ¾"-2" and Factory Mutual Approved for ¾"-4". Complies with Federal Specification WW-H-171E Type 10 and Manufacturers' Standardization Society SP-58 & SP-69 Type 10.

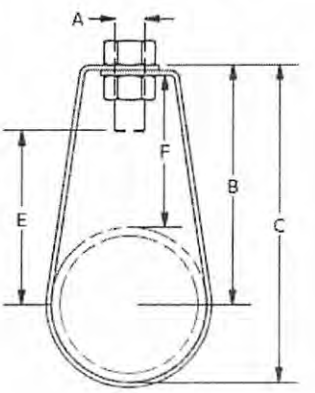


PIPE SIZE	WEIGHT PER 100	MAX. REC. LOAD LB.	DIMENSIONS					MATERIAL SIZE	ROD SIZE	NFPA ROD SIZE
			A	B	C	D	E			
½	11	400	2¼	⅞	1½	2⅝	3 3/16	16ga x ⅝	⅜	⅜
¾	11	400	2 1/16	⅞	1¼	2½	3 3/16	16ga x ⅝	⅜	⅜
1	12	600	2	⅞	1⅜	2⅝	3⅜	16ga x ⅝	⅜	⅜
1¼	13	600	2	⅞	1⅜	2¾	3¾	16ga x ⅝	⅜	⅜
1½	14	600	1⅞	⅞	1⅜	2⅞	4	16ga x ⅝	⅜	⅜
2	15	600	2⅛	⅞	1¼	3¼	4⅝	16ga x ⅝	⅜	⅜
2½	32	600	2½	1⅛	1⅜	3¾	5⅝	13ga x ¾	½	⅜
3	34	600	2⅞	1⅛	2⅞	4½	6¼	13ga x ¾	½	⅜
3½	37	600	3	1⅛	1¾	5	7	13ga x ¾	½	⅜
4	78	1250	2¾	1⅛	1¾	5	7⅜	11ga x 1	⅝	⅜
5	94	1250	3¼	1⅛	1⅞	6	9⅛	11ga x 1	⅝	½
6	120	1250	3¾	1½	2½	7¼	10⅝	11ga x 1	¾	½
8	145	1250	4½	1½	3⅛	8⅞	13⅛	11ga x 1	¾	½

FIG. 115

ADJUSTABLE BAND HANGER

MATERIAL: Carbon steel.
FINISH: Black, electro-galvanized.
SERVICE: For suspension of non-insulated, stationary pipe lines and conduit.
ORDERING: Specify pipe size, figure number and finish.
APPROVALS: Complies with Federal Specification WW-H-171E Type 7 and Manufacturers' Standardization Society SP-58 & SP-69 Type 7.

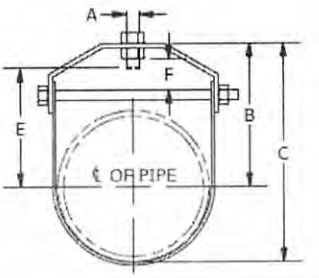


PIPE SIZE	MATERIAL SIZE	MAX. REC. LOAD LB.	A	B	C	E	F	WEIGHT PER 100
⅜	16ga x ⅞	610	⅜	2 5/16	2⅝	1 9/16	1⅜	11
½	16ga x ⅞	610	⅜	2 3/16	2⅝	1 7/16	1¼	11
¾	16ga x ⅞	610	⅜	2 1/16	2⅝	1 5/16	1	12
1	16ga x ⅞	610	⅜	2 1/16	2 11/16	1 5/16	1 5/16	12
1¼	16ga x ⅞	610	⅜	2 9/16	3 7/16	1 13/16	1¼	14
1½	16ga x ⅞	610	⅜	2¾	3 11/16	2	1 3/16	16
2	16ga x ⅞	610	⅜	3	4 3/16	2¼	1 3/16	23
2½	14ga x 1	970	½	3 3/16	4⅞	2 7/16	1¼	28
3	13ga x 1	970	½	4¼	6	3¼	1⅝	41
3½	13ga x 1	970	½	4⅛	6⅛	3⅛	1⅜	44
4	11ga x 1	1250	½	4½	6¾	3¼	1⅜	87
5	11ga x 1	1250	½	5	7¾	4¾	1¼	100
6	11ga x 1½	1600	¾	6 11/16	10	5 3/16	2⅛	160
8	11ga x 1½	1800	¾	7 9/16	11⅞	6 13/16	2	260

FIG. 200

ADJUSTABLE CLEVIS HANGER

MATERIAL: Carbon steel and 304/316 stainless steel.
FINISH: Black, electro or hot-dipped galvanized.
SERVICE: For the suspension of non-insulated, stationary pipe lines.
ORDERING: Specify pipe size, figure number and finish.
APPROVALS: Underwriters Laboratories Listed and Factory Mutual Approve ¾"-8". Complies with Federal Specification WW-H-171E Type 1 and Manufacturers' Standardization Society SP-58 & SP-69 Type 1.



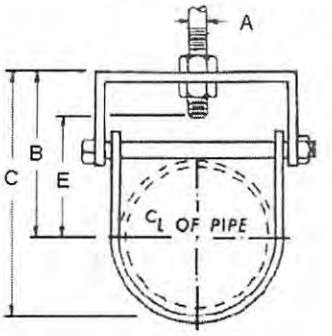
PIPE SIZE	SIZE OF STEEL		A	B	C	E	F	WGT. PER 100	MAX. REC. LOAD, LBS.
	UPPER	LOWER							
½	13ga x ⅞	13ga x ⅞	⅜	1 11/16	2 1/16	1 5/16	7/16	18	610
¾	13ga x ⅞	13ga x ⅞	⅜	1 11/16	2 3/16	1 5/16	7/16	18	610
1	13ga x ⅞	13ga x ⅞	⅜	2 1/16	2 11/16	1 5/8	5/8	22	610
1¼	13ga x ⅞	13ga x ⅞	⅜	2½	3 3/16	2 1/16	⅞	26	610
1½	12ga x ⅞	12ga x ⅞	⅜	2⅞	3 11/16	2 7/16	1 1/16	34	610
2	12ga x ⅞	12ga x ⅞	⅜	3 5/16	4 7/16	2 7/8	1¼	38	610
2½	9ga x 1 3/16	10ga x 1 3/16	½	4½	5 7/8	3 7/8	1 15/16	86	1130
3	9ga x 1 3/16	10ga x 1 3/16	½	4¾	6½	4 3/16	1¾	96	1130
3½	8ga x 1 3/16	10ga x 1 3/16	½	5⅞	7 15/16	5 5/16	2 9/16	114	1130
4	8ga x 1 3/16	10ga x 1 3/16	⅝	5 15/16	8 3/16	5 3/16	2⅛	126	1430
5	4ga x 1¼	8ga x 1¼	⅝	5 11/16	8 7/16	4 15/16	1 7/16	220	1430
6	3ga x 1½	8ga x 1½	¾	6 13/16	10⅛	5 15/16	1¾	300	1940
7	3ga x 1½	8ga x 1½	¾	7 13/16	11⅝	6 15/16	2	420	2000
8	3ga x 1¾	8ga x 1¾	¾	8 1/16	12 7/16	7⅛	1⅞	450	2000
10	⅜ x 1¾	3ga x 1¾	⅞	10	15 7/16	8⅞	2¼	806	3600
12	⅜ x 2	3ga x 2	⅞	11 9/16	18	10 7/16	2 13/16	1100	3800
14	½ x 2	¼ x 2	1	12 9/16	19 9/16	10 9/16	2 9/16	1480	4200
16	½ x 2½	¼ x 2½	1	13 15/16	21 15/16	11 15/16	2 13/16	2100	4600
18	½ x 2½	¼ x 2½	1	16	25	13⅞	3¼	2440	4800
20	⅝ x 3	⅜ x 3	1¼	17½	27½	15⅛	3¾	4700	4800
24	⅝ x 3	⅜ x 3	1¼	19¾	31¾	17⅜	4	5400	4800
30	¾ x 3	⅜ x 3	1¼	24⅛	39⅛	21½	4¾	6950	6000

NOTE: CLEVIS HANGERS FOR 20" PIPE AND LARGER ARE FURNISHED WITH PIPE SPACER ON CROSS BOLTS

FIG. 205

FLAT TOP CLEVIS HANGER

MATERIAL: Carbon steel.
FINISH: Black, electro or hot-dipped galvanized.
SERVICE: General piping, where space does not permit installation of standard figure 200 clevis hanger.
ORDERING: Specify pipe size, figure number and finish.



PIPE SIZE	SIZE OF STEEL		A	B	C	E	MAX. REC. LOAD, LBS.	WGT. PER 100
	UPPER YOKE	LOWER STRAP						
2	8ga x 1	12ga x ⅞	⅜	2½	3 11/16	2 1/16	300	46
2½	8ga x 1¼	10ga x 1 3/16	½	2⅞	4 3/16	2 5/16	500	78
3	8ga x 1¼	10ga x 1 3/16	½	3⅜	5⅜	3 1/16	500	98
3½	8ga x 1¼	10ga x 1 3/16	½	4 1/16	6 1/16	3 7/16	500	136
4	4ga x 1¼	10ga x 1 3/16	⅝	4 1/16	6 5/16	3 5/16	700	138
5	4ga x 1¼	8ga x 1¼	⅝	4⅞	7⅝	4⅛	700	208
6	3ga x 1½	8ga x 1½	¾	5½	8⅞	4⅝	900	282
8	3ga x 1¾	8ga x 1¾	⅞	6⅜	10⅞	5½	1000	434

GBR 25 Mini Digital Differential Pressure Gauge With Alarm

System alarms and monitoring made simple and affordable.

Finally a product that has what you need and can be easily installed.
The GBR 25 is a compact stand alone system gauge with an audible and visual alarm that works for VOC and Radon systems operating at system pressures greater than 2" wc. Included is a second relay that can be used to trigger additional alarms.
Includes Power supply
Optional 4-20 MA or 0-10 outputs can be used to monitor system pressure.

Contact OBAR for a quote to build custom alarm panels for your needs.

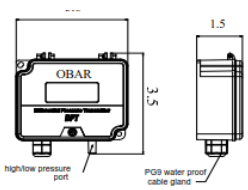
Applications and features

- Scale 0-40 inches WC eliminates need for multiple gauges.
- Visual and audible alarm included and factory set at 1" WC The alarm set point can be changed in the field.
- Second adjustable relay for triggering additional alarms.
- Optional 4-20 MA or 0-10 output for data.
- Accuracy is up to ±1% FS, with large LCD display.
- Function keys: zero reset, units select, display update time, automatic sleep time, alarm, etc.

Specifications

Medium: Non-combustible, non-corrosive air, insensitive to moisture, dust, condensation and oil
Working Temp.: 20~70°C
Medium Temp.: 0~60°C
Temp. Compensation: 0~50°C
Working Pressure: overload 10xFS, burst 15xFS
Display: 5 bits LCD, with engineering unit & backlight
Output: 0-10V / 4-20mA (3 wires)
Output load: ≤500Ω (current), ≥2KΩ (voltage)
Relay Output: 2×SPST, 3A/30VDC, 3A/250VAC or 1xBuzzer
Accuracy: up to ±1.0%FS(±2.0%FS@25Pa range)
Long term stability: ±0.5%FS /Year
Thermal effect: <0.05%FS/°C (zero), <0.08%FS/°C(FS)
Power type 16~28VDC/AC
24V Power Supply included
Process Connection: 5mm ID tubing, two pairs (left/back)
Keys: 3 touch buttons
Protection: IP54
Approval: CE
Display update time: selectable for 0.5/1/5/10s (default 1s)

DPT(DPT-F Flush Mount) Differential Pressure Transmitter



OBAR Systems, Inc. **800-949-OBAR** **wholesale@obarsystems.com**

Standard Operating Procedure Installation and Extraction of the Vapor Pin®

Updated March 16, 2018

Scope:

This standard operating procedure describes the installation and extraction of the VAPOR PIN® for use in sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the VAPOR PIN® for the collection of sub-slab soil-gas samples or pressure readings.

Equipment Needed:

- Assembled VAPOR PIN® [VAPOR PIN® and silicone sleeve(Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole **must** be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- VAPOR PIN® installation/extraction tool;
- Dead blow hammer;
- VAPOR PIN® flush mount cover, if desired;
- VAPOR PIN® drilling guide, if desired;
- VAPOR PIN® protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the VAPOR PIN®.

Figure 1. Assembled VAPOR PIN®

Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a VAPOR PIN® drilling guide is recommended.

4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole **must** be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.

VAPOR PIN® protected under US Patent # 8,220,347 B2, US 9,291,531 B2 and other patents pending

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of VAPOR PIN® assembly into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the vapor pin to protect the barb fitting, and tap the vapor pin into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the vapor pin to avoid damaging the barb fitting.

Figure 2. Installing the VAPOR PIN®

During installation, the silicone sleeve will form a slight bulge between the slab and the VAPOR PIN® shoulder. Place the protective cap on VAPOR PIN® to prevent vapor loss prior to sampling (Figure 3).

Figure 3. Installed VAPOR PIN®

7) For flush mount installations, cover the vapor pin with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).

Figure 4. Secure Cover Installed

8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the VAPOR PIN®. This connection can be made using a short piece of Tygon™ tubing to join the VAPOR PIN® with the

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Nylaflow tubing (Figure 5). Put the Nylaflow tubing as close to the VAPOR PIN® as possible to minimize contact between soil gas and Tygon™ tubing.

Figure 5. VAPOR PIN® sample connection

10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the VAPOR PIN® via Mechanical Means (Figure 6). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.

Figure 6. Water dam used for leak detection

11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the protective cap and flush mount cover until the next event. If the sampling is complete, extract the VAPOR PIN®.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the VAPOR PIN® (Figure 7). Turn the tool clockwise continuously, don't stop turning, the VAPOR PIN® will feed into the bottom of the installation/extraction tool and will extract from the hole like a wine cork, DO NOT PULL.

2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.

Figure 7. Removing the VAPOR PIN®

- Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the VAPOR PIN® in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes. For both steps, **STAINLESS – ½ hour, BRASS 8 minutes**

3) Replacement parts and supplies are available online.

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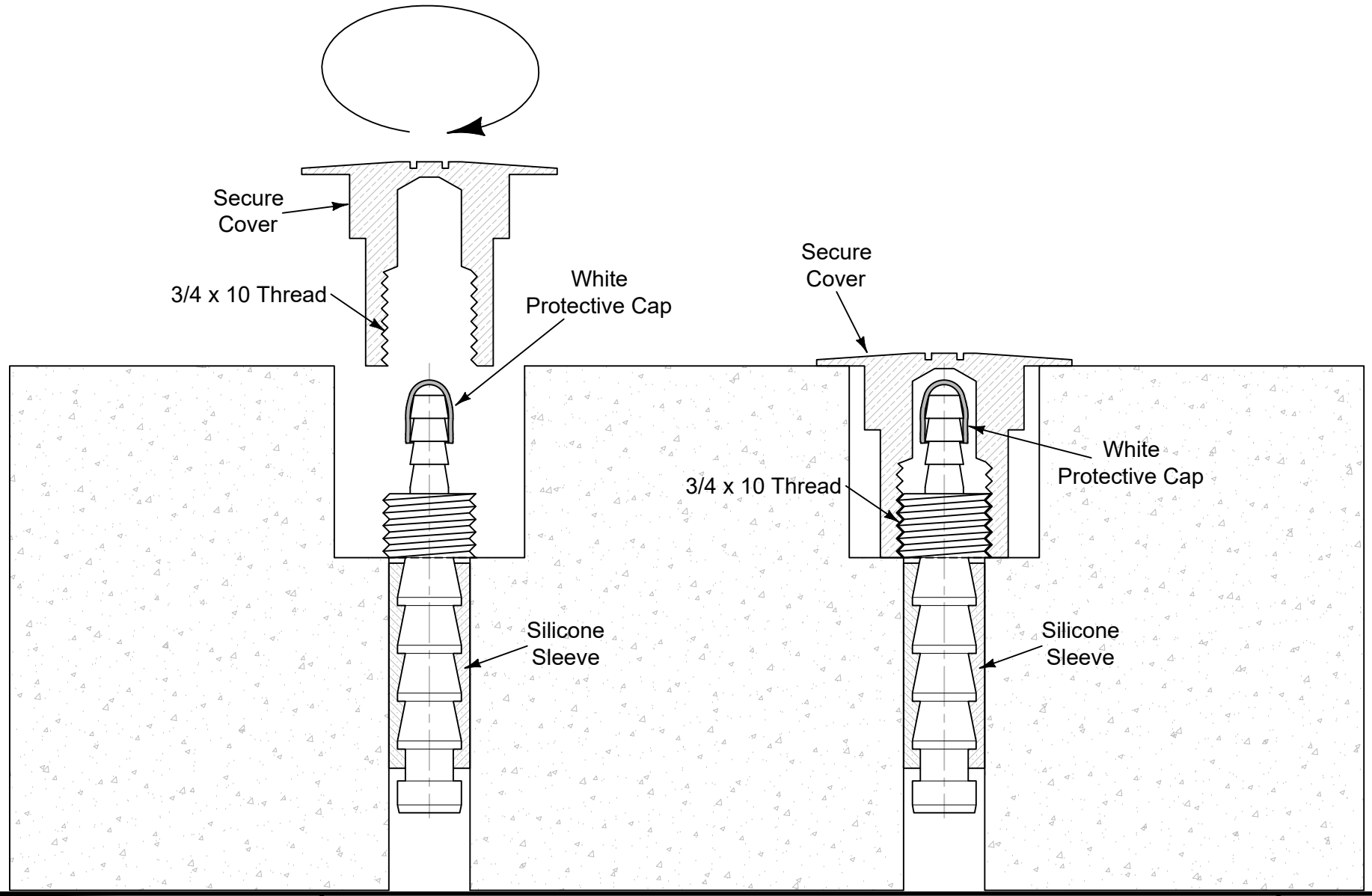

VaporPin®

Stainless Steel Vapor Pin® and Secure Cover,
Vapor Pin Enterprises, Inc.
January 4, 2010

Figure

3

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Technical Datasheet

VAPORTIGHT COAT®-SG3

100% Solids, Moisture mitigation and pH barrier coating

CSI Div. 07 + 09
07 26 00 VAPOR RETARDERS
09 96 56 EPOXY COATINGS

LEED Points
IEQ Credit 4.2, Low-Emitting Materials, Paints & Coatings: 1 Point
Using this AQUAFIN product can help contribute to LEED certification of projects in the categories shown above.

Product Description:
VAPORTIGHT COAT®-SG3 is a unique 2-component, moisture tolerant, low viscosity, solvent free, chemically enhanced epoxy based product which reduces the passage of water vapor and moisture through slabs on, below and above grade as well as split slabs, thus eliminating delamination of adhesives, floor coverings and coatings. SG3 meets or exceeds the requirements of ASTM F3010-13 Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings.

Typical Applications:
- Indoor and outdoor, new and existing concrete slabs: on grade, above grade, below grade and split slabs, old cementitious underlayment (no gypsum) and ceramic tiles with missing or damaged under-slab vapor barriers.
- Industrial/retail facilities, office buildings, supermarkets, food processing plants, airplane hangars, hospitals, schools, etc.
- Use VAPORTIGHT COAT-SG2 for capillary infiltration of oil or other chemicals from the ground or to treat oil-contaminated slabs or radon infiltration.

Advantages:
- One coat system - No sand broadcast
- Low viscosity, solvent free, no VOC's
- For slabs with MVER up to 25 lbs and RH up to 100%
- ASTM E 96 perm rating ≤0.10
- Flooring system installed next day
- Can be applied to damp & green concrete (min. 5 days old)
- High alkalinity barrier (pH 14)
- Compatible with most flooring systems
- Does not support mold growth
- Great for indoor applications: low odor and non-flammable.
- SG3 passed Indoor Air Quality Material Emissions Test as per DIN EN ISO 16000 (Report CT-10-06-22-01:250005/2-3)

Testing Concrete Slabs for Contaminants:
Aquafin recommends testing slabs with unknown history, as well as slabs with previously failed flooring systems, for contaminants (i.e. hydrocarbons, other organic compounds, un-reacted water soluble silicates, chlorides, ASR, Sulfurous compounds, etc.) to determine suitability of SG3. Provide Ion Chromatography and IR Spectroscopy data to Aquafin before commencing application. A separation screed may be required.

Physical and Technical Data	
Material	2-component, clear epoxy
Density:	~9.08 lbs/gal (1.09 ± 0.02 kg/L)
VOC:	0 g/L
Volume Solids	100 %
Flash Point: Part A Part B	>212°F (>100°C) 170°F (77°C)
Mixing Ratio	100:50 (by weight)
Viscosity	600±80 cps (mPa*s) @ 77°F (25°C)
Pot Life @ 73°F (23°C)	~35 Minutes
Open to Foot Traffic	after 12 hrs at 73°F (23°C)
Recoat Time at 73°F (23°C)	minimum 12 hrs max. 5 days, observe dew point!
Application Temperature	min. 45°F (8°C) – max. 95°F (35°C)
Curing Temperature	min. 45°F (8°C)
Full Strength	after 7 days at 73°F (23°C)
Compressive Strength:	>11,000 psi (>80 MPa)
Adhesion to Concrete (ASTM D7234)	>480 psi (3.3 MPa) Failure in substrate
pH 14 Resistance	Pass 14 day test. (ASTM D-1308)
Water Vapor Transmission (ASTM E 96)	0.100 grains/h-ft²-in.Hg
Average Critical Radiant Flux (CRF)	1.00 W/cm² - Passed = nonflammable (ASTM E 648-03)
Methane Permeability (ISO 15105-2)	2.20 [cm³ / (m²*d*bar)] at 36 mils (0.90 mm) thickness
Indoor Air Quality Control (DIN EN ISO 16000)	Passed: VOC (0 mg/m³) & Formalde- hyde emissions (<0.01 ppm)

All data are average values obtained under laboratory conditions. In practical use temperature, humidity and absorbance of the substrate may influence the above given values.

Moisture Vapor Emission Testing:
Aquafin recommends testing to determine moisture vapor emission rate (MVER) including "Anhydrous Calcium Chloride" testing as per ASTM F 1869-11 on slabs to be treated, to determine the MVER in lb/1000 ft² • 24 hrs (grams/m² • hr) and to determine RH content (%) as per ASTM F 2170. This testing can be used to determine application rate of material required to obtain AQUAFIN warranty.

VAPORTIGHT COAT®-SG3

Substrate Preparation:

- Concrete must be a minimum 5 days old or have reached a minimum 2,500 psi (17 MPa) compressive strength, to be treated with SG3. Concrete must be clean, sound and have an "open"/absorptive surface ("tooth and suction"). All slabs must be mechanically prepared (i.e. Shot blast) to a concrete surface profile (CSP) 3 – 5 per the International Concrete Repair Institute (ICRI) Guideline No. 301-2R-2013. Acid etching is not allowed, broom finish on new slabs is not acceptable. Burn off any reinforcing fibers and vacuum remains.
- Remove glaze from "quarry tiles".
- After surface preparation, check slab surface with the water drop method. Pour a drop of water about the size of a dime in several places. If the water beads, the surface is not absorptive and requires additional preparation or core extraction and testing. If the water "wets out" or penetrates the concrete within 30 - 60 seconds the surface is ready to receive the SG3 treatment.
  Note: This method does not replace pre-testing of concrete cores. A test application is highly recommended on existing slabs to determine adhesion (i.e. Elcometer, etc.).
- Treat saw cut and expansion joints as per drawings on page 3.

Separation Screed:

Concrete floors which contain water soluble, unreacted sodium and/or potassium silicates or chlorides can not be coated when certain thresholds of these compounds are exceeded. If these soluble mediums have deeper penetration into the substrate than standard steel shot blasting will remove, it will be required to remove 3/8" - 1/2" (10 mm - 13 mm)of the concrete surface and replace it with a separation screed, such as MORTAR-Screed to prevent substrate failure when trapped rising moisture activates these mediums. SG3 will then be applied over the separation screed. All separation screed surfaces must be mechanically prepared like a concrete surface (CSP 3 - 5) as indicated above.

Water-Vapor Transmission Treatment:

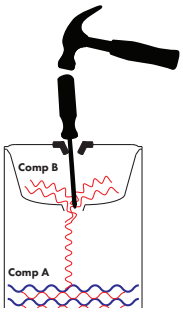
1. Remove existing floor coverings, coatings, adhesives, curing compounds, efflorescence, dust, grease, laitance, etc. down to bare concrete with steel shot blasting, scarifying or grinding using a diamond cup blade (run with low RPM and assure that surface is profiled).
2. Repair cracks with a suitable patching mortar or SG3 mixed with 5 parts by volume of oven-dried sand.
3. Install cementitious underlayment's or leveling mortars on top of SG3.

Mixing:

SG3 is supplied in the appropriate mixing ratio (Comp-A = resin, Comp-B = hardener). Always mix full units.

- Use chemical resistant gloves and goggles when mixing or applying SG3.
- Material should be minimum 60°F (15°C) at time of mixing.

1. For 4.6 & 2.7 gal kits only (7.3 gal kit packaged seperate A&B containers!): Pierce a hole through the rubber membrane in the lid and continue through the bottom of "lid well". Assure Part B completely drains into Part A.
2. Stir mixture for approx. 5 minutes to a homogenous, streak free consistency, using a slow speed drill (~300 rpm) with a PS Jiffy blade. Avoid entrapping air. Ensure that the material at the bottom and sides are scraped and thoroughly mixed.
3. Pour mixed material from the mixing container into another, clean container and carefully mix for additional 30 seconds.



Application:

- Substrate and ambient temperatures must be between 45°F (8°C) and 95°F (35°C).
- All exterior applications must be protected from strong sun light, wind and rain until fully cured.
- All interior applications must be protected from drafts to avoid "skinning over".
- SG3 surface must be protected from bond inhibiting contaminants, i.e. dirt, dust and debris.
- Application equipment needed: Clean mixing containers, soft-edge squeegee, non-shed synthetic roller.

1. All surfaces must be saturated surface dry (SSD) with no standing water.
2. Pour SG3 in sufficient quantity over the area to be treated and uniformly distribute with a notched squeegee.
3. Follow with a non-shed roller, back rolling at right angle (90 degrees) to the squeegee application to achieve uniform coverage and let product cure for minimum 12 hours.

NOTE: Where sand broadcast is desired use SG2 in lieu of SG3.

4. Re-treat "outgasing channels" and pin-holes by sanding surface, and cleaning with hot water. Make sure surface is dry and re-apply SG3.
5. Immediately clean all equipment and tools with mineral spirits.

Maximum recoat time:

- Interior Applications: Top coatings (i.e. epoxy, terrazzo, urethane) and flooring systems (i.e. VCT, sheet vinyl, carpet, wood) must be applied within 12 hrs - 5 days.
- Exterior Applications: Top coatings such as epoxy, urethane traffic membranes, must be applied within 24 hrs - 36 hrs.
- If recoat time is missed, SG3 surface must be sanded, cleaned with hot water, and allowed to dry, before application of flooring systems or top coatings.

Flooring

- Water or solvent based adhesives may require a cementitious underlayment (see Aquafin LEVEL-Ultra TDS) of a minimum 1/8" (3 mm) thickness to absorb excess moisture/solvent (check with adhesive manufacturer).
- Pressure sensitive adhesives installed directly over SG3 require a longer "tack" time than listed on manufacturer's literature to prevent adhesive moisture or solvent entrapment.
- Many flooring systems require a more level or smooth surface. In such cases an application of a self-leveling cementitious underlayment (minimum 1/8" (3 mm) thickness) is required to provide a proper substrate for the floor covering and the adhesive (See Aquafin LEVEL-Ultra TDS).
- Do not apply flooring system if SG3 surface is wet due to dew point or other causes.

Underlayment's and Patching:

If cement based toppings, such as underlayments, screeds, "flash" patching, repair mortars are to be used, the manufacturer's recommended primer or Aquafin SLU-PRIMER must be applied over SG3.

Packaging and Shelf Life:

Shelf life is 2 years in closed, original packaging, stored in a dry, cool place.

- 0.24 gal/2.2 lb (0.9 L/1.0 kg) kit. (special order only)
- 2.4 gal/22 lb (9.2 L/10 kg) kit.
  A-Comp: 1.5 gal/14.48 lb (5.8 L/6.58 kg)
  B-Comp: 0.9 gal/7.52 lb (3.4 L/3.42 kg).

VAPORTIGHT COAT®-SG3

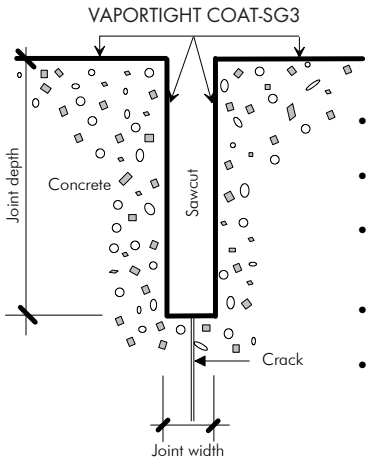
Special order size:
- 7.3 gal/65.59 lb (27.5 L/30 kg) kit.
  A-Comp: 4.6 gal/41.06 lb (17.3 L/18.87 kg)
  B-Comp: 2.7 gal/24.53 lb (10.2 L/11.13 kg).

Limitations:
- Do not spray apply SG3.
- Post-cracking of the concrete, slab warping or warping relaxation at joints or cracks after installation of the SG3 may cause a breach in the coating and void warranty.
- Do not apply over gypsum based substrates.
- Do not alter mixing ratios, thin or mix with Cab-O-Sil.
- Call Aquafin Technical Department for slabs with floor heating systems or installation recommendations for any substrates and conditions not listed.

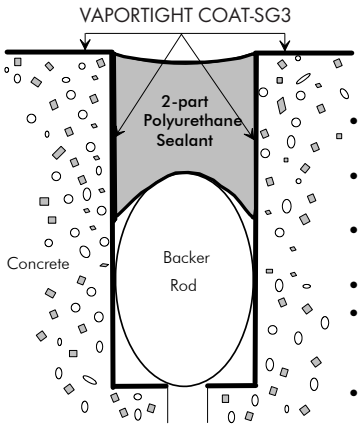
Note:
Installer is responsible for proper product application. Site visits by Aquafin personnel or representatives are solely for the purpose of making technical recommendations, not for providing supervision or quality control. This product is not sold to the Do-it-Yourself market. **For Professional Use Only.**

Safety: Refer to SDS.
Part A - irritant; sensitizer - contains epoxy resins.
Part B - corrosive; sensitizer - contains amines.
KEEP OUT OF REACH OF CHILDREN.
Spills: Ventilate area. Contain and collect spillage with noncombustible, absorbent materials (i.e. sand, vermiculite, universal binders, sawdust, etc.) and place in container for disposal. Emergency procedures are not required. Dispose of in accordance with current local, state and federal regulations. VOC limit: This product is well below the allowable EPA limits as stated in 40 CFR Part 59.

LIMITED WARRANTY: AQUAFIN, INC. warrants its products to be manufactured free of defects for one year and to be consistent with its standard high quality. We will replace or, at our election, refund the purchase price of, any product which is proven to be defective, provided that the product was properly applied. Our product recommendations are based on Industry Standards and testing procedures. We assume no warranties either written, expressed or implied as to any specific methods of application or use of the product. AQUAFIN, INC. MAKES NO WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. AQUAFIN, INC. shall not be liable for damages of any sort including remote or consequential damages, down time, or delay. Contact Aquafin for information on extended warranty's.



- Coat slab surface with SG3 as per specifications.
- Coat sidewalls and bottom of cavity with SG3.
- Fill cavity with a flooring system manufacturer recommended joint filler.
- Touch-up slab surface if necessary.
- Install sub-flooring system.



- Coat slab surface with SG3 as per specifications.
- Coat sidewalls and bottom of cavity with SG3.
- Allow SG3 to cure for min. 12 hrs at 73°F (23°C).
- Install backer rod.
- Fill cavity with a suitable polyurethane sealant or as specified by the A/E.
- Install sub-flooring system.

SG3 Application Rates per ASTM F-1869 (CaCl) & F-2170 or ASTM F-2420 (RH - Relative Humidity):

Moisture vapor emission rate (MVER): listed by lbs/1000 ft² * 24hrs	RH: listed by percentage (%)	No. of coats	Application rate ft²/gal	Application rate (kg/m²)	~Thickness mils	~Thickness mm	~ Yield: 2.4 gal (9.2L) ft²	~ Yield: 2.4 gal (9.2L) m²	~Yield: 7.3 gal (27.5 L) ft²	~Yield: 7.3 gal (27.5 L) m²
up to 10 lbs	<85%	1	155	0.29	10	0.25	370	33.4	1,130	105
10 - 15 lbs	85 - 90%	1	130	0.35	12	0.30	310	28.8	950	88
15 - 25	90 - 100%	1	100	0.45	16	0.40	240	22.3	730	67
Stand-alone coating on slabs		1	90	0.50	18	0.45	215	20.0	655	61
New concrete (min. 5 days old)		1	100	0.45	16	0.40	240	22.3	730	67

Walls: contact our technical dept. Note: all values theoretical. Application thicknesses are approximate. Some variations may apply due to porosity and absorption of substrate.

Sample Water Vapor Transmission Reduction — **Test : ASTM E 96**

Test carried out by independent laboratory (Wet method)	**BEFORE: Untreated Control**	**AFTER: VAPORTIGHT COAT®-SG3**	
Water Vapor Transmission: • lbs/1000 ft² * 24 hrs	24.08	Sample A, No.1 0.18 (Mactec, 3/17/06)	REDUCTION 99%
Vapor Permeance: grains/hour/ft²/in.Hg	3.17	0.10 @ 16 mils (Nelson Testing, 01/08/14)	ASTM F3010-13

Appendix G – New York State Department of Health Soil Vapor/Indoor Air Matrices May 2017

Soil Vapor / Indoor Air Matrix A
May 2017

Analytes Assigned:
Trichloroethene (TCE), *cis*-1,2-Dichloroethene (*c*12-DCE), 1,1-Dichloroethene (11-DCE), Carbon Tetrachloride

	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m^3)		
SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m^3)	< 0.2	0.2 to < 1	1 and above
< 6	1. No further action	2. No Further Action	3. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
6 to < 60	4. No further action	5. MONITOR	6. MITIGATE
60 and above	7. MITIGATE	8. MITIGATE	9. MITIGATE

No further action: No additional actions are recommended to address human exposures.

Identify Source(s) and Resample or Mitigate: We recommend that reasonable and practical actions be taken to identify the source(s) affecting the indoor air quality and that actions be implemented to reduce indoor air concentrations to within background ranges. For example, if an indoor or outdoor air source is identified, we recommend the appropriate party implement actions to reduce the levels. In the event that indoor or outdoor sources are not readily identified or confirmed, resampling (which might include additional sub-slab vapor and indoor air sampling locations) is recommended to demonstrate that SVI mitigation actions are not needed. Based on the information available, mitigation might also be recommended when soil vapor intrusion cannot be ruled out.

Monitor: We recommend monitoring (sampling on a recurring basis), including but not necessarily limited to sub-slab vapor, basement air and outdoor air sampling, to determine whether concentrations in the indoor air or sub-slab vapor have changed and/or to evaluate temporal influences. Monitoring might also be recommended to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined based on site-, building- and analyte-specific information, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

Mitigate: We recommend mitigation to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

These general recommendations are made with consideration being given to the additional notes on page 2.

ADDITIONAL NOTES FOR MATRIX A

This matrix summarizes actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate analyte-specific, building-specific conditions (e.g., dirt floor in basement, crawl spaces, thick slabs, current occupancy, etc.), and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, collection of additional samples may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Mitigation might be recommended when the results of multiple contaminants indicate monitoring is recommended. Proactive actions may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action might be undertaken for reasons other than public health (e.g., seeking community acceptance, reducing costs, etc.). However, actions implemented *in lieu* of sampling will typically be expected to be captured in the final engineering report and site management plan, and might not rule out the need for post-implementation sampling (e.g., to document effectiveness or to support terminating the action).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of soil vapor contamination, nor does it preclude remediating contaminated soil vapor or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 0.20 microgram per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples and dirt floor soil vapor samples, a minimum reporting limit of 1 microgram per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions might be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including but not limited to the following: the identified source of the volatile chemicals, the environmental remediation program, and analyte-specific, site-specific and building-specific factors.

Soil Vapor / Indoor Air Matrix B
May 2017

Analytes Assigned:
Tetrachloroethene (PCE), 1,1,1-Trichloroethane (111-TCA), Methylene Chloride

	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m^3)		
SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m^3)	< 3	3 to < 10	10 and above
< 100	1. No further action	2. No Further Action	3. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
100 to < 1,000	4. No further action	5. MONITOR	6. MITIGATE
1,000 and above	7. MITIGATE	8. MITIGATE	9. MITIGATE

No further action: No additional actions are recommended to address human exposures.

Identify Source(s) and Resample or Mitigate: We recommend that reasonable and practical actions be taken to identify the source(s) affecting the indoor air quality and that actions be implemented to reduce indoor air concentrations to within background ranges. For example, if an indoor or outdoor air source is identified, we recommend the appropriate party implement actions to reduce the levels. In the event that indoor or outdoor sources are not readily identified or confirmed, resampling (which might include additional sub-slab vapor and indoor air sampling locations) is recommended to demonstrate that SVI mitigation actions are not needed. Based on the information available, mitigation might also be recommended when soil vapor intrusion cannot be ruled out.

Monitor: We recommend monitoring (sampling on a recurring basis), including but not necessarily limited to sub-slab vapor, basement air and outdoor air sampling, to determine whether concentrations in the indoor air or sub-slab vapor have changed and/or to evaluate temporal influences. Monitoring might also be recommended to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined based on site-, building- and analyte-specific information, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

Mitigate: We recommend mitigation to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

These general recommendations are made with consideration being given to the additional notes on page 2.

ADDITIONAL NOTES FOR MATRIX B

This matrix summarizes actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate analyte-specific, building-specific conditions (e.g., dirt floor in basement, crawl spaces, thick slabs, current occupancy, etc.), and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, collection of additional samples may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Mitigation might be recommended when the results of multiple contaminants indicate monitoring is recommended. Proactive actions may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action might be undertaken for reasons other than public health (e.g., seeking community acceptance, reducing costs, etc.). However, actions implemented *in lieu* of sampling will typically be expected to be captured in the final engineering report and site management plan, and might not rule out the need for post-implementation sampling (e.g., to document effectiveness or to support terminating the action).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of soil vapor contamination, nor does it preclude remediating contaminated soil vapor or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 1 microgram per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples and dirt floor soil vapor samples, a minimum reporting limit of 1 microgram per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions might be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including but not limited to the following: the identified source of the volatile chemicals, the environmental remediation program, and analyte-specific, site-specific and building-specific factors.

Soil Vapor/Indoor Air Matrix C

May 2017

Analytes Assigned:
Vinyl Chloride

	INDOOR AIR CONCENTRATION of COMPOUND (mcg/m^3)	
SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m^3)	< 0.2	0.2 and above
< 6	1. No further action	2. IDENTIFY SOURCE(S) and RESAMPLE or MITIGATE
6 to < 60	3. MONITOR	4. MITIGATE
60 and above	5. MITIGATE	6. MITIGATE

No further action: No additional actions are recommended to address human exposures.

Identify Source(s) and Resample or Mitigate: We recommend that reasonable and practical actions be taken to identify the source(s) affecting the indoor air quality and that actions be implemented to reduce indoor air concentrations to within background ranges. For example, if an indoor or outdoor air source is identified, we recommend the appropriate party implement actions to reduce the levels. In the event that indoor or outdoor sources are not readily identified or confirmed, resampling (which might include additional sub-slab vapor and indoor air sampling locations) is recommended to demonstrate that SVI mitigation actions are not needed. Based on the information available, mitigation might also be recommended when soil vapor intrusion cannot be ruled out.

Monitor: We recommend monitoring (sampling on a recurring basis), including but not necessarily limited to sub-slab vapor, basement air and outdoor air sampling, to determine whether concentrations in the indoor air or sub-slab vapor have changed and/or to evaluate temporal influences. Monitoring might also be recommended to determine whether existing building conditions (e.g., positive pressure heating, ventilation and air-conditioning systems) are maintaining the desired mitigation endpoint and to determine whether changes are needed. The type and frequency of monitoring is determined based on site-, building- and analyte-specific information, taking into account applicable environmental data and building operating conditions. Monitoring is an interim measure required to evaluate exposures related to soil vapor intrusion until contaminated environmental media are remediated.

Mitigate: We recommend mitigation to minimize current or potential exposures associated with soil vapor intrusion. The most common mitigation methods are sealing preferential pathways in conjunction with installing a sub-slab depressurization system and changing the pressurization of the building in conjunction with monitoring. The type, or combination of types, of mitigation is determined on a building-specific basis, taking into account building construction and operating conditions. Mitigation is considered a temporary measure implemented to address exposures related to soil vapor intrusion until contaminated environmental media are remediated.

These general recommendations are made with consideration being given to the additional notes on page 2.

ADDITIONAL NOTES FOR MATRIX C

This matrix summarizes actions recommended to address current and potential exposures related to soil vapor intrusion. To use the matrix appropriately as a tool in the decision-making process, the following should be noted:

[1] The matrix is generic. As such, it may be appropriate to modify a recommended action to accommodate analyte-specific, building-specific conditions (e.g., dirt floor in basement, crawl spaces, thick slabs, current occupancy, etc.), and/or factors provided in Section 3.2 of the guidance (e.g., current land use, environmental conditions, etc.). For example, collection of additional samples may be recommended when the matrix indicates "no further action" for a particular building, but the results of adjacent buildings (especially sub-slab vapor results) indicate a need to take actions to address exposures related to soil vapor intrusion. Mitigation might be recommended when the results of multiple contaminants indicate monitoring is recommended. Proactive actions may be proposed at any time. For example, the party implementing the actions may decide to install sub-slab depressurization systems on buildings where the matrix indicates "no further action" or "monitoring." Such an action might be undertaken for reasons other than public health (e.g., seeking community acceptance, reducing costs, etc.). However, actions implemented *in lieu* of sampling will typically be expected to be captured in the final engineering report and site management plan, and might not rule out the need for post-implementation sampling (e.g., to document effectiveness or to support terminating the action).

[2] Actions provided in the matrix are specific to addressing human exposures. Implementation of these actions does not preclude investigating possible sources of soil vapor contamination, nor does it preclude remediating contaminated soil vapor or the source of soil vapor contamination.

[3] Appropriate care should be taken during all aspects of sample collection to ensure that high quality data are obtained. Since the data are being used in the decision-making process, the laboratory analyzing the environmental samples must have current Environmental Laboratory Approval Program (ELAP) certification for the appropriate analyte and environmental matrix combinations. Furthermore, samples should be analyzed by methods that can achieve a minimum reporting limit of 0.20 microgram per cubic meter for indoor and outdoor air samples. For sub-slab vapor samples and dirt floor soil vapor samples, a minimum reporting limit of 1 microgram per cubic meter is recommended.

[4] Sub-slab vapor and indoor air samples are typically collected when the likelihood of soil vapor intrusion is considered to be the greatest (i.e., worst-case conditions). If samples are collected at other times (typically, samples collected outside of the heating season), then resampling during worst-case conditions might be appropriate to verify that actions taken to address exposures related to soil vapor intrusion are protective of human health.

[5] When current exposures are attributed to sources other than soil vapor intrusion, the agencies should be given documentation (e.g., applicable environmental data, completed indoor air sampling questionnaire, digital photographs, etc.) to support a proposed action other than that provided in the matrix box and to support agency assessment and follow-up.

[6] The party responsible for implementing the recommended actions will differ depending upon several factors, including but not limited to the following: the identified source of the volatile chemicals, the environmental remediation program, and analyte-specific, site-specific and building-specific factors.

Appendix H – Diagnostic Report &

Sub-Slab Depressurization (SSD) /

Soil Vapor Extraction (SVE) System Design

Plan By OBAR Systems Inc.

DIAGNOSTIC REPORT & SUB-SLAB DEPRESSURIZATION (SSD) / SOIL VAPOR EXTRACTION (SVE) SYSTEM DESIGN PLAN

Site Address:

1810 Cropsey Ave. Brooklyn, NY

Prepared for:

Mr. Danny D. Singh

Senior Environmental Consultant

RSK Environmental Group

Prepared by:

Mr. Daniel Nuzzetti

Project Engineer/ Mitigation Specialist

OBAR Systems, Inc.

2969 Route 23

Newfoundland, NJ 07435

April 27, 2023

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Attached Tables

Table 1 – Suction Point 1
Table 2 – Suction Point 2

Attachments

Attachment 1 – Blowers
Attachment 2 – Pipe, Supports, and Hangers
Attachment 3 – Test Ports
Attachment 4 – Vacuum gauge and alarm

Drawings

SSD-1–Diagnostic Locations
SSD-2- Mapped ROI
SSD-3- System Design
SSD-4 – System Details

1. Background

OBAR Systems was contacted by RSK regarding diagnostics and the design of a vapor intrusion mitigation system comprised of a sub slab depressurization (SSD) and soil vapor extraction (SVE) system for the building located at 1810 Cropsey Avenue in Brooklyn, New York. The building of concern features an unfinished basement and measures approximately 4,200 square feet. The street view below shows the building of concern, diagnostics were performed on April 24th, 2023 in accordance with the April 5th, 2023 Diagnostic and Design proposal.

2. Mitigation Concepts

Volatile Organic Compounds (VOCs) located in the soil are drawn into the building by the negative pressure of the building relative to the surrounding soil. As a gas, the VOCs enter the structure through cracks and openings and can migrate through the concrete floor and walls. A common remedy to reverse the intrusion process is Sub Slab Depressurization (SSD), which is a system that depressurizes the soil under the slab. The concept is that by creating a vacuum beneath the slab, the soil gases will be drawn into the system where they can be discharged to a safe location.

3. Diagnostic Method

The method used for diagnostic measurement and system design involved coring 2 ½" suction holes in the concrete floor and 5/16" test holes at various distances from the suction hole. A specialized Sub Slab Diagnostic Vacuum (SSDV), capable of up to 200 cfm and a vacuum of 45 inches of water column ("W.C.) was used with a variable speed controller to define the flow and vacuum characteristics of the soil beneath the slab. The data obtained during the diagnostic investigation has been provided in the attached tables. The range of applied vacuum and flow rate used for each suction point was determined by evaluating the baseline data taken in the maximum flow and vacuum test performed at the beginning of each sampling series. The number of test point locations at each suction point was determined based on the results of the

first sampling series at that location. The data collected at each suction point series includes; maximum vacuum and airflow at the suction point, vacuum 1 foot away from the suction point (SSP1), vacuum at each test point at multiple vacuum speeds or flow rates, and the distance each test point is from the suction point. Following the competition of diagnostics all holes were permanently sealed.

4. Data Analysis

The information obtained from the suction points was examined to identify the associated radius of influence (ROI) for that location during the applied test conditions. The test data was used to determine the number of full-scale SVE/SSD system suction points required to address the area of concern within the building. The test data was then used to determine the type and number of blowers required to effectively operate all of the full-scale system suction points.

4.1. Analysis of data Series

For locations of all suction points and test points see attached drawing sheet (SSD-1); for full test results see the attached data tables. The proposed radius of influence (ROI) is visually illustrated on drawing sheet SSD-2.

4.1.1. Suction Point 1

Suction Point 1 (S1) was located centrally in the east side of the basement near a structural column (See Drawing SSD-1). The purpose of this suction point was to evaluate the ROI produced from full-scale suction points installed in this area and to determine if sub slab communication would be observed into the opposite side of the basement. The suction point revealed loose brown sandy soil. An ROI of approximately 40 feet was observed at 10 inches of water column ("w.c.) applied and a 10 cubic feet per minute (cfm) airflow yield. Communication was diminished towards the rear elevated slab area. See Table 1 attached for full test results.

4.1.2. Suction Point 2

Suction Point 2 (S2) was located centrally on the western side of the basement (See Drawing SSD-1). The purpose of this suction point was to determine if both sides of the basement had similar communication profiles. The suction point revealed very similar soils to those seen at S1. An ROI in excess of 40 feet was observed at 8 inches of water column ("w.c.) applied and a 25 cubic feet per minute (cfm) airflow yield. See Table 2 attached for full test results.

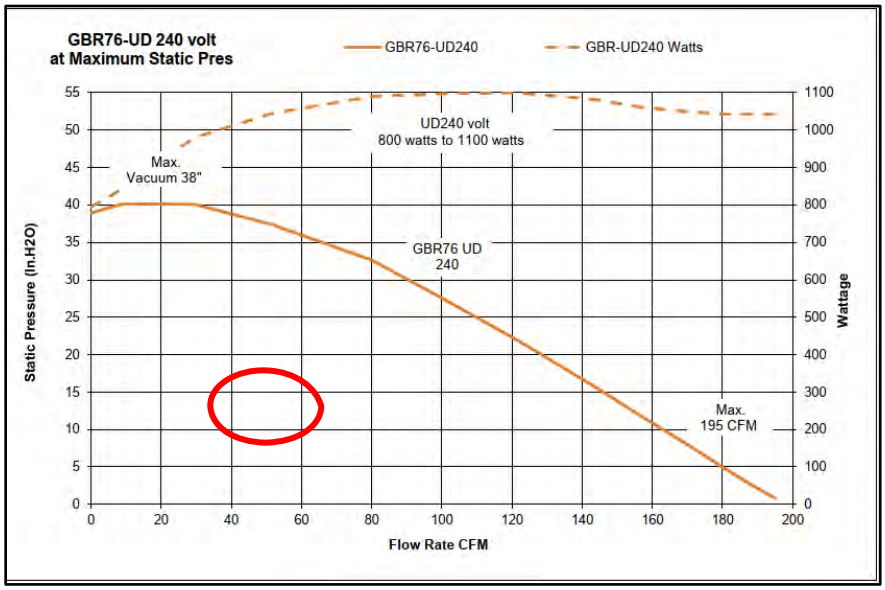
4.2. Collective Analysis

The full-scale system design was developed by using the diagnostic test results to produce a map that projects the estimated ROIs around suction points installed in locations that cover the area of concern. The SSDS suction point ROIs were estimated by examining the vacuum data measured during the diagnostic survey at nearby test points. The required system operating vacuums were determined by using values measured at the diagnostic head and the SSPs, along with performance tables for the Sub Slab Diagnostic Vacuum. An approximate 40 foot radius of influence was observed throughout the basement at approximately 8 to 10 "w.c. of applied vacuum and a 10-25 cfm airflow yield.

5. System Design

One Sub Slab Depressurization System (SSDS) / Soil Vapor Extraction (SVE) system paired with three (3) vertical suction points will be installed to depressurize the entire area of concern. The blower will be mounted on the side exterior wall of the building; the blower curve for the system is shown below with the performance of the system indicated. The blower has been specified with additional capacity to compensate for potential vacuum loss through the RSK specified carbon vessel.

System #	# of suction points	Fan type	Projected airflow (cfm)	Applied Vacuum ("w.c.)
1	3	GBR76UD	50	10



6. Mitigation System Components

6.1. System Blowers

The blower will be mounted on the exterior wall of the building. The blower exhaust will extend vertically up the wall and terminate 1 foot above the roofline and 10 feet from any intake it is not at least two feet above. The blower location is shown on the attached drawing sheet (SSD-3); the location is approximate and should be verified prior to final mounting.

6.2. Vertical Suction Points

The suction points will be installed by coring 3 ½ inch holes through the slab and hand excavating approximately 0.5 cubic feet of sub slab material to a depth of 6 inches below the slab. Holes will be backfilled with crushed stone (AASHTO #57) following clean out and sealed with concrete upon completion. The vertical risers will be installed and sealed directly into the suction holes. Each suction point will have a ball valve for balancing airflow. See details sheet (SSD-4) for suction point details.

6.3. System Piping

All interior system piping will be 3-inch no hub cast iron black pipe and exterior system piping and fittings will be 3-inch schedule 40 or cellular core PVC, refer to Attachment 2 for pipe specifications. Overhead piping will be installed in the locations shown on the attached drawing. All overhead piping will be installed as high as possible, within the building and without the possibility of water traps. All overhead piping must have 1 inch of pitch per 10 feet of horizontal pipe in order to drain condensation. The suction points will have a vertical riser pipe that connects into the overhead piping. The common riser pipe for the system will exit through the exterior wall to the wall mounted blower. Cut sheets for the pipe and fittings are attached.

6.4. Test Ports

Sub Slab test ports will be installed within the systems' radius of influence to confirm sub slab vacuum. Suggested test port locations are shown on drawing sheet SSD-3. GBR sub slab test ports will be installed by drilling a 20mm hole and hammering in the port. Riser test ports will be installed in each riser pipe for vacuum and airflow sampling.

6.5. Electrical

All electrical work is to be done in accordance with state and local codes. The GBR76UD mitigation fan will require 120/240 volts and be on a dedicated breaker.

6.6. Monitoring

The system will feature a GBR25T vacuum gauge with a built in audible/visual alarm. The gauge will be paired with an Obar Instruments Environmental Data Gateway (EDG) for real time monitoring and alerts. The first year of monitoring is included, following the second year of service it will be billed annually at $13.50 per month.

6.7. System Labels

All exposed system piping will be labeled with a sticker indicating that the system is a vapor intrusion mitigation system. A sticker with the contact information of the installer will be located on the system gauge.

6.8. Sealing

There are multiple sump pits and areas of deteriorated or removed concrete that require sealing where indicated on the drawing. Sumps will have a polycarbonate lid installed with a drainjer device for dewatering. Exposed soil or broken concrete will be sealed where required to prevent system vacuum loss.

7. Post Installation

7.1. As Built Drawings

As-built drawings will be provided showing the system locations, the monitoring and alarm locations, and sub-slab vacuum monitoring test port locations after installation.

7.2. System Start Up and Commissioning

Upon system start up the mitigation fan will be tuned for optimal efficiency. The applied vacuum and airflow for the system will be measured and reported. The sub slab pressure differentials at the permanent

test ports will be measured and reported. A commissioning report that includes commissioning data, operations and maintenance procedures, as-built drawings, and all other requirements in accordance with guidance documents will be prepared and submitted.

8. Logistics

8.1. Confirmation of Locations and Logistics

All equipment, pipe, and suction point locations should be verified by the installation contractor to be in accordance with local and national standards prior to installation. The installation will take place during normal business hours.

8.2. Guarantee

Obar systems guarantees the system designed herein to meet a sub slab pressure differential of -0.004 inches of water column throughout the building area of concern to be demonstrated at the monitoring port locations shown in the attached drawing.

8.3. Cost

System installation cost including labor and materials:	**$17,300.00**
Projected permitting cost:	**$6,000.00**
Projected electrician cost:	**$1,500.00**

TERMS: Net 60 days, -2% if paid in 30 days.

All pricing is subject to change based on material cost, fuel cost, and any other circumstances. Pricing is valid from 30 days of proposal date.

Table: 1

Suction Point # :	S1			
Location / Description :	West side of basment near central column			
Soil Description	Loose broiwn sandy soil			
Temperature :	45°F			
Weather :	Clear			
Background:	-			
	Distance (ft.)	**Series 1**	**Series 2**	**Max**
Airflow Yield (cfm)		10	10	20
Applied Vacuum (''w.c.)		20	10	33
SSP 1 (1' from applied)		1.1	0.5	4.6
TP-1	10	0.209	0.118	
TP-2	20	0.091	0.046	
TP-3	30	0.050	0.026	
TP-4	10	0.169	0.083	
TP-5	20	0.033	0.013	
TP-6	24	0.017	0.007	
TP-7	10	0.178	0.096	
TP-8	16	0.070	0.044	
TP-9	10	0.186	0.094	
TP-10	20	0.076	0.041	
TP-11	30	0.039	0.023	
TP-12	40	0.023	0.01	
TP-13	44	0.013	0.005	
TP-14	39	0.015	0.008	

Test Point data is reported in inches of water column.
All pressure values negative unless indicated otherwise.
BG: Background
N/A: Bad test point

Table: 2

Suction Point # :	S2			
Location / Description :	East side of basement, centrally located			
Soil Description	Loose brown sandy soil			
Temperature :	50°F			
Weather :	Clear			
Background:	-			
	Distance (ft.)	**Series 1**	**Series 2**	**Max**
Airflow Yield (cfm)		40	25	50
Applied Vacuum (''w.c.)		16	8	20
SSP 2 (1' from applied)		7.3	3.9	8.7
TP-12	8	0.868	0.451	
TP-13	22	0.256	0.137	
TP-10	12	0.602	0.336	
TP-14	27	0.234	0.124	
TP-4	35	0.140	0.075	
TP-5	40	0.034	0.014	
TP-6	43	0.026	0.010	
TP-9	21	0.320	0.030	
TP-1	29	0.159	0.105	
TP-2	30	0.183	0.099	
TP-3	36	0.040	0.067	
TP-8	45	0.054	0.026	
TP-7	40	0.087	0.045	

Test Point data is reported in inches of water column.
All pressure values negative unless indicated otherwise.
BG: Background
N/A: Bad test point

LEGEND:

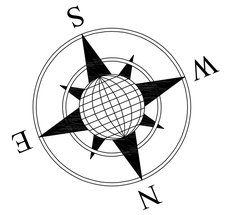
DIAGNOSTICS

- SUCTION POINT
- TEST POINT
- INTERIOR COLUMN

Scale: 1" = 4'

0 4' 16'

2' 8'



Notes:

NOTES

REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

OBAR SYSTEMS, INC.
2969 NJ 23, Newfoundland, NJ, 07435

OBAR SYSTEMS, INC.

SITE: 1810 Cropsey Avenue, Brooklyn, NY 11214

DATE:	DRAWN:
4/24/23	TN

SHEET #:	SHEET NAME:	SHEET SIZE:
SSD-1	Diagnostic Map	ARCH E1

LEGEND:

INSTALLATION

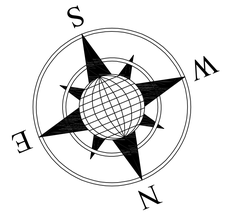
RADIUS OF INFLUENCE

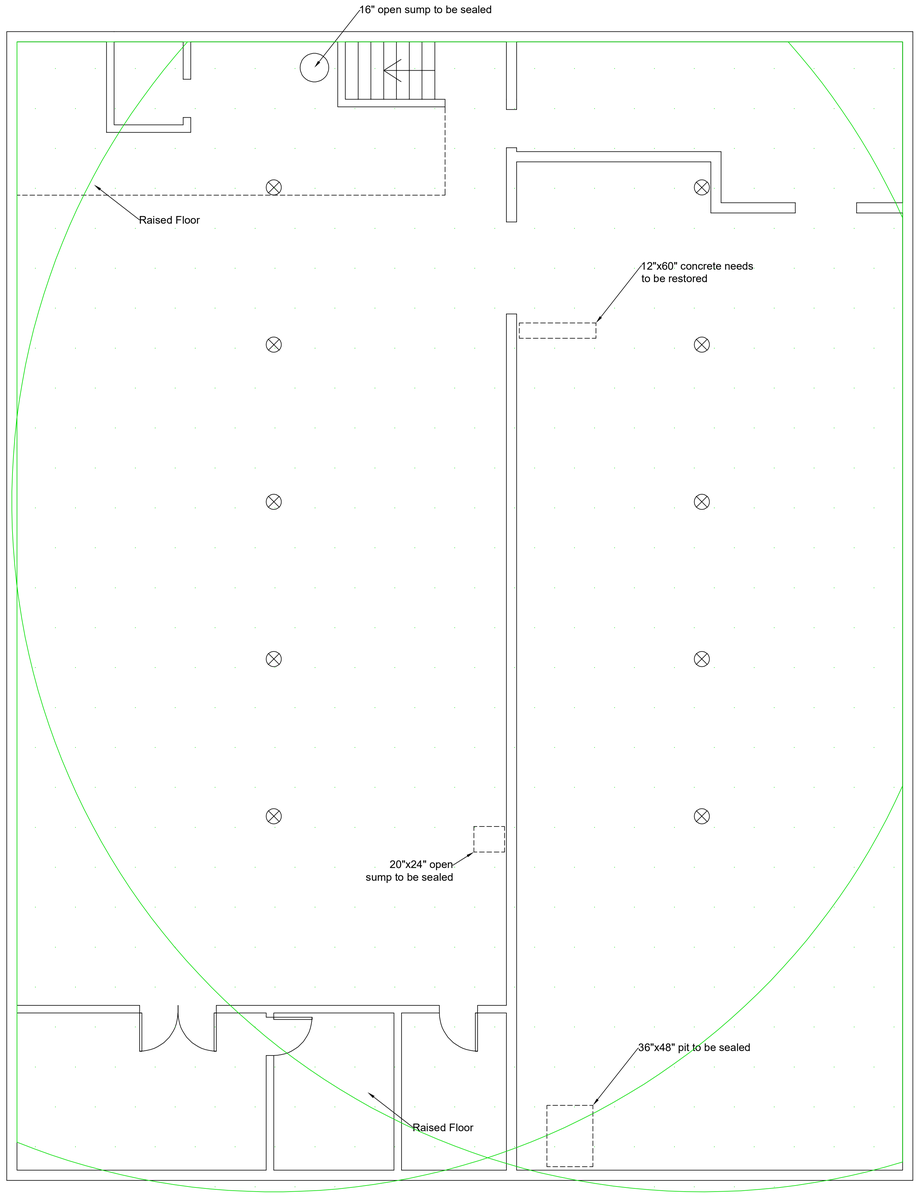
INTERIOR COLUMN

Scale: 1" = 4'

0 4' 16'

2' 8'





Notes:

NOTES

REV:	DESCRIPTION:	BY:	DATE:

STATUS:

OBAR SYSTEMS, INC.
2989 NJ 23, Newfoundland, NJ, 07435

OBAR SYSTEMS, INC.

SITE: 1810 Cropsey Avenue, Brooklyn, NY 11214

DATE:	DRAWN:
4/24/23	TN

SHEET #:	SHEET NAME:	SHEET SIZE:
SSD-1	Mapped ROIs	ARCH E1

LEGEND:

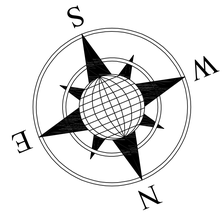
INSTALLATION

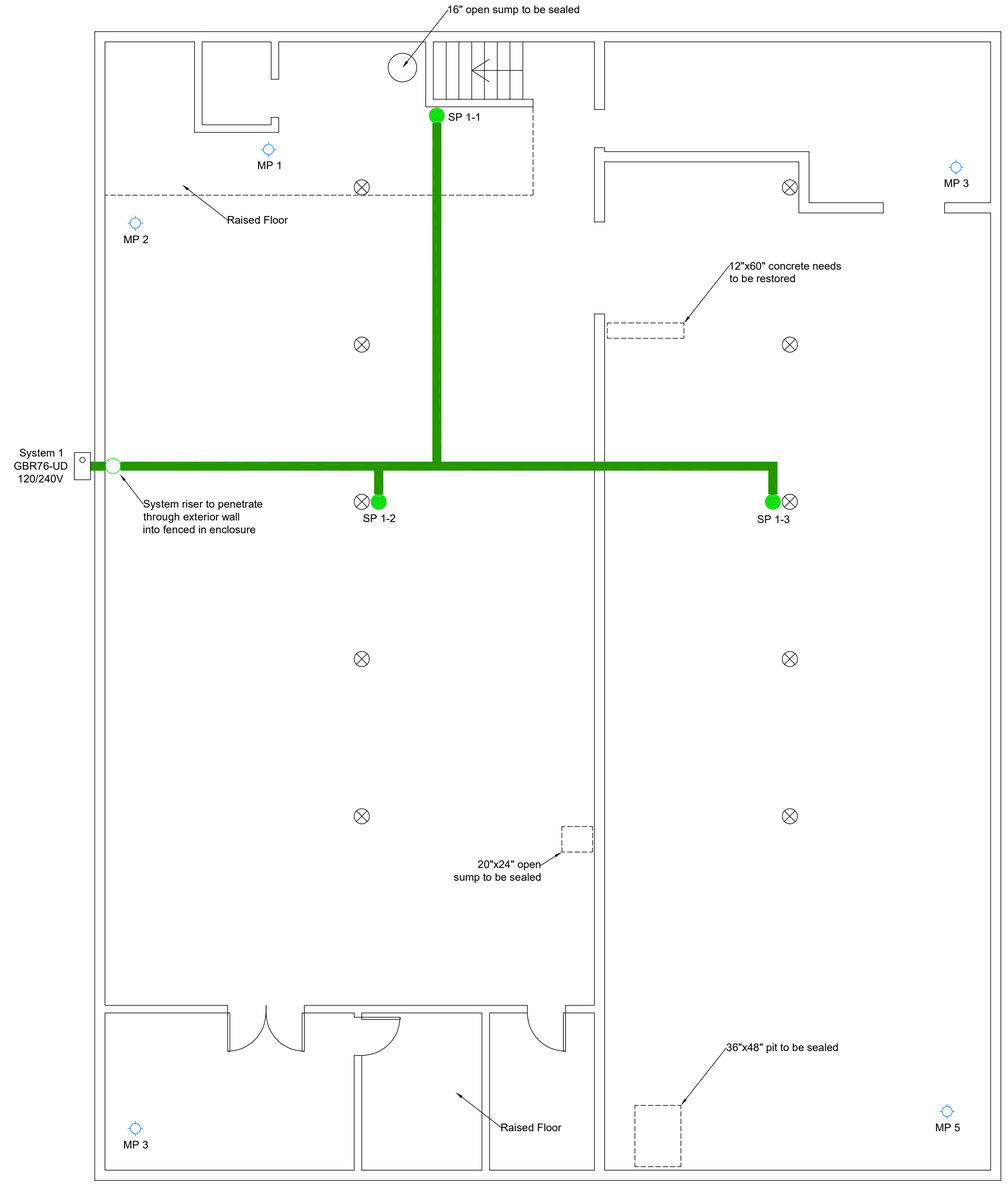
- SUCTION POINT
- OVERHEAD 3" PIPE
- WALL MOUNTED MITIGATION FAN
- MONITORING TEST PORT
- INTERIOR COLUMN

Scale: 1" = 4'

0 4' 16'

2' 8'





Notes:

NOTES

REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

OBAR SYSTEMS, INC.
2969 NJ 23, Newfoundland, NJ, 07435

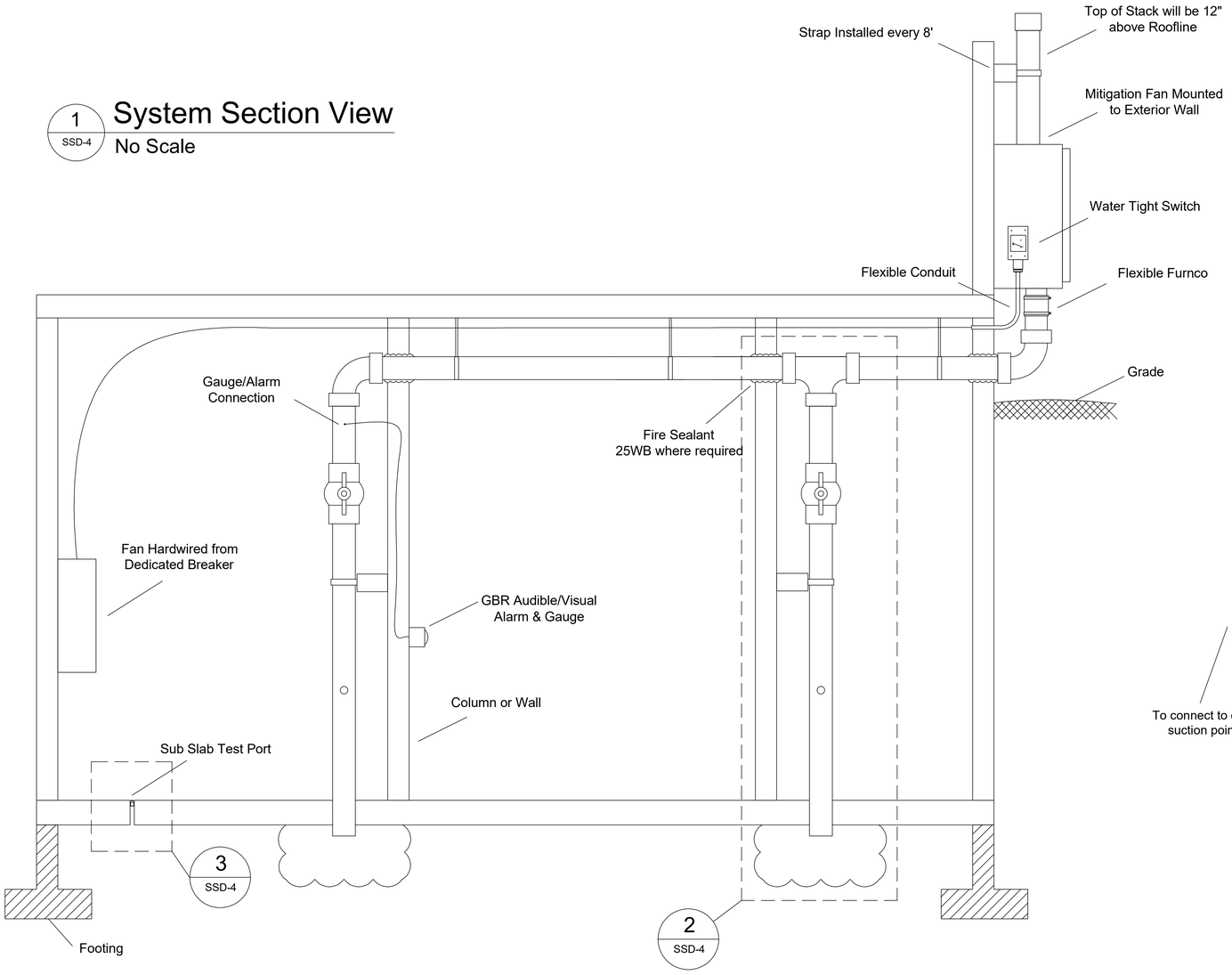
SITE: 1810 Cropsey Avenue, Brooklyn, NY 11214

DATE:	DRAWN:
4/24/23	TN

SHEET #:	SHEET NAME:	SHEET SIZE:
SSD-1	Mapped ROIs	ARCH E1

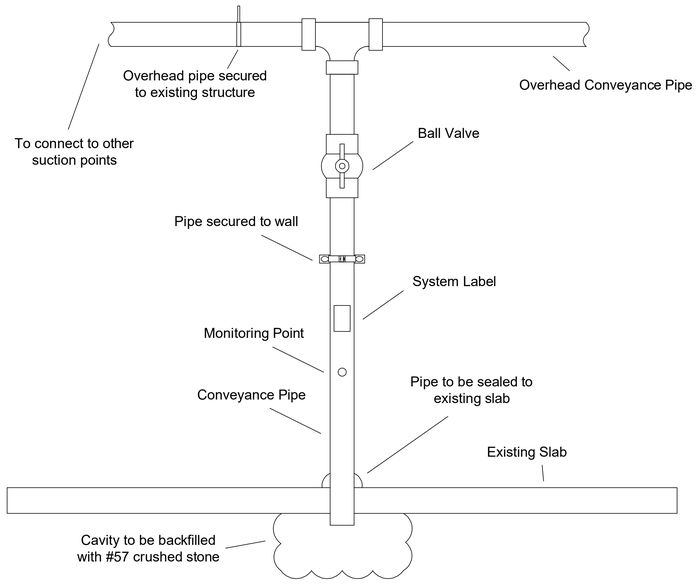
1 SSD-4 System Section View

No Scale



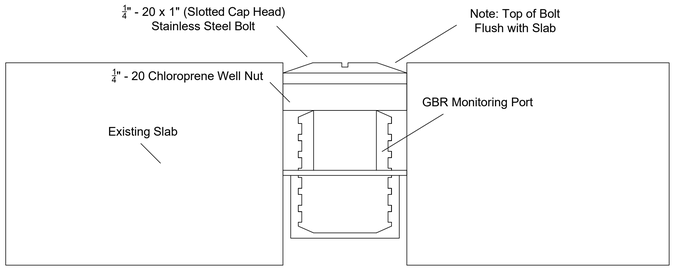
2 SSD-4 Suction Point and Riser

No Scale



3 SSD-4 GBR Monitoring Port

No Scale



Notes:

NOTES

1. ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE NEW YORK CITY BUILDING CODE
2. ALL HORIZONTAL PIPE RUNS (ABOVE GROUND AND UNDERGROUND) MUST BE PITCHED A MINIMUM OD 1/8-INCH VERTICAL PER FOOT HORIZONTAL (1% SLOPE) TOWARDS SSDS SUCTION PIT/PIPE. THE SYSTEM SHALL BE INSTALLED SUCH THAT NO PORTION WILL ALLOW EXCESS ACCUMULATION OF CONDENSATION.
3. RISERS AND EXHAUST STACKS SHALL BE SECURELY ANCHORED WITH ADEQUATE STRUCTURAL SUPPORTS.
4. ELECTRICAL WORK TO BE COMPLETED BY LICENSED ELECTRICIAN IN ACCORDANCE TO CODE.
5. SYSTEM INSTALLATION SHALL ADHERE TO APPLICABLE LOCAL AND NATIONAL VAPOR INTRUSION TECHNICAL GUIDANCE DOCUMENTS
6. CONTRACTOR SHALL CONFIRM LOCATIONS OF ALL EQUIPMENT PIPING AND SUCTION POINTS ARE IN COMPLIANCE PRIOR TO INSTALLATION
7. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
8. PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS. DROPS AND RISES OF RUNS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH EXISTING SERVICES, INCLUDING OF OTHER TRADES IS REQUIRED.
9. SUPPORT ALL PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FROM EQUIPMENT FURNISHED ADDITIONAL FRAMING.
10. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OF PIPES.
11. WHERE PENETRATIONS THROUGH FIRED RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.

REV:	DESCRIPTION:	BY:	DATE:

STATUS:

OBAR SYSTEMS, INC.
2969 NJ 23, Newfoundland, NJ, 07435

OBAR SYSTEMS, INC.

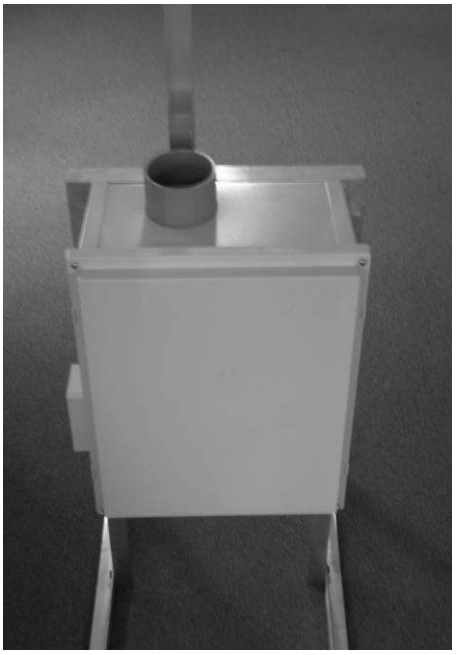
SITE:
1810 Cropsey Avenue,
Brooklyn, NY 11214

DATE:	DRAWN:
4/25/23	TN

SHEET NO:	SHEET NAME:	REVISION:
SSD-4	System Details	ARCH E1

THE OBAR GBR76
COMPACT RADIAL BLOWER

Based on 25 years of experience and 2 years of research and development, the patent pending GBR series of compact radial blowers provide the perfect combination of performance and design.



GBR76 WITH ROOF MOUNT

PERFORMANCE

- GBR76 SOE 16" WC @ 0 Max flow 155 CFM.
- GBR76 UD 40" WC @ 0 Max flow 195 CFM.
- Built in speed control to customize performance.
- Condensate bypass built in.
- 12 month warranty - 40,000 hr sealed bearings.

DESIGN

- Our modular design means the blower and manifold assembly can be removed and replaced as a unit. This makes repairs cost effective and easy and allows contractors to upgrade systems simply by swapping assemblies.
- The GBR series is based on a bypass blower designed to handle combustible materials.
- The housing is not required to be air tight, so you can add gauges and alarms without compromising the system.
- Built in condensate bypass.
- Built in speed control.
- Quick disconnect electrical harness.
- All UL listed components including UL listed enclosure for outside use.
- Wall fastening lugs included.
- GBR series roof and wall mounts available to quickly configure the blowers for your installation while providing a custom built look.
- Compact design 16"x 14"x 8" weighing only 18 lbs.
- 3" schedule 40 inlet and exhaust.
- Universal Drive model accepts voltage from 120-240V without alteration

OBAR SYSTEMS INC 2969 ROUTE 23 SOUTH NEWFOUNDLAND NJ 07435 800 949 6227

GBR76 SOE	0”	2”	4”	6”	8”	10”	12”	16”	Wattage
SOE 16	150	140	129	118	105	90	75	35	150-320
SOE 12	125	115	100	83	62	39	0		110-200
SOE 8	105	90	70	42	0				60-120
SOE 4	75	50	0						37-50

GBR SOE performance using built in potentiometer set at sealed vacuums of 16, 12, 8, and 4” WC

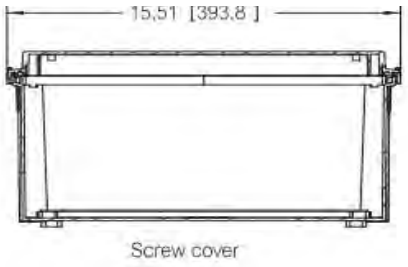
GBR76 UD	0”	10”	20”	30”	37”	Wattage
110V	195	158	118	63	20	700-870
220V	197	162	130	89	50	800-1100

Blower Specifications

Notes:

- **Input Voltage Range:** 108-132 Volts AC RMS, 50/60 Hz, single phase.
- **Input Current:** 6 amps AC RMS
- **Operating Temperature (Ambient Air and Working Air):** 0°C to 50°C
- **Storage Temperature:** -40°C to 85°C
- **Dielectric Testing:** 1500 Volts AC RMS 60 Hz applied for one second between input pins and ground, 3mA leakage maximum.
- **Speed Control Methods:** PWM (Pulse Width Modulation) (1 kHz to 10 kHz)
  0 to 10 VDC speed control.
  Mechanical: A potentiometer is available for speed control of the blower. The potentiometer can be preset for a specific speed. Access for speed adjustment located in motor housing.
- **Approximate Weight:** 4.8 Lbs. / 2.2 Kg
- **Regulatory Agency Certification:** Underwriters Laboratories Inc. UL507 Recognized under File E94403 and compliant under the CE Low Voltage Directive 2006/95/EC.
- **Design Features:** Designed to provide variable airflow for low NOx & CO emission in high efficiency gas fired combustion systems. Built with non-sparking materials. Blower housing assembly constructed of die cast aluminum. Impeller constructed from hardened aluminum. Rubber isolation mounts built into blower construction to dampen vibration within the motor. Two piece blower housing assembly sealed with O-ring gasket for combustion applications. Customer is responsible to check for any leakage once the blower is installed into the final application.
- **Miscellaneous:** Blower inlet, discharge, and all motor cooling inlet and discharge vents must not be obstructed. Motor ventilation air to be free of oils and other foreign particles, (i.e. breathing quality air). Blower is to be mounted so ventilation air cannot be re-circulated.
  POWER CONNECTION: Blower connector, AMP Universal MATE-N-LOK, part no. 1-350943-0.
  SPEED CONNECTION: Blower connector, Molex Mini-Fit Jr., part no. 39-30-3056.
  Mating harnesses available upon request.

Enclosure Specifications



Screw cover

Ratings:

Ingress Protection (EN 60529): 66/67

Electrical insulation: Totally insulated

Halogen free (DIN/VDE 0472, Part 815): yes

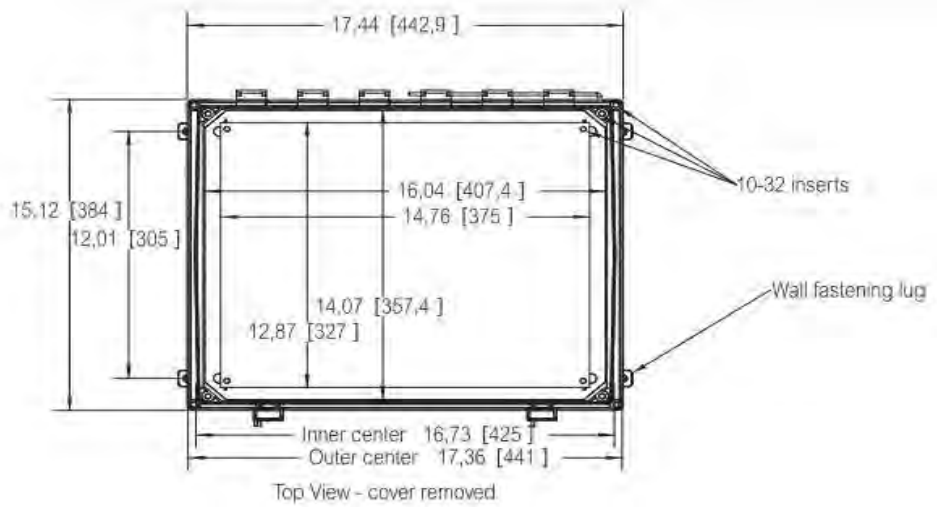
UV resistance: UL 508

Flammability Rating (UL 746 C 5): complies with UL 508

Glow Wire Test (IEC 695-2-1) °C: 960

NEMA Class: UL Type 4, 4X, 6, 6P, 12 and 13

Certificates: Underwriters Laboratories



Top View - cover removed

CHARLOTTE
PIPE AND FOUNDRY COMPANY

You can't beat the system.®

Submittal Package Cast Iron No-Hub System

(Updated February 2, 2018)

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SUBMITTAL PACKAGE

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SUBMITTAL FOR CHARLOTTE PIPE® HUBLESS CAST IRON SOIL PIPE AND FITTINGS

Date: _____

Job Name: _____ Location: _____

Engineer: _____ Contractor: _____

Scope:

ouplings used in sanitary drain, waste and vent (DWV), sewer, and storm drainage applications. This system is intended for use in non-pressure applications.

Specification:

Hubless Cast Iron pipe and shall be manufactured from gray cast iron and shall conform to ASTM A 888 and CISPI Standard 301. ark of the Cast Iron Soil Pipe Institute® and listed by NSF® International. Hubless Couplings shall conform to CISPI Standard 310, shall be ® International. Heavy Duty and Medium Duty couplings shall conform to ASTM C 1540, shall be manufactured in the United States, and shall be used if indicated.

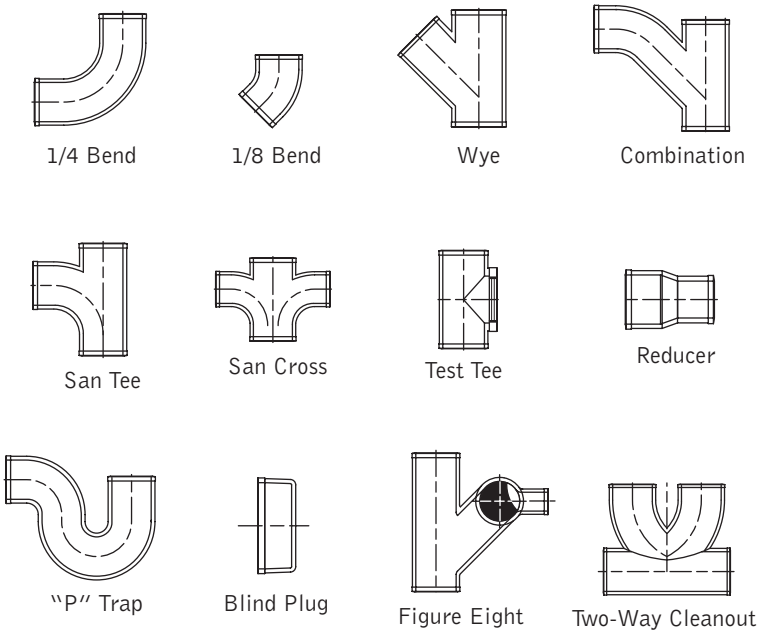
Installation:

Installation shall comply with the latest installation instructions published by Charlotte Pipe and Foundry Company® g code requirements. The system shall be hydrostatically tested after installation to 10 ft. of head (4.3 psi maximum). **WARNING!** Never test with or transport/ so can result in explosive failures and cause severe injury or death.

Referenced Standards:

ASTM C 564:	Rubber Gaskets for Cast Iron Soil Pipe and Fittings
CISPI 301:	Hubless Cast Iron Soil Pipe and Fittings
CISPI 310:	Hubless Couplings for Cast Iron Soil Pipe and Fittings
ASTM C 1277:	Hubless Couplings
ASTM C 1540:	Hubless Medium Duty and Heavy Duty Couplings

MADE IN USA



Not all fitting patterns shown

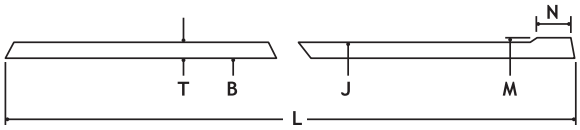


TABLE 1

DIMENSIONS AND TOLERANCES (IN INCHES) OF SPIGOTS AND BARRELS FOR NO-HUB PIPE AND FITTINGS

Size	Inside Barrel Diameter	Outside Diameter Barrel	Outside Diameter Spigot	Width Spigot Bead N	Thickness of Barrel		Gasket Positioning Lug
	B	J	M	(± .13)	T-Nom.	T-Min.	W
1½	1.50 ± .09	1.90 ± .06	1.96 ± .06	.25	.16	.13	1.13
2	1.96 ± .09	2.35 ± .09	2.41 ± .09	.25	.16	.13	1.13
3	2.96 ± .09	3.35 ± .09	3.41 ± .09	.25	.16	.13	1.13
4	3.94 ± .09	4.38 + .09 – .05	4.44 ± .09	.31	.19	.15	1.13
5	4.94 ± .09	5.30 + .09 – .05	5.36 ± .09	.31	.19	.15	1.50
6	5.94 ± .09	6.30 + .09 – .05	6.36 ± .09	.31	.19	.15	1.50
8	7.94 ± .13	8.38 ± .09	8.44 ± .09	.31	.23	.17	2.00
10	10.00 ± .13	10.56 ± .09	10.62 ± .09	.31	.28	.22	2.00
12	11.94 ± .09	12.50 ± .13	12.62 ± .13	.31	.28	.22	2.75
15	15.11 ± .09	15.83 ± .13	16.12 ± .13	.31	.36	.30	2.75

Note: *Charlotte Pipe does not recommend or warrant installations joined with unshielded hubless couplings.*

Charlotte Pipe and Charlotte Pipe and Foundry Company are registered trademarks of Charlotte Pipe and Foundry Company.

CHARLOTTE
PIPE AND FOUNDRY COMPANY®

Certifications

This is to verify that products manufactured by Charlotte Pipe and Foundry, Cast Iron Division, are manufactured in the United States and conform to the following standards:

SERVICE HUB AND SPIGOT PIPE AND FITTINGS

All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI).
ASTM A 74
ANSI A 112.5.1
Listed by NSF® International to the UP Code
ISO 9001:2008 Certified

EXTRA HEAVY HUB AND SPIGOT PIPE AND FITTINGS

All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI).
ASTM A 74
ANSI A 112.5.1
Listed by NSF® International to the UP Code
ISO 9001:2008 Certified

HUBLESS PIPE AND FITTINGS

All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI).
CISPI Standard 301
ASTM A 888
Listed by NSF® International to the UP Code
ISO 9001:2008 Certified

HUBLESS COUPLINGS

CISPI Standard 310
ASTM C 1277
Certified by NSF® International

HUBLESS HEAVY DUTY COUPLINGS

Meets ASTM C 1540

COMPRESSION GASKETS

ASTM C 564
CISPI HSN 85

Very truly yours,

Hooper Hardison

Hooper Hardison, President

Terri L. Wilson

Notary Public
My commission expires July 02, 2022

TERRI L WILSON
NOTARY PUBLIC
UNION COUNTY, NC
My Commission Expires 7-2-2022

MADE IN USA

LC-CI (6-28-17)

Reference Standards Cast Iron

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM	TITLE
A 74	SPECIFICATION FOR CAST IRON SOIL PIPE AND FITTINGS HUB AND SPIGOT (SERVICE AND EXTRA HEAVY)
SCOPE:	THIS SPECIFICATION COVERS CAST IRON PIPE AND FITTINGS USED IN SANITARY DRAIN, WASTE, AND VENT (DWV), SEWER, AND STORM DRAINAGE APPLICATION. THIS SYSTEM IS INTENDED FOR USE IN NONPRESSURE APPLICATIONS.
C 564	SPECIFICATION FOR RUBBER GASKETS FOR CAST IRON SOIL PIPE AND FITTINGS
SCOPE:	THIS SPECIFICATION COVERS PREFORMED RUBBER GASKETS USED TO SEAL JOINTS IN CAST IRON SOIL PIPE AND FITTINGS.
C 1277	SPECIFICATION FOR COUPLING FOR USE IN CONNECTION WITH HUBLESS CAST IRON PIPE AND FITTINGS FOR SANITARY AND STORM DRAIN, WASTE, AND VENT PIPING APPLICATION (REGULAR HUBLESS COUPLING)
SCOPE:	THE PURPOSE OF THIS SPECIFICATION IS TO ESTABLISH CRITERIA FOR MATERIAL DIMENSIONS AND TOLERANCES FOR ONE TYPE OF COUPLING USED IN HUBLESS CAST IRON SOIL PIPE AND FITTING FOR SANITARY AND STORM DRAIN, WASTE AND VENT PIPING APPLICATIONS.
C 1540	SPECIFICATION FOR SHIELDED COUPLINGS JOINING HUBLESS CAST IRON SOIL PIPE AND FITTINGS (HEAVY DUTY COUPLINGS)
SCOPE:	THIS SPECIFICATION COVERS THE EVALUATION OF THE PERFORMANCE OF SHIELDED HUBLESS COUPLINGS TO JOIN CAST IRON SOIL PIPE AND FITTINGS.

CAST IRON SOIL PIPE INSTITUTE

CISPI	TITLE
301	SPECIFICATION FOR HUBLESS CAST IRON SOIL PIPE AND FITTINGS FOR SANITARY AND STORM DRAIN, WASTE, AND VENT PIPING APPLICATIONS
SCOPE:	THE PURPOSE OF THIS STANDARD IS TO ESTABLISH STANDARDS COVERING MATERIAL, DIMENSIONS, AND TOLERANCE FOR PIPE AND FITTINGS FOR HUBLESS CAST IRON SANITARY AND STORM DRAIN, SANITARY WASTE, AND VENT PIPING APPLICATIONS.
310	SPECIFICATION FOR COUPLING FOR USE IN CONNECTION WITH HUBLESS CAST IRON PIPE AND FITTINGS FOR SANITARY AND STORM DRAIN, WASTE, AND VENT PIPING APPLICATION (REGULAR HUBLESS COUPLING)
SCOPE:	THE PURPOSE OF THIS SPECIFICATION IS TO ESTABLISH CRITERIA FOR MATERIAL DIMENSIONS AND TOLERANCES FOR ONE TYPE OF COUPLING USED IN HUBLESS CAST IRON SOIL PIPE AND FITTING FOR SANITARY AND STORM DRAIN, WASTE AND VENT PIPING APPLICATIONS.

Gray Iron Physical Properties

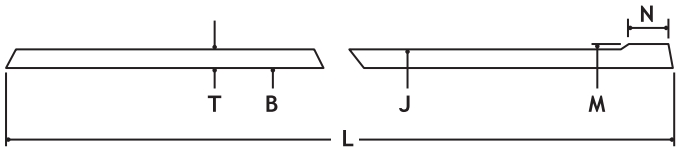
Tensile Strength	20,000 p.s.i. — 60,000 p.s.i. (21,000 p.s.i.)
Elastic Modulus (Young's modulus)	10 - 23 x 10^6 p.s.i.
Hardness (Brinell)	150 - 250 BHN
Thermal Conductivity	0.110 - 0.137 calories/cm^2/Sec/cm/ °C
Thermal Expansion	10 x 10^{-6} / °C 6 x 10^{-6} / °F
Density	0.25 - 0.28 lb./in^3 6.95 - 7.35 gm/cm^3
Specific Heat	0.13 BTU / lb / °F 0.13 cal / gm / °C

Composition of Gray Iron

The following are typical ranges of elements present in unalloyed gray cast iron normally produced in commercial practice:

Carbon (C)	2.60 - 3.85%
Silicon (Si)	1.25 - 2.90%
Manganese (Mn)	0.40 - 1.00%
Phosphorus (P)	0.02 - 0.90%
Sulfur (S)	0.04 - 0.20%

Hubless Cast Iron



DIMENSIONS AND TOLERANCES (IN INCHES) OF SPIGOTS AND BARRELS FOR HUBLESS PIPE AND FITTINGS

Size	Inside Barrel Diameter	Outside Diameter Barrel	Outside Diameter Spigot	Width Spigot Bead N	Thickness of Barrel		Gasket Positioning Lug
	B	J	M	(± .13)	T-Nom.	T-Min.	W
1½	1.50 ± .09	1.90 ± .06	1.96 ± .06	.25	.16	.13	1.13
2	1.96 ± .09	2.35 ± .09	2.41 ± .09	.25	.16	.13	1.13
3	2.96 ± .09	3.35 ± .09	3.41 ± .09	.25	.16	.13	1.13
4	3.94 ± .09	4.38 + .09 − .05	4.44 ± .09	.31	.19	.15	1.13
5	4.94 ± .09	5.30 + .09 − .05	5.36 ± .09	.31	.19	.15	1.50
6	5.94 ± .09	6.30 + .09 − .05	6.36 ± .09	.31	.19	.15	1.50
8	7.94 ± .13	8.38 ± .09	8.44 ± .09	.31	.23	.17	2.00
10	10.00 ± .13	10.56 ± .09	10.62 ± .09	.31	.28	.22	2.00
12	11.94 ± .09	12.50 ± .13	12.62 ± .13	.31	.28	.22	2.75
15	15.11 ± .09	15.83 ± .13	16.12 ± .13	.31	.36	.30	2.75

⚠ WARNING

Cast Iron pipe and fittings are only intended for DWV (drain, waste and vent) non-pressure applications. Using cast iron pipe and fittings in pressure applications could result in explosive failures, causing serious injury or death or property damage.

⚠ WARNING

Testing with or use of compressed air or gas in Cast Iron pipe or fittings can result in explosive failures and cause severe injury or death.

- NEVER test with or transport/store compressed air or gas in Cast Iron pipe or fittings.
- NEVER test Cast Iron pipe or fittings with compressed air or gas.
- ONLY use Cast Iron pipe and fittings for drain, waste and vent or sanitary sewer applications.

Hubless Cast Iron

Hubless Cast Iron Soil Pipe

Part No. NH 2
No-Hub (Hubless) Pipe

Size	Weight
1½"x10'	28.5
2"x10'	37.1
3"x10'	54.0
4"x10'	71.2
5"x10'	97.6
6"x10'	117.8
8"x10'	170.9
10"x10'	254.6
12"x10'	318.1
15"x10'	492.6

⚠ WARNING

Cast Iron pipe and fittings are only intended for DWV (drain, waste and vent) non-pressure applications. Using cast iron pipe and fittings in pressure applications could result in explosive failures, causing serious injury or death or property damage.

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Testing with or use of compressed air or gas in Cast Iron pipe or fittings can result in explosive failures and cause severe injury or death.

- NEVER test with or transport/store compressed air or gas in Cast Iron pipe or fittings.
- NEVER test Cast Iron pipe or fittings with compressed air or gas.
- ONLY use Cast Iron pipe and fittings for drain, waste and vent or sanitary sewer applications.

PART NO. NH 1

No-Hub (Standard) Coupling

Size	Shield Width	Number of Clamps
1½	2.13″	2
2 x 1½	2.13″	2
2	2.13″	2
3 x 2	2.13″	2
3	2.13″	2
4 x 3	2.13″	2
4	2.13″	2
5	3.00″	4
6	3.00″	4
8	4.00″	4
10	4.00″	4

PART NO. MDC 2

Heavy Duty (MD) Coupling

Size	Shield Width	Number of Clamps
1½	3.00″	4
2	3.00″	4
3	3.00″	4
4	3.00″	4
5	4.00″	6
6	4.00″	6
8	4.00″	6
10	4.00″	6

PART NO. SDC 4

Heavy Duty (HD) Coupling

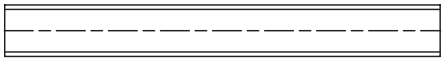
Size	Shield Width	Number of Clamps
1½	3.00″	4
2	3.00″	4
3	3.00″	4
4	3.00″	4
5	4.00″	6
6	4.00″	6
8	4.00″	6
10	4.00″	6

PART NO. HD 1

Heavy Duty Coupling

Size	Shield Width	Number of Clamps
12	5.50″	6
15	5.50″	6

PART NO. NH 2

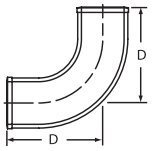


No-Hub Pipe - Ten Feet Laying Length

Size	Weight
1½″ x 10′	28.5
2″ x 10′	35.0
3″ x 10′	54.0
4″ x 10′	71.2
5″ x 10′	97.6
6″ x 10′	117.8
8″ x 10′	170.9
10″ x 10′	254.6
12″ x 10′	318.1
15″ x 10′	492.6

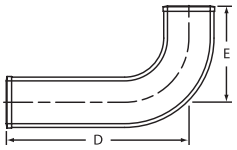
PART NO. NH 4

Quarter Bend



Size	D	Weight
1½	4¼	1.7
2	4½	2.2
3	5	3.7
4	5½	6.5
5	6½	9.3
6	7	15.0
8	8½	23.1
4 x 3	5½	5.5

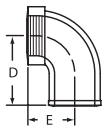
Long Quarter Bend



Size	D	E	Weight
2 x 12	12	4½	5.4
2 x 18	18	4½	8.8
2 x 24	24	4½	10.7
3 x 12	12	5	8.5
4 x 12	12	5½	11.2

PART NO. NH 4A

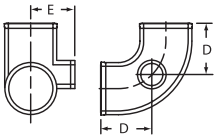
Tapped Quarter Bend



Size	D	E	Weight
1½ x 1½	3	2	1.9
2 x 1¼	3¼	2¼	2.0
2 x 1½	3¼	2¼	1.8
2 x 2	3¼	2¼	2.9

PART NO. NH 6

Quarter Bend with Side Opening

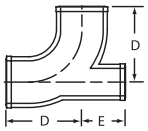


Size	E	D	Weight
3 x 2	3¼	4	5.1
4 x 2	3¾	4 5/16	7.5

PART NO. NH 8

Quarter Bend with Heel Opening

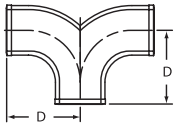
Size	D	E	Weight
3 x 2	5	2 7/8	5.6
4 x 2	5 1/2	3 1/4	7.2



PART NO. NH 8A

Double Quarter Bend

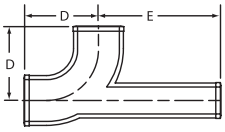
Size	D	Weight
2	4 1/2	4.5
3	5	7.1
4	5 1/2	9.7



PART NO. NH 8B

Extended Quarter Bend with Low Heel Outlet

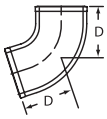
Size	D	E	Weight
3 x 2	5	10 1/2	7.8



PART NO. NH 9

Fifth Bend

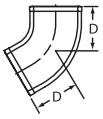
Size	D	Weight
2	3 11/16	2.3
3	4 1/16	3.7
4	4 7/16	6.1



PART NO. NH 10

Sixth Bend

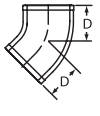
Size	D	Weight
2	3 1/4	2.2
3	3 1/2	3.0
4	3 13/16	5.3



PART NO. NH 12

Eighth Bend

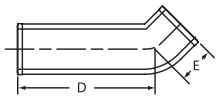
Size	D	Weight
1 1/2	2 5/8	1.5
2	2 3/4	1.5
3	3	2.9
4	3 1/8	4.0
5	3 7/8	7.4
6	4 1/16	9.1
8	5	14.9
10	5 15/16	31.7
12	6 9/16	31.6
15	7 13/16	62.0



PART NO. NH 12

Long Eighth Bend

Size	D	E	Weight
2 x 12	12	2 3/4	4.6
2 x 18	18	2 3/4	7.3
3 x 12	12	3	8.0
3 x 18	18	3	10.2
4 x 12	12	3 1/8	9.7



PART NO. NH 14

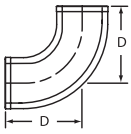
Sixteenth Bend

Size	D	Weight
1 1/2	2 1/8	1.2
2	2 1/8	1.4
3	2 1/4	2.1
4	2 5/16	3.4
5	2 7/8	5.4
6	3	6.7
8	3 3/4	12.0

PART NO. NH 16

Short Sweep

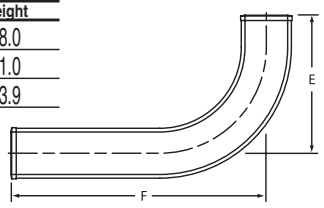
Size	D	Weight
2	6 1/2	3.1
3	7	6.3
4	7 1/2	8.1
5	8 1/2	13.1
6	9	17.1
8	10 1/2	31.0
10	12	53.4
12	13 1/4	61.3
15	14 3/4	105.6



PART NO. EZS 14

Extended Short Sweep

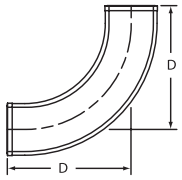
Size	E	F	Weight
2 x 18	6 1/2	18	8.0
2 x 24	6 1/2	24	11.0
2 x 34	6 1/2	34	13.9



PART NO. NH 18

Long Sweep

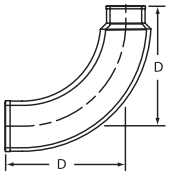
Size	D	Weight
1½	9¼	4.4
2	9½	5.8
3	10	9.4
4	10½	12.3
5	11½	18.6
6	12	23.3



PART NO. NH 18

Reducing Long Sweep

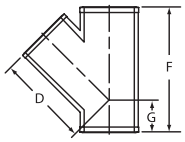
Size	D	Weight
4 x 3	10½	12.4



PART NO. NH 20

Wye

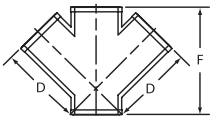
Size	D	F	G	Weight
1½ x 1½	4	6	2	2.5
2 x 2	4⅝	6⅝	2	3.3
3 x 1½	4⅝	6⅛	1 15/16	4.4
3 x 2	5 5/16	6⅝	1½	3.4
3	5¾	8	2¼	4.6
4 x 2	6	6⅝	1	5.1
4 x 3	6½	8	1 11/16	7.3
4	7 1/16	9½	2 7/16	9.1
5 x 2	7½	8 1/16	5/16	8.8
5 x 3	8	9 11/16	1 11/16	10.5
5 x 4	8½	11 3/16	2 7/16	13.1
5	9½	12⅝	3⅛	15.1
6 x 2	8¼	8 5/16	½	9.8
6 x 3	8¾	9¾	1¼	12.5
6 x 4	9¼	11 3/16	1 15/16	14.6
6 x 5	10¼	12½	2 9/16	17.6
6	10¾	14 1/16	3 5/16	19.7
8 x 3	9 13/16	9 15/16	⅛	17.5
8 x 4	10⅜	11 7/16	15/16	22.0
8 x 5	11⅜	12 13/16	1⅝	23.9
8 x 6	11 13/16	14 3/16	2 5/16	28.3
8	13⅜	17⅛	3¾	36.3
10 x 4	11 11/16	12⅝	¾	32.9
10 x 6	13⅛	15 7/16	2 3/16	42.1
10 x 8	14 11/16	18⅜	3⅝	56.1
10	16½	21½	5 1/16	74.9
12	19¾	25½	5¾	97.0
15	23¼	30	6¾	189.5



PART NO. NH 21

Double Wye

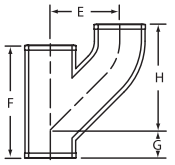
Size	D	F	Weight
2	4⅝	6⅝	4.5
3 x 2	5 5/16	6⅝	5.5
3	5¾	8	7.9
4 x 2	6	6⅝	6.5
4 x 3	6½	8	8.8
4	7 1/16	9½	12.1
5 x 4	8½	11 3/16	15.7
6 x 4	9¼	11 3/16	16.4
6	10¾	14 1/16	27.4
8	13⅜	17⅛	45.3
8 x 4	10⅜	11 7/16	23.0
8 x 6	11 13/16	14 3/16	31.3



PART NO. NH 21A

Upright Wye

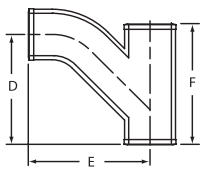
Size	H	E	F	G	Weight
2	8¼	5½	7	2	4.8
3 x 2	8 3/16	5½	7	1½	5.7
3	8 7/16	5½	8⅜	2 3/16	9.5
4 x 2	8¼	5½	7	1	7.7
4 x 3	8 7/16	5½	8⅜	1 11/16	10.1
4	9⅛	6	9¾	2 7/16	12.9
5 x 2	9	6⅛	8	1	11.0
5	11 7/16	7⅛	12¾	2¾	19.9



PART NO. NH 22

Combination

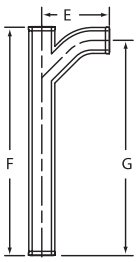
Size	D	E	F	Weight
1½	4¾	5⅜	6	3.1
2 x 1½	5	5⅞	6	3.4
2	5⅜	6⅛	6⅝	3.5
3 x 1½	5½	6¾	6⅝	5.0
3 x 2	5½	6¾	6⅝	5.7
3	7 5/16	8	8	8.5
4 x 2	5½	7¼	6⅝	6.6
4 x 3	7¼	8½	8	9.5
4	9¼	10	9½	13.7
5 x 2	5 15/16	7¾	8 1/16	8.5
5 x 3	7¾	9	9 11/16	12.0
5 x 4	9¾	10½	11 3/16	17.1
5	11¾	12½	12⅝	19.7
6 x 2	6	8¼	8 5/16	12.0
6 x 3	7 13/16	9½	9¾	14.7
6 x 4	9¾	11	11 3/16	18.4
6 x 5	11 11/16	13	12½	23.4
6	13⅝	14⅜	14 1/16	30.0
8 x 4	9 7/16	11 5/16	11 3/16	25.1
8 x 6	12	13⅜	13 15/16	35.4
8	14¾	15 9/16	16 15/16	49.3



PART NO. EZS 15

Extended Combination

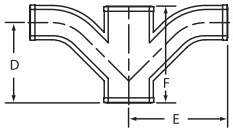
Size	E	F	G	Weight
2 x 24	6 3/16	25 3/8	24	12.0
2 x 36	6 3/16	36	34 3/4	15.4



PART NO. NH 24

Double Combination

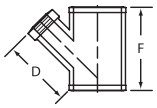
Size	D	E	F	Weight
2	5 3/8	6 1/8	6 5/8	6.3
3 x 2	5 1/2	6 3/4	6 5/8	7.7
3	7 5/16	8	8	11.8
4 x 2	5 1/2	7 1/4	6 5/8	8.3
4 x 3	7 1/4	8 1/2	8	13.7
4	9 1/4	10	9 1/2	20.5



PART NO. NH 26

Tapped Wye

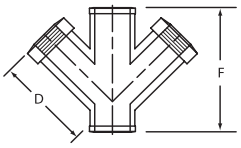
Size	D	F	Weight
2 x 1 1/2	5 1/16	6 5/8	3.4
2 x 2	5 1/16	6 5/8	4.6
3 x 1 1/2	5 3/4	6 5/8	5.1
3 x 2	5 13/16	6 5/8	5.3
4 x 1 1/2	6 7/16	6 5/8	6.0
4 x 2	6 1/2	6 5/8	7.2



PART NO. NH 27

Tapped Double Wye

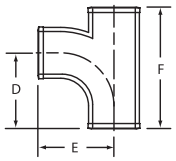
Size	D	F	Weight
2 x 1 1/2	5 1/16	6 5/8	5.6



PART NO. NH 28

Sanitary Tee

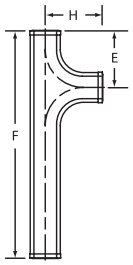
Size	E	F	D	Weight
1 1/2 x 1 1/2	4 1/4	6 1/2	4 1/4	2.9
2 x 1 1/2	4 1/2	6 5/8	4 1/4	3.4
2	4 1/2	6 7/8	4 1/2	3.1
3 x 1 1/2	5	6 1/2	4 1/4	4.5
3 x 2	5	6 7/8	4 1/2	3.7
3	5	8	5	5.5
4 x 2	5 1/2	6 7/8	4 1/2	5.3
4 x 3	5 1/2	8	5	7.6
4	5 1/2	9 1/8	5 1/2	8.5
5 x 2	6 1/2	8 1/2	5	8.3
5 x 3	6	9 5/16	5 1/2	10.2
5 x 4	6	10 13/32	6	11.5
5	6 1/2	11 7/16	6 1/2	12.5
6 x 2	6 1/2	8 3/16	5	9.9
6 x 3	6 1/2	9 3/16	5 1/2	11.5
6 x 4	6 1/2	10 1/16	6	12.0
6 x 5	7	11 1/2	6 1/2	15.6
6	7	12 1/2	7	12.9
8 x 3	7 1/2	10 3/8	6	17.9
8 x 4	7 1/2	11 1/2	6 1/2	21.6
8 x 5	8	12 1/2	7	24.0
8 x 6	8	13 1/2	7 1/2	24.0
8	8 1/2	15 1/2	8 1/2	30.8



PART NO. EZS 16

2" x 24" Two-Way Sanitary Tee

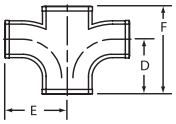
Size	E	H	F	Weight
2 x 18	4 1/2	4 1/2	18	7.8
2 x 24	4 1/2	4 1/2	24	10.4
2 x 36	4 1/2	4 1/2	36	15.6



PART NO. NH 30

Sanitary Cross

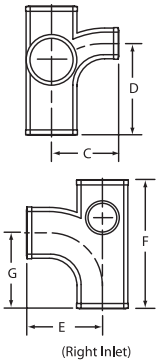
Size	E	F	D	Weight
1 1/2	4 1/4	6 1/2	4 1/2	3.6
2	4 1/2	6 7/8	4 1/2	5.0
3 x 2	5	6 7/8	4 1/2	6.2
3	5	8	5	7.6
4 x 2	5 1/2	6 7/8	4 1/2	7.3
4 x 3	5 1/2	8	5	8.5
4	5 1/2	9 1/8	5 1/2	11.0
5 x 4	6	10 13/32	6	13.4
6 x 4	6 1/2	10 1/16	6	14.0
6	7	12 1/2	7	21.0
8 x 4	7 1/2	11 1/2	6 1/2	23.0
8	8 1/2	15 1/2	8 1/2	37.9



PART NO. NH 31

Sanitary Tee with 2″ 90° Sanitary Opening Above Center (New Orleans Code)

Size	C	D	E	F	G	Weight
3 (L)	4 1/2	6	5	8 1/2	5	6.7
3 (R)	4 1/2	6	5	8 1/2	5	6.3
4 (L)	5	6 1/2	5 1/2	9 3/16	5 1/2	8.6
4 (R)	5	6 1/2	5 1/2	9 3/16	5 1/2	8.5

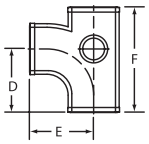


(Right Inlet)

PART NO. NH 32

Sanitary Tee with 2″ Side Inlets Right Hand and Left Hand

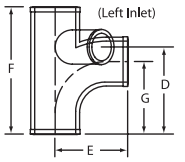
Size	E	F	D	Weight
4 x 4 w/RH & LH	5 9/16	9 1/8	5 1/2	10.9

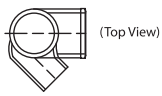


PART NO. NH 32B

Sanitary Tee with 2″ 45° Sanitary Opening Above Center (New Orleans Code)

Size	D	E	F	G	Weight
3 (L)	6	5	8 1/2	5	8.2
3 (R)	6	5	8 1/2	5	7.8
3 (R&L)	6	5	8 1/2	5	9.1
4 (L)	6 1/2	5 1/2	9 3/16	5 1/2	9.6
4 (R)	6 1/2	5 1/2	9 3/16	5 1/2	9.4

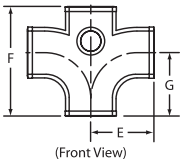


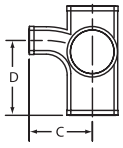


PART NO. NH 33A

Sanitary Cross with 2″ 90° Sanitary Openings Above Center (New Orleans Code)

Size	C	D	E	F	G	Weight
4	5	6 1/2	5 1/2	9 3/16	5 1/2	10.8



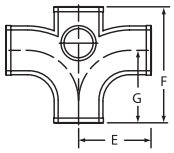
(Front View)


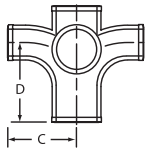
(Side View)

PART NO. NH 33C

Sanitary Cross with Two 2″ 90° Sanitary Openings Above Center (New Orleans Code)

Size	C	D	E	F	G	Weight
3	4 1/2	6	5	8 1/2	5	9.0
4	5	6 1/2	5 1/2	9 3/16	5 1/2	11.9



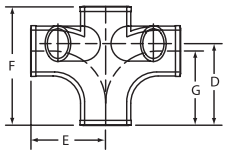
(Front View)


(Side View)

PART NO. NH 33F

Sanitary Cross with Two 2″ 45° Sanitary Openings Same Side (New Orleans Code)

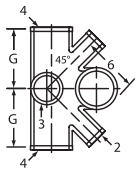
Size	D	E	F	G	Weight
3	6	5	8 1/2	5	9.8
4	5 1/2	5 1/2	9 1/16	5 1/2	13.8

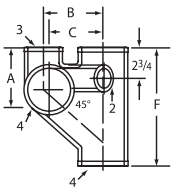


PART NO. NH 33G

Sanitary Cross with 3″ Vent and Two 2″ 45° Inlets

Size	A	B	C	F	G	Weight
4x3x4x2x2	3 3/4	5 1/4	4 3/4	10 1/2	6 1/2	24.0

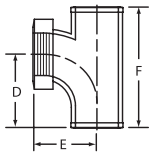




PART NO. NH 34

Sanitary Tapped Tee

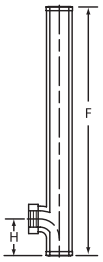
Size	D	E	F	Weight
1½ x 1¼	3¼	2⁹⁄₁₆	5¹¹⁄₁₆	2.3
1½ x 1½	3¼	2⁹⁄₁₆	5¹¹⁄₁₆	2.5
2 x 1¼	3¼	2¹³⁄₁₆	5¹¹⁄₁₆	2.8
2 x 1½	3¼	2¹³⁄₁₆	5¹¹⁄₁₆	3.1
2 x 2	3¾	3¹⁄₁₆	6⅜	3.8
3 x 1¼	3¼	3⁵⁄₁₆	5¹¹⁄₁₆	3.7
3 x 1½	3¼	3⁵⁄₁₆	5¹¹⁄₁₆	3.6
3 x 2	3¾	3⁹⁄₁₆	6⅜	4.9
3 x 3	4⅞	4⅛	8	7.3
4 x 1¼	3¼	3¹³⁄₁₆	5¹¹⁄₁₆	4.0
4 x 1½	3¼	3¾	5¹¹⁄₁₆	4.8
4 x 2	3¾	4¹⁄₁₆	6⅜	5.8
4 x 3	4½	4⅜	8	8.4
5 x 1½	3¾	4⁵⁄₁₆	7³⁄₁₆	6.5
5 x 2	4¼	4⁹⁄₁₆	8	9.3
6 x 1½	3¾	4¹³⁄₁₆	6¾	8.4
6 x 2	4¼	5¹⁄₁₆	7⁷⁄₁₆	9.2



PART NO. EZS 17

2″ x 22⁷⁄₈″ Extended Tapped Sanitary Tee

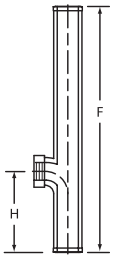
Size	H	F	Weight
2 x 1½ x 22⅞	3¼	22⅞	9.6
2 x 2 x 22⅞	3¾	22⅞	9.2



PART NO. EZS 27

Sanitary Tapped Tee

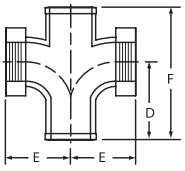
Size	H	F	Weight
2 x 1½ x 31	11¼	31	12.6
2 x 2 x 31	11¼	31	13.6



PART NO. NH 35

Sanitary Tapped Cross

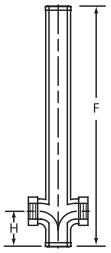
Size	D	E	F	Weight
1½ x 1½	3¼	2⁹⁄₁₆	5¹¹⁄₁₆	3.4
2 x 1¼	3¼	2¹³⁄₁₆	5¹¹⁄₁₆	3.9
2 x 1½	3¼	2¹³⁄₁₆	5¹¹⁄₁₆	4.0
2 x 2	3¾	3¹⁄₁₆	6⅜	5.3
3 x 1½	3¼	3⁵⁄₁₆	5¹¹⁄₁₆	4.3
3 x 2	3¾	3⁹⁄₁₆	6⅜	6.1
4 x 1½	3¼	3¾	5¹¹⁄₁₆	5.5
4 x 2	3¾	4¹⁄₁₆	6⅜	6.9



PART NO. EZS 18

2″ x 22⁷⁄₈″ Extended Tapped Sanitary Cross

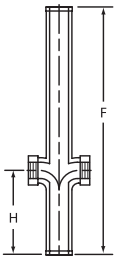
Size	H	F	Weight
2 x 1½ x 22⅞	3¼	22⅞	10.0
2 x 2 x 22⅞	3¾	22⅞	11.9



PART NO. EZS 28

Sanitary Tapped Cross

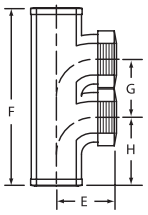
Size	H	F	Weight
2 x 1½ x 31	11¼	31	15.0
2 x 2 x 31	11¼	31	15.0



PART NO. NH 35B

Double Vertical Sanitary Tapped Tee

Size	E	F	G	H	Weight
2 x 1½	2¹³⁄₁₆	9¾	4½	3¼	4.8



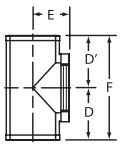
PART NO. NH 36

Test Tee Less Plug

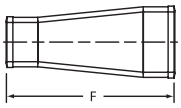
and PART NO. NH 36S

Test Tee with Southern Raised-Head Brass Plug Installed (2" through 8" only)

Size	IPS Tap	E	F	D	D'	Weight
2	2	2	6⅜	3³⁄₁₆	3³⁄₁₆	3.0
3	3	2¹¹⁄₁₆	7¾	3⅞	3⅞	5.8
4	4	3	8⅞	4⁷⁄₁₆	4⁷⁄₁₆	9.2
5	5	4½	11½	5¾	5¾	15.2
6	6	5	12½	6¼	6¼	22.0
8	8	6	15¼	7⅝	7⅝	37.1
10	10	6½	20	10	10	59.7
4 x 3	3½	2⅞	9½	5	4½	8.0



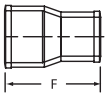
PART NO. NH 40



Increaser-Reducer

Size	F	Weight
2 x 3	8	3.8
2 x 4	8	4.4
3 x 4	8	5.0

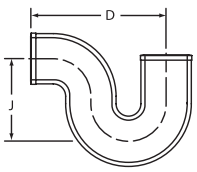
PART NO. NH 40A



Short Reducer

Size	F	Weight
2 x 1 1/2	3 5/8	1.1
3 x 1 1/2	3 5/8	1.8
3 x 2	3 5/8	1.8
4 x 2	3 5/8	2.3
4 x 3	3 5/8	2.3
5 x 2	4	3.3
5 x 3	4	3.8
5 x 4	4	3.2
6 x 2	4	4.3
6 x 3	4	3.7
6 x 4	4	4.1
6 x 5	4 1/2	4.3
8 x 2	4 1/2	7.0
8 x 3	4 1/2	7.6
8 x 4	4 1/2	7.7
8 x 5	5	7.3
8 x 6	5	8.0
10 x 4	5 1/2	12.5
10 x 6	6	13.3
10 x 8	6	14.9
12 x 4	6 1/2	19.1
12 x 6	6 1/2	18.3
12 x 8	7	17.3
12 x 10	7 1/2	18.9
15 x 4	7	30.0
15 x 6	7	31.8
15 x 8	7	32.2
15 x 10	7 1/2	32.2
15 x 12	7 3/4	30.5

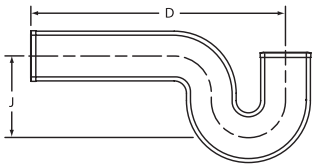
PART NO. NH 42



P-Trap

Size	D	J	Weight
1 1/2	6 3/4	3 1/2	3.4
2	7 1/2	4	4.7
3	9	5 1/2	8.9
4	10 1/2	6 1/2	17.0
6	14	8 1/2	33.6

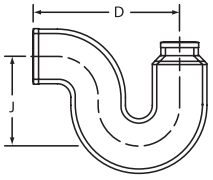
PART NO. NH 42



Long P-Trap

Size	D	J	Weight
2 x 12	12	4	6.1
2 x 18	18	4	8.0

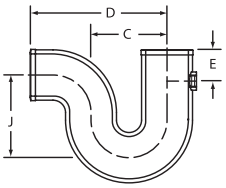
PART NO. NH 42A



P-Trap, Reducing

Size	D	J	Weight
3 x 2	9	5 1/2	10.0

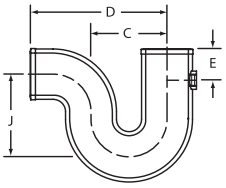
PART NO. NH 42B



P Trap with 1/2" Tap in Heel

Size	C	D	E	J	Weight
6	8	14	2 3/4	8 1/2	33.6

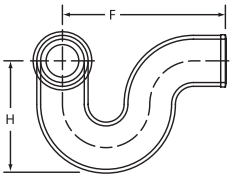
PART NO. NH 43



P Trap with 1/2" Tap in Heel

Size	C	D	E	J	Weight
2	4	7 1/2	2	4	4.7
3	5	9	2	5 1/2	10.8
4	6	10 1/2	2	6 1/2	18.8

PART NO. EZS 9



(Illustration Shows Right Hand)

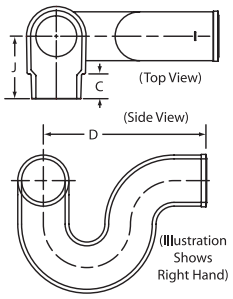
P-Trap with 1 1/2" Tapped Side Inlet

Size	H	F	Weight
2	5 3/16	7 1/2	6.2

PART NO. EZS 10

P-Trap with 2″ Side Inlet

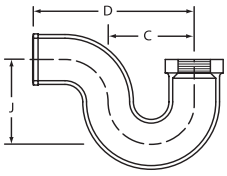
Size	C	D	J	Weight
2	1 3/16	7 1/2	3 1/16	6.4



PART NO. NH 44

P-Trap with Tapped Inlet

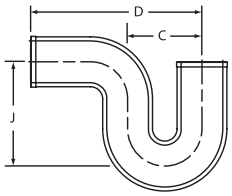
Size	C	D	J	Weight
1 1/2 x 1 1/2	3 1/2	6 3/4	3 1/2	3.0
2 x 1 1/2	4	7 1/2	4	4.5
2 x 2	4	7 1/2	4	5.4



PART NO. NH 44A

Deep Seal P Trap

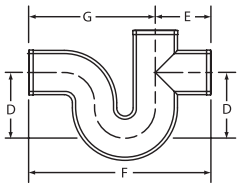
Size	C	D	J	Weight
2	4	7 1/2	7	6.6
3	5	9	7	11.0
4	6	10 1/2	8	18.6



PART NO. NH 45

Running Trap with Vent

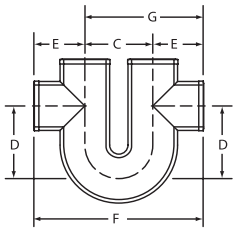
Size	D	E	F	G	Weight
4	6 1/2	4 1/2	15	10 1/2	20.5



PART NO. NH 45A

Running Trap with Double Vent

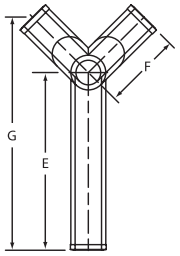
Size	C	D	E	F	G	Weight
4	6	6 1/2	4 1/2	15	10 1/2	21.4



PART NO. EZS 13

45° Vented Tub Wye

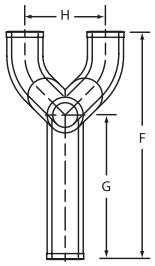
Size	E	F	G	Weight
2	12	5 1/4	15 3/4	10.1



PART NO. EZS 38

Vented Tub Wye

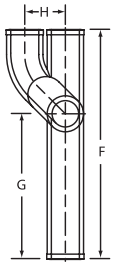
Size	G	H	F	Weight
2	9 1/2	5 1/4	15	9.4
2	24	5 1/4	29 1/2	13.7



PART NO. EZS 38 L

Vented Tub Wye
Left Hand

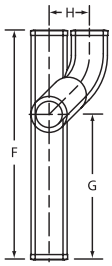
Size	G	H	F	Weight
2	9 1/2	3 3/4	15	10.0



PART NO. EZS 38 R

Vented Tub Wye
Right Hand

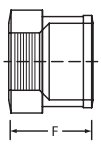
Size	G	H	F	Weight
2	9 1/2	3 3/4	15	9.0



PART NO. NH 48

Tapped Adapters

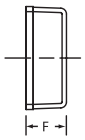
Size	F	IPS Tapping	Weight
1 1/2 x 1 1/2	2 5/8	1 1/2	1.3
2 x 1 1/4	2 3/16	1 1/4	1.0
2 x 1 1/2	2 3/16	1 1/2	0.9
2 x 2	2 5/8	2	1.7
3 x 2	2 3/16	2	1.0



PART NO. NH 50

Blind Plug

Size	F	Weight
1½	1¾	0.6
2	1¾	0.7
3	1¾	1.1
4	1¾	2.0
5	1¾	2.9
6	1¾	3.2
8	2¼	6.5
10	3	14.7
12	3½	17.6
15	3½	28.0

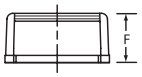


PART NO. NH 52

Tapped Ferrule Less Brass Plug and PART NO. NH 52S

Tapped Ferrule with Southern Raised-Head Brass Plug Installed

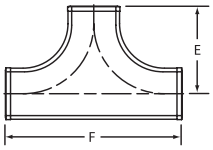
Size	F	IPS Tapping	Weight
2	2 3/16	1½	0.9
3	2 3/16	2½	1.9
4	2 3/16	3½	2.5
5	4½	4	6.5
6	4½	5	8.0
8	4½	6	12.1



PART NO. NH 53

Single Two-Way Cleanout

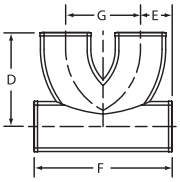
Size	E	F	Weight
4	7½	15	16.0



PART NO. NH 53A

Two-Way Cleanout

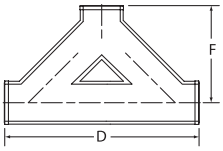
Size	D	E	F	G	Weight
4	8¼	2¾	12	6½	15.0



PART NO. NH 54

Two-Way Baffle Cleanout

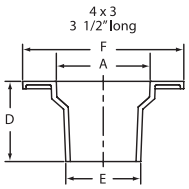
Size	D	F	Weight
3 x 3 x 4	15	9	14.2
4 x 4 x 4	18 3/8	9½	22.0

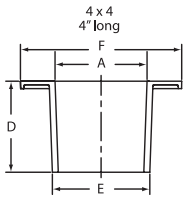


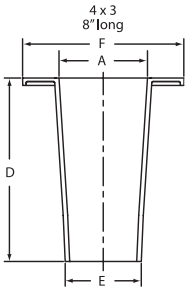
PART NO. NH 56

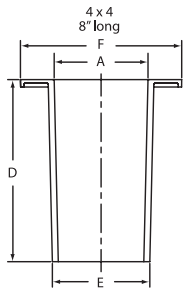
Notched and Slotted Closet Collar

Size	D	E	F	A	Weight
4 x 3	3½	3 3/8	7¼	4 7/32	3.3
4 x 3	8	3 27/64	7¼	4	6.1
4 x 4	4	4 3/8	7¼	4 9/64	4.7
4 x 4	8	4 3/8	7¼	4 7/32	7.0





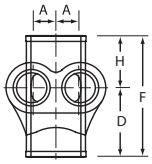




PART NO. NH 57

Horizontal Twin Tapped Tee

Size	A	D	F	H	Weight
3 x 1½	1 3/8	4	7	3	7.3
4 x 1½	1 3/8	4	7	3	8.0

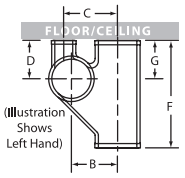


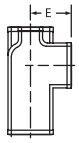
PART NO. NH 457

Vented Closet Tee with 2″ Top Vent

(Left or Right; Designed for use below the floor; Fitting does not require a baffle)

Size	B	C	D	E	F	G	Wt.
4x4x2x4(L)	4¼	5¼	3¾	4	10½	3¾	12.1
4x4x2x4(R)	4¼	5¼	3¾	4	10½	3¾	11.

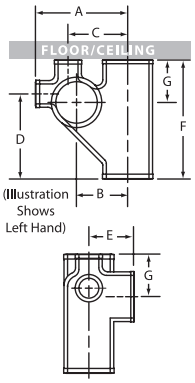




PART NO. NH 458

Vented Closet Tee with 2″ Top Vent and 2″ Side Opening
(Left or Right; Designed for use below the floor; Fitting does not require a baffle)

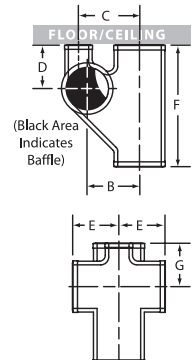
Size	A	B	C	D	E	F	G	Wt.
4x4x2x2x4(L)	8 1/8	4 1/4	5 1/4	7 1/2	4	10 1/2	3 3/4	12.3
4x4x2x2x4(R)	8 1/8	4 1/4	5 1/4	7 1/2	4	10 1/2	3 3/4	12.2



PART NO. NH 463

Vented Closet Cross with 2″ Top Vent
(Designed for use below the floor; Fitting has a baffle)

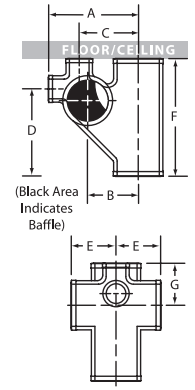
Size	B	C	D	E	F	G	Wt
4x4x2x4x4	4 1/4	5 1/4	3 3/4	4	10 1/2	3 3/4	15.0



PART NO. NH 464

Vented Closet Cross with 2″ Top Vent and 2″ Side Opening
(Designed for use below the floor; Fitting has a baffle)

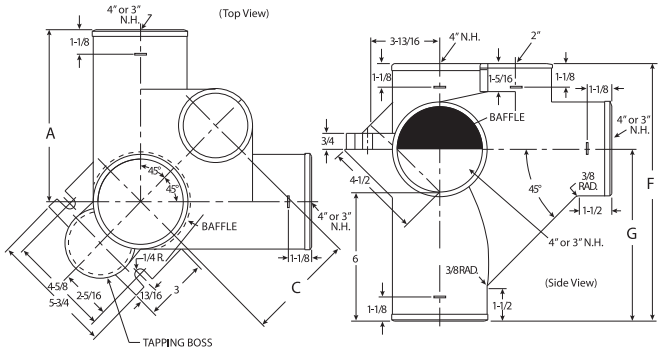
Size	A	B	C	D	E	F	G	Wt.
4x4x2x2x4x4	8 1/8	4 1/4	5 1/4	7 1/2	4	10 1/2	3 3/4	15.6



PART NO. NH 502

4″ No Hub Prison Fitting with 2″ Top Vent
(Designed for use above the floor; Baffle helps prevent passage of contraband between cells)

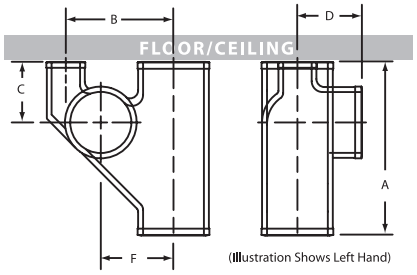
Part No.	Size	UPC# 611942-	A	C	F	G	Weight
NH 502	4 Less Tap	00639	8	5 1/4	12	8	20.3
NH 502	4 With Tap	00640	8	5 1/4	12	8	20.8
NH 502	4x3 Less Tap	11119	8	5 1/4	12	8	23.4
NH 502	4x3 With Tap	11120	8	5 1/4	12	8	23.4



PART NO. EZS 50*

10″ Closet Fittings with 2″ Inlet
(Double, Left Hand or Right Hand; Designed for use below the floor; Fitting does not have a baffle)

Part No.	Size	UPC# 611942-	A	B	C	D	F	Weight
EZS 50D***	4	04484	10 3/4	6 1/2	3 3/4	4	4 1/2	15.0
EZS 50L	4	04476	10 3/4	6 1/2	3 3/4	4	4 1/2	12.3
EZS 50R	4	04477	10 3/4	6 1/2	3 3/4	4	4 1/2	12.2

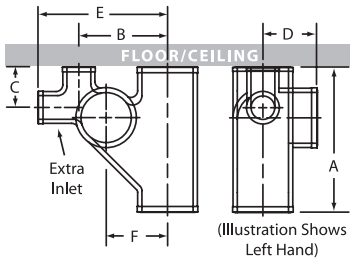


* When ordering please specify Double, Left or Right.
*** Double closet fitting does not have a baffle.

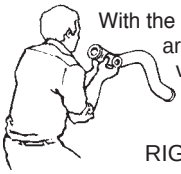
PART NO. EZS 51*

10″ Closet Fittings with 2″ Inlet and 2″ Side Inlet
(Double, Left Hand or Right Hand; Designed for use below the floor; Fitting does not have a baffle)

Part No.	Size	UPC# 611942-	A	B	C	D	E	F	Weight
EZS 51D***	4	04424	10¾	6½	3	4	9½	4½	15.0
EZS 51L	4	04425	10¾	6½	3	4	9½	4½	12.8
EZS 51R	4	04473	10¾	6½	3	4	9½	4½	12.6



HOW TO DETERMINE RIGHT or LEFT HAND CROSS-OVER



With the vented end toward you, hold the fitting so that you are looking into its length with the curved side up. If the vent is on your left side, it is a Left Hand fitting. If the vent is on your right side, it is a Right Hand fitting.

RIGHT HAND CROSS-OVER ILLUSTRATED

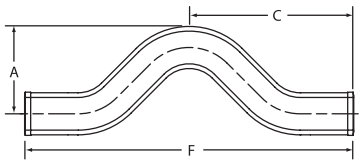
Note: VENT CROSS-OVER for use with EZS-50 through 800 Series fittings. Specify Right, Left, Plain or Double.

Note: Our crossovers are designed for use with EZS starter fittings, that is for the vent and stack centerline to be 6½″

PART NO. EZS 7

2″ Vent Cross-Over, Plain
(No Outlets)

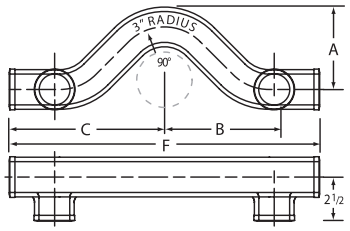
U.P.C. No. 611942	Size	A	C	F	Weight
04429	2 x 18⅜	4⅞	9 3/16	18⅜	8.1



PART NO. EZS 7D

2″ Vent Cross-Over, Double (2 Inlets)

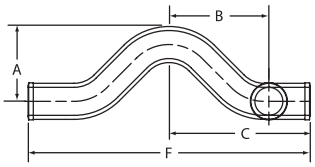
U.P.C. No. 611942	Size	A	B	C	F	Weight
04430	2 x 18⅜	4⅞	6½	9 3/16	18⅜	8.0



PART NO. EZS 7L

2″ Vent Cross-Over with Left Hand Inlet

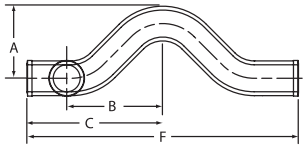
U.P.C. No. 611942	Size	A	B	C	F	Weight
04431	2 x 18⅜	4⅞	6½	9 3/16	18⅜	8.2



PART NO. EZS 7R

2″ Vent Cross-Over with Right Hand Inlet

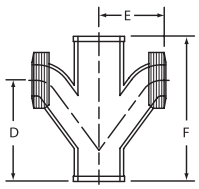
U.P.C. No. 611942	Size	A	B	C	F	Weight
04432	2 x 18⅜	4⅞	6½	9 3/16	18⅜	8.4



PART NO. EZS 1

Figure One

Size	E	F	D	Weight
2 x 1½	3 3/16	7	4⅞	5.3



* When ordering please specify Double, Left or Right.
*** Double closet fitting does not have a baffle.

PART NO. NH 25

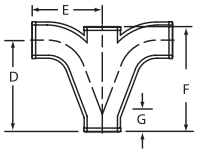


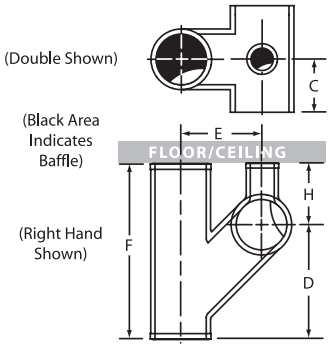
Figure Five Double Fixture Fitting

Size	D	E	F	G	Weight
2	6 1/2	5	8	1 13/16	7.0
3	8 7/8	6 9/16	10 1/8	2	10.5
3 x 2 x 3 x 3	8 7/8	6 9/16	9 1/4	2	10.7
4	10 1/4	7 3/4	12	1 15/16	22.5
4 x 2 x 4 x 4	10 1/4	7 3/4	11 1/2	1 15/16	19.8

PART NO. EZS 6*

Figure Six
(Double, Left Hand or Right Hand; Designed for use below the floor)

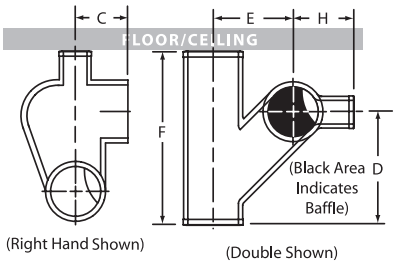
Part No.	Size	C	D	E	F	H	Weight
EZS 6D**	3x2	4 1/8	7 9/16	5 1/16	11	3 7/16	13.0
EZS 6D**	4x2	4 1/2	9	6 1/2	13	4	23.1
EZS 6L	3x2	4 1/8	7 9/16	5 1/16	11	3 7/16	11.4
EZS 6L	4x2	4 1/2	9	6 1/2	13	4	18.0
EZS 6R	3x2	4 1/8	7 9/16	5 1/16	11	3 7/16	11.4
EZS 6R	4x2	4 1/2	9	6 1/2	13	4	18.0



PART NO. EZS 8*

Figure Eight
(Double, Left Hand or Right Hand; Designed for use below the floor)

Part No.	Size	C	D	E	F	H	Weight
EZS 8D**	3x2	4 1/8	7 9/16	5 1/16	11	3 7/16	13.0
EZS 8L	3x2	4 1/8	7 9/16	5 1/16	11	3 7/16	12.5
EZS 8L	4x2	4 1/2	9	6 1/2	13	4	19.8
EZS 8R	3x2	4 1/8	7 9/16	5 1/16	11	3 7/16	12.5
EZS 8R	4x2	4 1/2	9	6 1/2	13	4	19.8

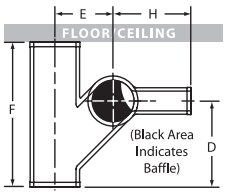


* When ordering please specify Double, Left or Right.
** Double fitting has a baffle.

PART NO. EZS 8A

Figure Eight Double Fixture Fitting, Extended**
(Designed for Use Below the Floor)

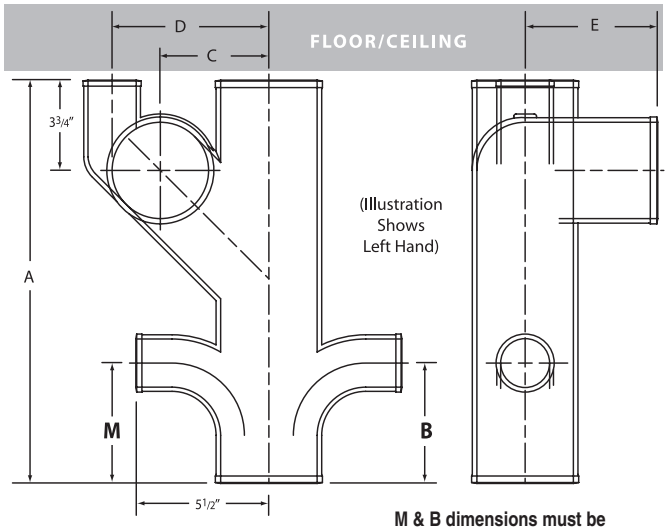
Size	D	E	F	H	Weight
4 x 2	9	6 1/2	13	8	23.4



PART NO. EZS 100*

16″ Closet Fittings with 2″ Inlets
(Double, Left Hand or Right Hand; Designed for use below the floor)

Part No.	Size	A	B	C	D	E	M	Weight
EZS 100D	4x16	16 3/4	5	4 1/2	6 1/2	5 1/2	5	22.0
EZS 100L	4x16	16 3/4	5	4 1/2	6 1/2	5 1/2	5	20.0
EZS 100R	4x16	16 3/4	5	4 1/2	6 1/2	5 1/2	5	21.1

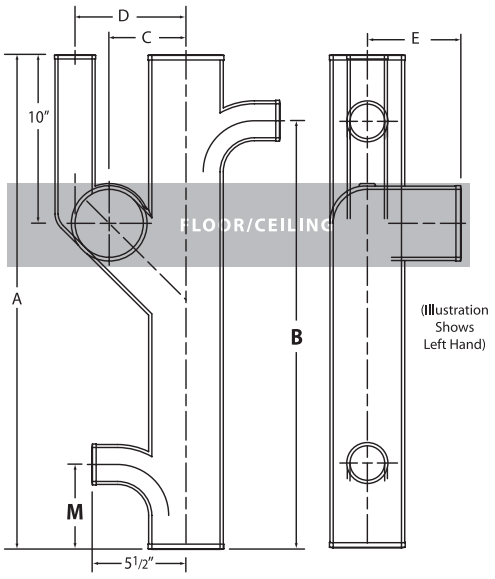


M & B dimensions must be measured from the bottom of the fitting.

PART NO. EZS 400*

30″ Closet Fittings with 2″ Inlet
(Double, Left Hand or Right Hand; Designed for use in the floor)

Part No.	Size	A	B	C	D	E	M	Weight
EZS 400L	4x30	30	0	4½	6½	5½	0	34.0
EZS 400L	4x30	30	6½	4½	6½	5½	0	34.2
EZS 400L	4x30	30	12	4½	6½	5½	0	37.8
EZS 400L	4x30	30	26½	4½	6½	5½	0	34.3
EZS 400L	4x30	30	0	4½	6½	5½	4	34.0
EZS 400L	4x30	30	26½	4½	6½	5½	4	34.0
EZS 400L	4x30	30	0	4½	6½	5½	6½	33.1
EZS 400L	4x30	30	6½	4½	6½	5½	6½	34.0
EZS 400L	4x30	30	26½	4½	6½	5½	6½	36.8
EZS 400L	4x30	30	0	4½	6½	5½	12	31.0
EZS 400L	4x30	30	26½	4½	6½	5½	12	30.0
EZS 400R	4x30	30	0	4½	6½	5½	0	32.9
EZS 400R	4x30	30	6½	4½	6½	5½	0	34.5
EZS 400R	4x30	30	12	4½	6½	5½	0	37.1
EZS 400R	4x30	30	26½	4½	6½	5½	0	33.8
EZS 400R	4x30	30	0	4½	6½	5½	4	34.0
EZS 400R	4x30	30	26½	4½	6½	5½	4	28.9
EZS 400R	4x30	30	0	4½	6½	5½	6½	33.9
EZS 400R	4x30	30	6½	4½	6½	5½	6½	35.4
EZS 400R	4x30	30	26½	4½	6½	5½	6½	35.4
EZS 400R	4x30	30	0	4½	6½	5½	12	31.0
EZS 400R	4x30	30	26½	4½	6½	5½	12	28.5
EZS 400D	4x30	30	0	4½	6½	5½	0	29.3
EZS 400D	4x30	30	6½	4½	6½	5½	0	36.4
EZS 400D	4x30	30	12	4½	6½	5½	0	39.6
EZS 400D	4x30	30	0	4½	6½	5½	4	38.0
EZS 400D	4x30	30	0	4½	6½	5½	6½	35.6
EZS 400D	4x30	30	26½	4½	6½	5½	6½	38.9
EZS 400D	4x30	30	0	4½	6½	5½	12	35.7
EZS 400D	4x30	30	26½	4½	6½	5½	12	38.0

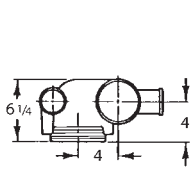


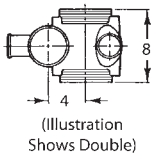
* When ordering please specify Double, Left or Right.
** Double starter fittings have a baffle.

PART NO. EZS 700*

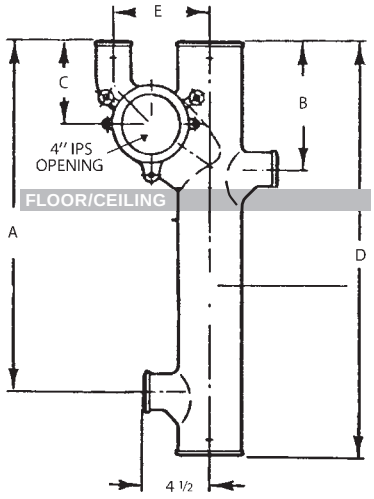
Threaded Starter Fitting with or without No-Hub Inlets
(Double, Left Hand or Right Hand; Designed for use above the floor with back-outlet water closets; Double Starter fittings have a baffle)

Part No.	Size	A	B	C	D	E	Weight
EZS 700D**	4x28	0	0	5½	28	6½	40.0
EZS 700D**	4x28	0	8½	5½	28	6½	42.0
EZS 700D**	4x28	23½	8½	5½	28	6½	42.0
EZS 700L	4x28	0	0	5½	28	6½	34.6
EZS 700L	4x28	0	8½	5½	28	6½	35.7
EZS 700L	4x28	14	8½	5½	28	6½	36.3
EZS 700L	4x28	23½	8½	5½	28	6½	32.0
EZS 700R	4x28	0	0	5½	28	6½	30.0
EZS 700R	4x28	0	8½	5½	28	6½	34.0
EZS 700R	4x28	14	8½	5½	28	6½	35.3
EZS 700R	4x28	23½	8½	5½	28	6½	32.0





A & B Dimensions must be measured from the top of the fitting.



2″ inlets available

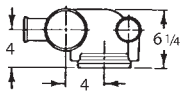
Note: Trim package not included in price of fitting
"O" dimension denotes the absence of the designated inlet.

PART NO. EZS 800*

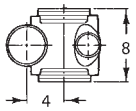
Threaded Starter Fitting with or without No-Hub Inlets

(Double, Left Hand or Right Hand; Designed for use above the floor with back-outlet water closets; Double starter fittings have a baffle)

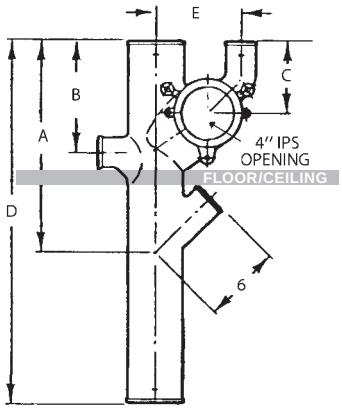
Part No.	Size	A	B	C	D	E	Weight
EZS 800D**	4x28	16	0	5½	28	6½	42.0
EZS 800D**	4x28	16	8½	5½	28	6½	42.0
EZS 800L	4x28	16	0	5½	28	6½	35.4
EZS 800L	4x28	16	8½	5½	28	6½	36.3
EZS 800R	4x28	16	0	5½	28	6½	35.6
EZS 800R	4x28	16	8½	5½	28	6½	35.3



(Illustration Shows Right Hand)



(Illustration Shows Double)



2″ inlets available

A & B Dimensions must be measured from the top of the fitting.

Note: Trim package not included in price of fitting
"O" dimension denotes the absence of the designated inlet.

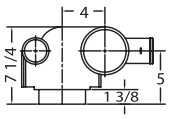
* When ordering please specify Double, Left or Right.
** Double starter fittings have a baffle.

PART NO. EZS 710*

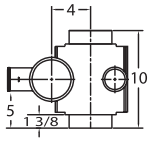
No-Hub Starter Fitting with or without 2″ No-Hub Inlets

(Double, Left Hand or Right Hand; Designed for use above the floor with back-outlet water closets; Double starter fittings have a baffle)

Part No.	Size	A	B	C	D	E	Weight
EZS 710D**	4x28	0	0	5½	28	4	43.0
EZS 710D**	4x28	0	8½	5½	28	4	43.0
EZS 710D**	4x28	23½	8½	5½	28	4	43.0
EZS 710L	4x28	0	0	5½	28	4	36.6
EZS 710L	4x28	0	8½	5½	28	4	36.6
EZS 710L	4x28	14	8½	5½	28	4	36.6
EZS 710L	4x28	23½	8½	5½	28	4	36.6
EZS 710R	4x28	0	0	5½	28	4	36.6
EZS 710R	4x28	0	8½	5½	28	4	36.6
EZS 710R	4x28	14	8½	5½	28	4	36.6
EZS 710R	4x28	23½	8½	5½	28	4	36.6



(Illustration Shows Left Hand)



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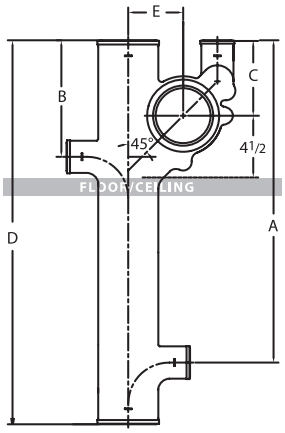


2″ inlets available

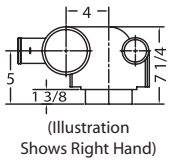
A & B Dimensions must be measured from the top of the fitting.

Note: Not designed for use with trim package
"O" dimension denotes the absence of the designated inlet.

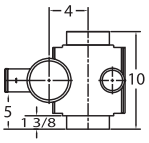
PART NO. EZS 810*

No-Hub Starter Fitting with or without 2″ No-Hub Inlets
(Double, Left Hand or Right Hand; Designed for use above the floor with back-outlet water closets; Double starter fittings have a baffle)

Part No.	Size	A	B	C	D	E	Weight
EZS 810D**	4x28	16	0	5½	28	6½	43.0
EZS 810D**	4x28	16	8½	5½	28	6½	43.0
EZS 810L	4x28	16	0	5½	28	6½	36.6
EZS 810L	4x28	16	8½	5½	28	6½	36.6
EZS 810R	4x28	16	0	5½	28	6½	36.6
EZS 810R	4x28	16	8½	5½	28	6½	36.6

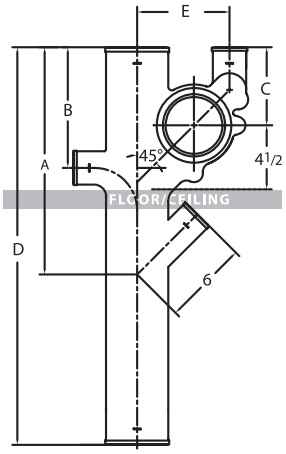


(Illustration Shows Right Hand)



(Illustration Shows Double)

A & B Dimensions must be measured from the top of the fitting.



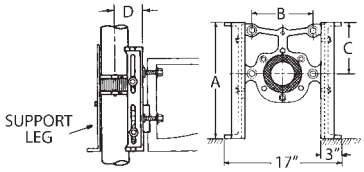
2″ inlets available

Note: Not designed for use with trim package
"O" dimension denotes the absence of the designated inlet.

* When ordering please specify Double, Left or Right.
** Double starter fittings have a baffle.

MOUNTING HARDWARE

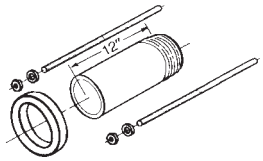
PART NO. EZS 22
Trim Package, Support Frame Assembly



A	B	C	D
20	9	7½	4

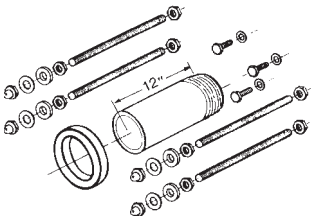
1—FRAME
1—LEFT LEG
1—RIGHT LEG
1—SUPPORT LEG (used for single only)
5—½″ x 1¼″ BOLTS
5—½″ FLAT WASHERS

PART NO. EZS 23
Trim Package, Floor-Mounted Back-Outlet Assembly
(Note: Not to be used with PART NO. EZS 22 Support Frame Assembly)



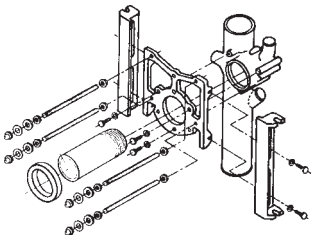
1—4″ PVC Sch. 80 NIPPLE with TEST CAP
1—BOWL GASKET
2—5/16″ x 12″ RODS
2—5/16″ HEX NUTS
2—5/16″ FLAT WASHERS
2—5/16″ CAP NUTS

PART NO. EZS 24
Trim Package, Wall-Hung Back-Outlet Assembly
(Note: To be used with PART NO. EZS 22 Support Frame Assembly)



Exploded View of Support Assembly Hardware

1—4″ PVC Sch. 80 NIPPLE with TEST CAP
1—BOWL GASKET
4—5/8″ x 12″ RODS
4—5/8″ CHROME CAP NUTS
8—5/8″ JAM NUTS
4—5/8″ FLAT WASHERS
4—5/8″ FIBER WASHERS
3—3/8″ x 1½″ BOLTS FOR FACEPLATE
3—3/8″ FLAT WASHERS
4—5/8″ STAR WASHERS



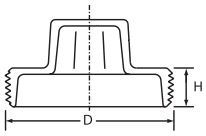
EZS 22 and EZS 24 Assemblies Illustrated

Plugs

PART NO. PLG 410

Ohio Code Brass Plug

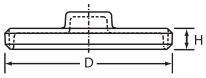
Size	D	H	Weight
10	$10\frac{23}{32}$	$2\frac{1}{32}$	10.6



PART NO. PLG 430

Southern Code Brass Plug

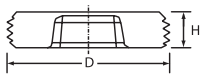
Size	D	H	Weight
$1\frac{1}{2}$	$1\frac{57}{64}$	$\frac{49}{64}$	0.2
2	$2\frac{23}{64}$	$\frac{49}{64}$	0.3
$2\frac{1}{2}$	$2\frac{55}{64}$	$\frac{51}{64}$	0.4
3	$3\frac{15}{32}$	$\frac{57}{64}$	0.6
$3\frac{1}{2}$	$3\frac{63}{64}$	$\frac{57}{64}$	0.7
4	$4\frac{31}{64}$	$\frac{61}{64}$	1.1
5	$5\frac{35}{64}$	$\frac{61}{64}$	1.5
6	$6\frac{19}{32}$	$\frac{17}{32}$	2.5
8	$8\frac{39}{64}$	$\frac{19}{32}$	4.0



PART NO. PLG 440

Southern Code Countersunk Brass Plug

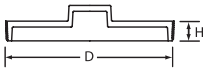
Size	D	H	Weight
$1\frac{1}{2}$	$1\frac{57}{64}$	$\frac{13}{32}$	0.2
2	$2\frac{23}{64}$	$\frac{7}{16}$	0.3
3	$3\frac{15}{32}$	$\frac{33}{64}$	0.6
$3\frac{1}{2}$	$3\frac{63}{64}$	$\frac{33}{64}$	0.8
4	$4\frac{31}{64}$	$\frac{35}{64}$	0.9
5	$5\frac{35}{64}$	$\frac{11}{16}$	1.7
6	$6\frac{19}{32}$	$\frac{11}{16}$	2.3



PART NO. PLG 450

Cast Iron Plug

Size	D	H	Weight
6	$6\frac{35}{64}$	$1\frac{17}{64}$	4.2
10	$10\frac{39}{64}$	$1\frac{31}{32}$	9.0



SUBMITTAL FOR CHARLOTTE® STANDARD NO-HUB COUPLINGS

Date: _____

Job Name: _____ Location: _____

Engineer: _____ Contractor: _____

Charlotte® Standard No-Hub Couplings, manufactured by Ideal Clamp Products, are engineered to connect hub-less cast iron pipe The coupling sleeve or gasket is manufactured from a properly vulcanized virgin compound where the primary elastomer is polychloroprene (neoprene). The gasket is housed inside a 301 stainless steel corrugated shield. Depending on the size of the shield, (2) or (4) 301 stainless steel clamps surround the shield and provide the sealing force. The 5/16" hex-head screws are made from 305 grade stainless steel. The Charlotte Standard No-Hub Couplings are available in sizes ranging from 1½" – 10". The couplings are designed for installation torque of 60 in-lbs. The entire coupling is corrosion resistant.

Size	Installation Torque Inch Pounds	No. of Clamps Per Coupling
1½"	60	2
2"	60	2
3"	60	2
4"	60	2
5"	60	4
6"	60	4
8"	60	4
10"	60	4
2" x 1½"	60	2
3" x 2"	60	2
4" x 3"	60	2

The Design:
The Charlotte Standard No-Hub Coupling is engineered to provide superior sealing performance. The coupling is NSF® compliance to CISPI 310, ASTM C 1277 and ASTM C 564. ***Sizes 1½" through 10" only**

The Gasket:
The gasket is made from a properly vulcanized virgin compound in compliance to ASTM C 564. The Charlotte No-Hub gasket features multiple sealing beads under the clamp bands. The sealing beads on the gasket impede the movement of the gasket and pipe, providing a positive, reliable seal.

The Shield:
The 0.007" thick type 301 stainless steel shield requires less band load to transfer pressure to the gasket, leaving more clamping load in reserve to compress the gasket. The patented, bi-directional corrugations create clamp sealing pressure in both parallel and transverse patterns on the gasket and pipe, thereby avoiding pull-out failures, and providing a positive, reliable seal.

The Clamps:
Standard 301 stainless steel clamps and 5/16" hex-head 305 screws provide the sealing force. 1½" through 4" couplings use two (2) clamps; 5" through 10" couplings use four (4) clamps. The entire assembly is corrosion resistant.

NSF

MADE IN USA

CHARLOTTE® STANDARD NO-HUB COUPLINGS

Product Information Submittal for No-Hub Systems

TEST	GASKET PHYSICAL TEST MIN. OR MAX. REQUIREMENTS	ASTM METHOD
Tensile Strength	1500 psi min.	D 412
Elongation	250 min.	D 412
Durometer (Shore A)	70 +/-5 @ 76°F +/- 5°F	D 2240
Accelerated Aging	15% maximum tensile and 20% maximum elongation, 10 points maximum increase in hardness, all determinations after oven aging for 96 hours at 158°F	D 573
Compression Set	25% max. after 22 hours at 158°F	D 395 Method B
Oil Immersion	80% max. volume change after immersion in IRM 903 for 70 hours at 212°F.	D 471
Ozone Cracking	100 hours exposure in 1.5 ppm ozone concentration at 104°F. Testing and inspection to be on gasket which is loop mounted to give approximately 20% elongation of outer surface.	D 1149
Tear Resistance	150 lbf /in. min.	D 624
Water Absorption	20% max. by weight after 7 days at 158°F	D 471

MATERIALS	
Clamp	Type 301 AISI stainless steel
Screw	Type 305 AISI stainless steel 5/16" hex head/shoulder
Shield	Type 301 AISI stainless steel, corrugated. Shield thickness 0.007"
Gasket	The gasket is made of an elastomeric compound that meets the requirements of ASTM C 564

The Charlotte® patented Standard No-Hub Coupling has been engineered to provide an all stainless steel coupling, balancing the desire for a more rigid joint with the need to provide a superior, positive,

The 1½", 2", 3" and 4" diameter couplings consist of a 2⅛" wide bi-directional, corrugated 301 stainless steel shield in conjunction with two (2) stainless steel clamps mounted in a series, secured The 5" and 6" couplings consist of a 3" wide corrugated 301 stainless steel shield in conjunction with four (4) clamps and the 8" and 10" coupling consists of a 4" wide corrugated 301 stainless steel shield with four (4) stainless steel clamps.

All Charlotte Standard No-Hub Couplings are designed to be installed with a pre-set torque wrench calibrated at 60 in-lbs. to accommodate the 305 stainless steel 5/16" hex-head/shoulder screw.

Charlotte is a registered trademark of Charlotte Pipe and Foundry Company.

SUBMITTAL FOR CHARLOTTE®
HEAVY-DUTY "MD" NO-HUB COUPLINGS

Date: _____

Job Name: _____ Location: _____

Engineer: _____ Contractor: _____

Charlotte® Heavy-Duty "MD" (yellow shield) No-Hub Couplings, manufactured by Ideal Clamp Products, are engineered to connect No-Hub cast iron pipe in applications replacing the less-

of an elastomeric compound gasket (ASTM C 564) housed inside a 304 stainless steel corrugated shield. Depending on the size of the shield, (4) or (6) 304 stainless steel clamps surround the shield and provide the sealing force. The 5/16" hex-head screws are made from 305 stainless steel. The Charlotte patented Heavy-Duty "MD" No-Hub Couplings are available in sizes ranging from 1½" – 10". The couplings are designed to be torqued to 80 in-lbs. The entire coupling is corrosion resistant. Conforms to ASTM C 1540.

Heavy-Duty "MD" No-Hub Couplings

Size	Installation Torque Inch Pounds	No. of Clamps Per Coupling
1½"	80	4
2"	80	4
3"	80	4
4"	80	4
5"	80	6
6"	80	6
8"	80	6
10"	80	6

The Design:
The Charlotte Heavy-Duty "MD" No-Hub Couplings are engineered to provide all the extra holding power of a Heavy-Duty coupling without all the extra cost. Conforms to ASTM C 1540.

The Gasket:
Made from high-quality elastomeric compound (ASTM C 564), the Charlotte No-Hub gasket features a pattern of multiple thick sealing sectors and adjacent groove sectors laterally spaced. When the clamps are tightened, this pattern permits the clamping bands and the shield to form a restriction impeding the movement of the shield relative to the gasket.

The Shield:
0.008" thick type 304 stainless steel yellow shield requires less band load to transfer pressure to the gasket, leaving more clamping load in reserve to compress the gasket. The patented, bi-directional corrugations create clamp sealing pressure in both parallel and transverse patterns on the gasket and pipe, thereby avoiding pull-out failures, and providing a positive, reliable seal.

The Clamps:
Heavy-duty 304 stainless steel clamps and 5/16" hex-head 305 screws provide the sealing force. 1½" through 4" couplings use four (4) clamps; 5" through 10" couplings use six (6) clamps. The entire assembly is corrosion resistant.

MADE IN USA

CHARLOTTE® HEAVY-DUTY "MD" NO-HUB COUPLINGS

Product Information Submittal for No-Hub Systems

TEST	GASKET PHYSICAL TEST MIN. OR MAX. REQUIREMENTS	ASTM METHOD
Tensile Strength	1500 psi min.	D 412
Elongation	250 min.	D 412
Durometer (Shore A)	70 +/-5 @ 76°F +/- 5°F	D 2240
Accelerated Aging	15% maximum tensile and 20% maximum elongation, 10 points maximum increase in hardness, all determinations after oven aging for 96 hours at 158°F	D 573
Compression Set	25% max. after 22 hours at 158°F	D 395 Method B
Oil Immersion	80% max. volume change after immersion in IRM 903 for 70 hours at 212°F.	D 471
Ozone Cracking	100 hours exposure in 1.5 ppm ozone concentration at 104°F. Testing and inspection to be on gasket which is loop mounted to give approximately 20% elongation of outer surface.	D 1149
Tear Resistance	150 lbf /in. min.	D 624
Water Absorption	20% max. by weight after 7 days at 158°F	D 471

MATERIALS	
Clamp	Type 304 AISI stainless steel
Screw	Type 305 AISI stainless steel 5/16" hex head/shoulder
Shield	Type 304 AISI stainless steel, corrugated. Shield thickness 0.008"
Gasket	The gasket is made of an elastomeric compound that meets the requirements of ASTM C 564

The Charlotte® Heavy-Duty "MD" No-Hub Coupling has been engineered to provide a mid-range, all stainless steel coupling, balancing the desire for a more rigid joint with the need to provide a superior,

This has been accomplished by manufacturing our coupling with a mid-range corrugated shield of

First the overall dimensional thickness of the clamp and shield, in conjunction with the additional width of the coupling, result in a more uniformly rigid joint, with the load being supported at both the outer edge of the coupling and the centerline of the joint. Second, the additional sealing clamps yield

joint movement at higher internal pressures not commonly associated with DWV systems.

The 1½", 2", 3" and 4" diameter couplings consist of a 3" wide bi-directional, corrugated 304 stainless steel shield in conjunction with four (4) stainless steel clamps mounted in a series, secured in place

The 5", 6" 8" and 10" couplings consist of a 4" corrugated 304 stainless steel shield and six (6) stainless steel clamps.

All Charlotte Heavy-Duty "MD" No-Hub Couplings are designed to be installed with a pre-set torque wrench calibrated at 80 in-lbs. accommodates the 305 stainless steel 5/16" hex-head/ shoulder screw.

Charlotte is a registered trademark of Charlotte Pipe and Foundry Company.

SUBMITTAL FOR CHARLOTTE®
HEAVY-DUTY "HD" NO-HUB COUPLINGS

Date: _____

Job Name: _____ Location: _____

Engineer: _____ Contractor: _____

Charlotte® Heavy-Duty "HD" (green shield) No-Hub Couplings, manufactured by Ideal Clamp Products, are engineered to connect No-Hub cast hub & spigot material. The Coupling consists of an elastomeric compound gasket (ASTM C 564) housed inside a 304 stainless steel corrugated shield. Depending on the size of the shield, (4) or (6) 304 stainless steel clamps surround the shield and provide the sealing force. The 3/8" hex-head screws are made from 305 stainless- steel. Charlotte Heavy-Duty "HD" No-Hub Couplings are available in sizes ranging from 1½" – 10". The couplings are designed to be torqued to 80 in-lbs. The entire coupling is corrosion resistant. Conforms to ASTM C 1540.

Heavy-Duty "HD" No-Hub Couplings

Size	Installation Torque Inch Pounds	No. of Clamps Per Coupling
1½"	80	4
2"	80	4
3"	80	4
4"	80	4
5"	80	6
6"	80	6
8"	80	6
10"	80	6

The Design:
Charlotte Heavy-Duty "HD" No-Hub Couplings have been re-engineered to install with 80 in-lbs. of screw torque and boasts an ultimate torque rating exceeding 100 in/lbs. Our patented, extra wide bi-directional shield is now constructed with a heavier gauge stainless steel. The mechanically interlocked 9/16" wide clamps have also been augmented with a heavier gauge stainless steel and a 3/8" hex-head screw. These changes, teamed with our specially beaded gasket, enable our new Heavy-Duty "HD" coupling to exert exceptional hold on the pipe for a positive, reliable seal. Conforms to ASTM C 1540.

The Gasket:
Made from high-quality elastomeric compound (ASTM C 564), the Charlotte No-Hub gasket features a pattern of multiple thick sealing sectors and adjacent groove sectors laterally spaced. When the clamps are tightened, this pattern permits the clamping bands and the shield to form a restriction impeding the movement of the shield relative to the gasket.

The Shield:
0.008" thick type 304 stainless steel green shield requires less band load to transfer pressure to the gasket, leaving more clamping load in reserve to compress the gasket. The patented, bi-directional corrugations create clamp sealing pressure in both parallel and transverse patterns on the gasket and pipe, thereby avoiding pull-out failures, and providing a positive, reliable seal.

The Clamps:
Heavy-duty 304 stainless steel clamps and 3/8" hex-head 305 screws provide the sealing force. 1½" through 4" couplings use four (4) clamps; 5" through 10" couplings use six (6) clamps. The entire assembly is corrosion resistant.

MADE IN USA

CHARLOTTE® HEAVY-DUTY "HD" NO-HUB COUPLINGS

Product Information Submittal for No-Hub Systems

TEST	GASKET PHYSICAL TEST MIN. OR MAX. REQUIREMENTS	ASTM METHOD
Tensile Strength	1500 psi min.	D 412
Elongation	250 min.	D 412
Durometer (Shore A)	70 +/-5 @ 76°F +/- 5°F	D 2240
Accelerated Aging	15% maximum tensile and 20% maximum elongation, 10 points maximum increase in hardness, all determinations after oven aging for 96 hours at 158°F	D 573
Compression Set	25% max. after 22 hours at 158°F	D 395 Method B
Oil Immersion	80% max. volume change after immersion in IRM 903 for 70 hours at 212°F.	D 471
Ozone Cracking	100 hours exposure in 1.5 ppm ozone concentration at 104°F. Testing and inspection to be on gasket which is loop mounted to give approximately 20% elongation of outer surface.	D 1149
Tear Resistance	150 lbf /in. min.	D 624
Water Absorption	20% max. by weight after 7 days at 158°F	D 471

MATERIALS	
Clamp	Type 304 AISI stainless steel
Screw	Type 305 AISI stainless steel 3/8" hex head/shoulder
Shield	Type 304 AISI stainless steel, corrugated. Shield thickness 0.008"
Gasket	The gasket is made of an elastomeric compound that meets the requirements of ASTM C 564

The Charlotte® patented Heavy-Duty "HD" No-Hub Coupling has been engineered to provide a heavy-duty, all stainless steel coupling, balancing the desire for a more rigid joint with the need to provide a superior, positive seal which can accommodate possible disparities in the mating of No-Hub pipe This has been accomplished by manufacturing our Charlotte patented No-Hub Heavy-

surface-bearing sealing clamps.

First, the overall dimensional thickness of the clamp and shield, in conjunction with the additional width of the coupling, result in a more uniformly rigid joint, with the load being supported at both the outer edge of the coupling and the centerline of the joint. Second, the additional sealing clamps yield

joint movement at higher internal pressures not commonly associated with DWV systems.

The 1½", 2", 3" and 4" diameter couplings consist of a 3" wide bi-directional, corrugated 304 stainless steel shield in conjunction with four (4) stainless steel clamps mounted in a series, secured in place The 5", 6" 8" and 10" couplings consist of a 4" corrugated 304 stainless steel shield and six (6) stainless steel clamps.

All Charlotte patented Heavy-Duty "HD" No-Hub Couplings are designed to be installed with a pre-set torque wrench calibrated at 80 in-lbs. to accommodate the 305 stainless steel 3/8" hex-head/shoulder screw.

Charlotte is a registered trademark of Charlotte Pipe and Foundry Company.

SUBMITTAL FOR CHARLOTTE®
12" AND 15" HEAVY-DUTY NO-HUB COUPLINGS

Date: _____

Job Name: _____ Location: _____

Engineer: _____ Contractor: _____

Charlotte® Heavy-Duty No-Hub Couplings, manufactured by Ideal Clamp Products, are engineered to connect No-Hub cast iron pipe in

material. The Couplings consist of an elastomeric compound gasket (ASTM C 564) housed inside a 304 stainless steel corrugated shield. Six (6) 304 stainless steel clamps surround the shield and provide the sealing force. The 3/8" hex-head screws are made from 305 stainless steel. The Couplings are designed for installation torque of 120 in-lbs. The entire coupling is corrosion resistant.

12" & 15" Heavy-Duty No-Hub Couplings

Size	Installation Torque Inch Pounds	No. of Clamps Per Coupling
12"	120	6
15"	120	6

The Design:
Charlotte 12" and 15" Heavy-Duty No-Hub Couplings are engineered to provide superior performance at a very competitive cost. Conforms to ASTM C 1277.

The Gasket:
Made from high-quality elastomeric compound (ASTM C 564), the Charlotte No-Hub gasket features a pattern of multiple, thick sealing sectors and adjacent groove sectors laterally spaced. When the clamps are tightened, this pattern permits the clamping bands and the shield to form a restriction impeding the movement of the shield relative to the gasket.

The Shield:
0.008" thick type 304 stainless steel shield requires less band load to transfer pressure to the gasket, leaving more clamping load in reserve to compress the gasket. The patented, bi-directional corrugations create clamp sealing pressure in both parallel and transverse patterns on the gasket and pipe, thereby avoiding pull-out failures, and providing a positive, reliable seal. In addition, the shield design adjusts to differences in the circumference and outside diameters of the pipes being joined. This eliminates gasket wrinkling and thereby eliminating leak paths.

The Clamps:
Heavy-duty 304 stainless steel clamps and 3/8" hex-head 305 screws provide the sealing force. Both the 12" and the 15" coupling use six (6) 5/8" wide clamps. The entire assembly is corrosion resistant.

MADE IN USA

CHARLOTTE® 12" & 15" NO-HUB COUPLINGS

Product Information Submittal for No-Hub Systems

TEST	GASKET PHYSICAL TEST MIN. OR MAX. REQUIREMENTS	ASTM METHOD
Tensile Strength	1500 psi min.	D 412
Elongation	250 min.	D 412
Durometer (Shore A)	70 +/-5 @ 76°F +/- 5°F	D 2240
Accelerated Aging	15% maximum tensile and 20% maximum elongation, 10 points maximum increase in hardness, all determinations after oven aging for 96 hours at 158°F	D 573
Compression Set	25% max. after 22 hours at 158°F	D 395 Method B
Oil Immersion	80% max. volume change after immersion in IRM 903 for 70 hours at 212°F.	D 471
Ozone Cracking	100 hours exposure in 1.5 ppm ozone concentration at 104°F. Testing and inspection to be on gasket which is loop mounted to give approximately 20% elongation of outer surface.	D 1149
Tear Resistance	150 lbf /in. min.	D 624
Water Absorption	20% max. by weight after 7 days at 158°F	D 471

MATERIALS	
Clamp	Type 304 AISI stainless steel
Screw	Type 305 AISI stainless steel 3/8" hex head/shoulder
Shield	Type 304 AISI stainless steel, corrugated. Shield thickness 0.008"
Gasket	The gasket is made of an elastomeric compound that meets the requirements of ASTM C 564

The Charlotte® Heavy-Duty No-Hub Coupling has been engineered to provide an all stainless steel coupling, balancing the desire for a more rigid joint with the need to provide a superior, positive,

This has been accomplished by manufacturing our coupling with our standard corrugated shield of

First, the overall dimensional thickness of the clamp and shield, in conjunction with the additional width of the coupling, result in a more uniformly rigid joint, with the load being supported at both the outer edge of the coupling and the centerline of the joint. Second, the additional sealing clamps yield

joint movement at higher internal pressures not commonly associated with DWV systems.

The 12" and 15" diameter couplings consist of a 5 1/2" wide bi-directional, corrugated 304 stainless steel shield in conjunction with six (6) stainless steel clamps mounted in a series, secured in

MADE IN USA

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Limited Warranty

Charlotte Pipe and Foundry Company® (Charlotte Pipe®) Products are warranted to be free from manufacturing defects and to conform to currently applicable ASTM standards for a period of five (5) years from date of delivery. Buyer's remedy for breach of this warranty is limited to replacement of, or credit for, the defective product. This warranty excludes any expense for removal or reinstallation of any defective product and any other incidental, consequential, or punitive damages. **This limited warranty is the only warranty made by seller and is expressly in lieu of all other warranties, express and implied, including any warranties of merchantability and fitness for a particular purpose.** No statement, conduct or description by Charlotte Pipe or its representative, in addition to or beyond this Limited Warranty, shall constitute a warranty. This Limited Warranty may only be modified in writing signed by an officer of Charlotte Pipe.

This Limited Warranty will not apply if:

1) The Products are used for purposes other than their intended purpose as defined by local plumbing and building codes, and the applicable ASTM standard.
2) The Products are not installed in good and workmanlike manner consistent with normal industry standards; installed in compliance with the latest instructions published by Charlotte Pipe and good plumbing practices; and installed in conformance with all applicable plumbing, fire and building code requirements.
3) This limited warranty does not apply when the products of Charlotte Pipe are used with the products of other manufacturers that do not meet the applicable ASTM or CISPI standards or that are not marked in a manner to indicate the entity that manufactured them.
4) In hubless cast iron installations, this warranty will not apply if products are joined with unshielded hubless couplings. Charlotte Pipe requires that its hubless cast iron pipe and fittings be joined only with shielded hubless couplings manufactured in accordance with CISPI 310, ASTM C 1277 and certified by NSF® International or with Heavy Duty Couplings meeting ASTM C 1540.
5) The Products fail due to defects or deficiencies in design, engineering, or installation of the piping system of which they are a part.
6) The Products have been the subject of modification; misuse; misapplication; improper maintenance or repair; damage caused by the fault or negligence of anyone other than Charlotte Pipe; or any other act or event beyond the control of Charlotte Pipe.
7) The Products fail due to the freezing of water in the Products.
8) The Products fail due to contact with chemical agents, fire stopping materials, thread sealant, plasticized vinyl products, or other aggressive chemical agents that are not compatible.
9) Pipe outlets, sound attenuation systems or other devices are permanently attached to the surface of Charlotte® PVC, ABS or CPVC products with solvent cement or adhesive glue.

Charlotte Pipe products are manufactured to the applicable ASTM or CISPI standard. Charlotte Pipe and Foundry **cannot** accept responsibility for the performance, dimensional accuracy, or compatibility of pipe, fittings, gaskets, or couplings not manufactured or sold by Charlotte Pipe and Foundry.

Any Charlotte Pipe products alleged to be defective **must** be made available to Charlotte Pipe at the following address for verification, inspection and determination of cause:

Charlotte Pipe and Foundry Company
Attention: Technical Services
2109 Randolph Road
Charlotte, North Carolina 28207

Purchaser must obtain a return materials authorization and instructions for return shipment to Charlotte Pipe of any product claimed defective or shipped in error. Please refer to the **Return Material Policy** on the back of this page for specific instructions on returning materials to Charlotte Pipe.

Any Charlotte Pipe product **proved** to be defective in manufacture will be replaced F.O.B. point of original delivery, or credit will be issued, at the discretion of Charlotte Pipe.

4/24/15

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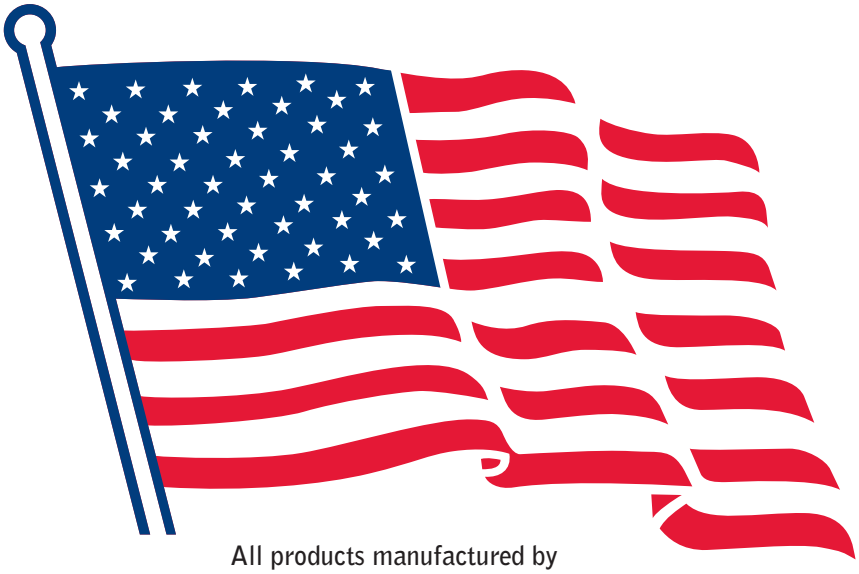


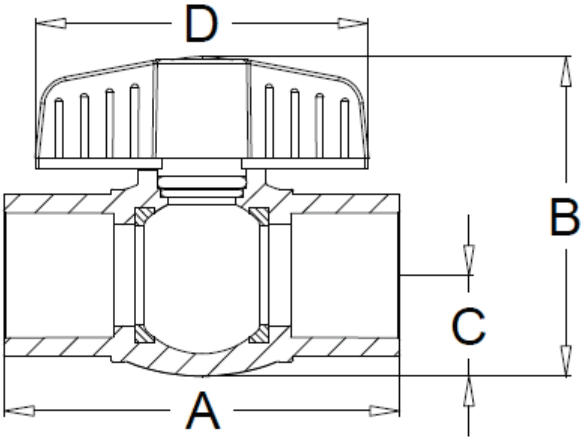
All products manufactured by
Charlotte Pipe and Foundry Company
are proudly made in the U.S.A.

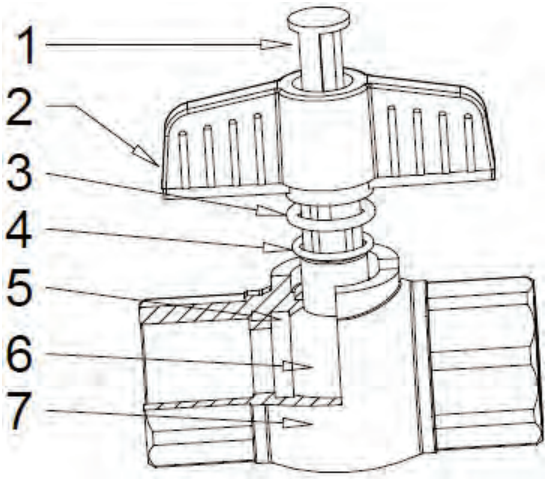
770 White PVC Ball Valve • Spec Sheet

Sizes 1/2” - 2”

FEATURES & BENEFITS

- ISO 9002
- 150 PSI @ 73 Deg. F.
- White Color
- NSF Approved
- Fits Sch. 40 & Sch. 80 Pipe
- Threaded or Solvent Ends
- Threaded Ends Comply With ANSI B1.20.1
- Solvent Ends Comply With ASTM D2466





DIMENSIONS

Part # Threaded	Part # Solvent	Size	A	B	C	D
770T03	770S03	1/2”	3.16	2.46	0.71	2.74
770T04	770S04	3/4”	3.61	2.98	0.87	3.01
770T05	770S05	1”	4.19	3.39	1.06	3.53
770T06	770S06	1-1/4”	4.76	3.80	1.21	3.54
770T07	770S07	1-1/2”	5.13	4.32	1.46	4.42
770T08	770S08	2”	5.93	5.36	1.83	5.53

MATERIAL SPECIFICATIONS

No.	Part	Material
1	Cap	ABS
2	Handle	ABS
3	O-Ring	EPDM
4	O-Ring	EPDM
5	Seat (2)	PTFE
6	Ball	PC + ABS
7	Body	PVC

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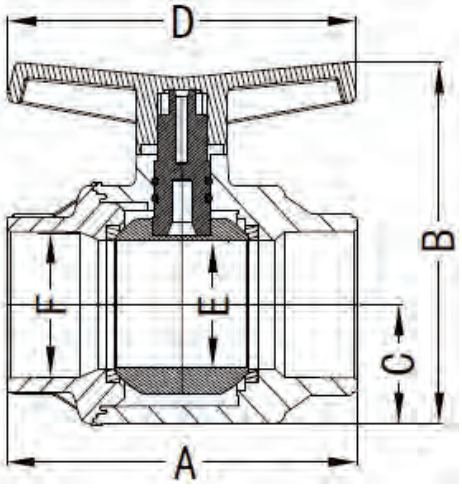
TEXAS 1150 Silber Rd., Houston TX 77055 • Toll Free: 800-935-5456 • Fax: 713-680-2999
NEW YORK PO Box 27, Rt. 22, Brewster NY 10509 • Toll Free: 800-431-2082 • Fax: 845-278-9056
WEB: **www.matco-norca.com** EMAIL: **mail@matco-norca.com**

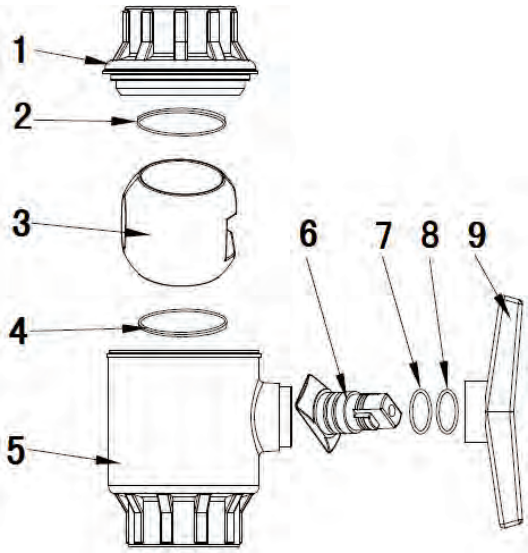
770 White PVC Ball Valve • Spec Sheet

Sizes 2-1/2" - 4"

FEATURES & BENEFITS

- ISO 9002
- 150 PSI @ 73 Deg. F.
- White Color
- NSF Approved
- Fits Sch. 40 & Sch. 80 Pipe
- Threaded or Solvent Ends
- Threaded Ends Comply With ANSI B1.20.1
- Solvent Ends Comply With ASTM D2466





DIMENSIONS

Part # Threaded	Part # Solvent	Size	A	B	C	D	E	F
770T09	770S09	2-1/2"	7.48	7.68	2.26	7.09	2.62	2.87
770T10	770S10	3"	8.66	8.86	2.66	9.05	3.06	3.49
770T11	770S11	4"	10.24	10.24	3.35	10.04	4.03	4.49

MATERIAL SPECIFICATIONS

No.	Part	Material
1	Nut	PVC
2, 4	Seat (2)	PTFE
3	Ball	PVC
5	Body	PVC
6	Stem	PVC
7, 8	O-Ring (2)	EPDM
9	Handle	ABS

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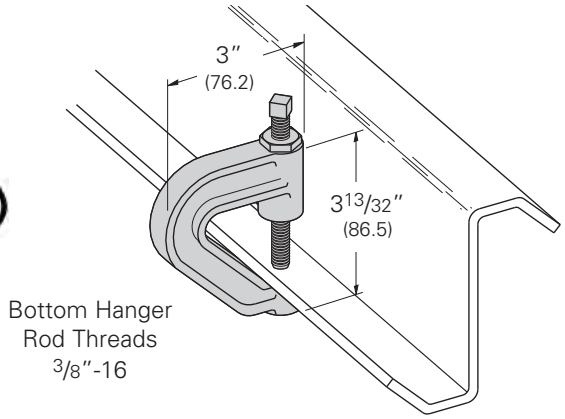
Beam Clamps

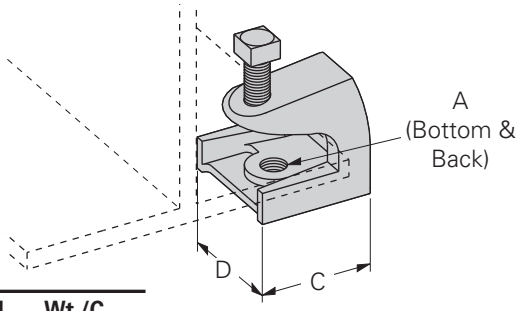
B3037Z
Z-Purlin C-Clamp

- Design Load 500 Lbs. (2.22 kN)
- Safety Factor of 5
- Designed for attaching a 3/8"-16 hanger rod to the bottom flange of a Z-purlin
- Setscrew and locknut included
- Material: Malleable iron
- Standard finishes: ZN, PLN



B444
Series Rod Support

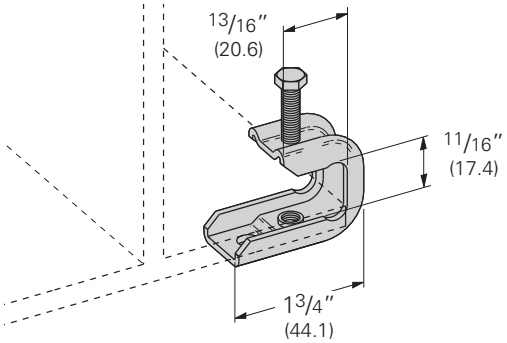
- Safety Factor of 5
- Max. Flange Thickness
  3/4" (19.0) for 1/4 & 5/16 sizes
  1" (25.4) for 3/8 & 1/2 sizes
- Setscrew included
- Material: Malleable iron
- Standard finish: ZN, available in HDG with CZ Hardware



Part No.	Thread Size A	Set Screw	C In.	C mm	D In.	D mm	Design Load Lbs.	Design Load kN	Wt./C Lbs.	Wt./C kg
B444-1/4	1/4"-20	1/4"-20	1 3/8"	(34.9)	1 3/16"	(30.1)	150	(.66)	24	(10.9)
B444-5/16	5/16"-18	1/4"-20	1 3/8"	(34.9)	1 3/16"	(30.1)	150	(.66)	23	(10.4)
B444-3/8	3/8"-16	1/2"-13	1 7/8"	(47.6)	2"	(50.8)	350	(7.12)	65	(29.5)
B444-1/2	1/2"-13	5/8"-11	2 3/8"	(60.3)	2 1/2"	(63.5)	1000	(4.45)	132	(59.9)

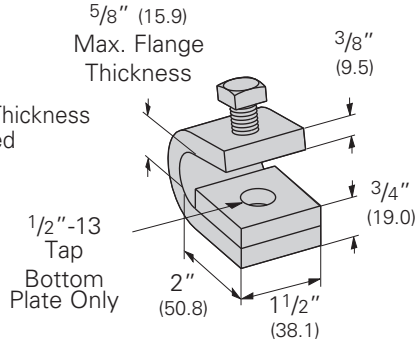
BC442
Light Duty Beam Clamp

- Design Load 75 Lbs. (.33 kN)
- Safety Factor of 5
- 11/16" (17.5) Max. Flange Thickness
- Setscrew included
- Holes tapped 1/4"-20 (Bottom & Back)
- Material: 13 Gauge (2.3)
- Standard finish: ZN
- Wt./C 13 Lbs. (3.9 kg)



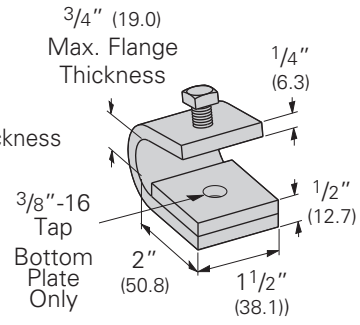
B210
Beam Clamp

- Design Load 800 Lbs. (3.56 kN)
- Safety Factor of 5
- 5/8" (15.9) Max. Flange Thickness
- 1/2"-13 Setscrew included
- Standard finish: ZN
- Wt./C 100 Lbs. (45.3 kg)



B210A
Beam Clamp

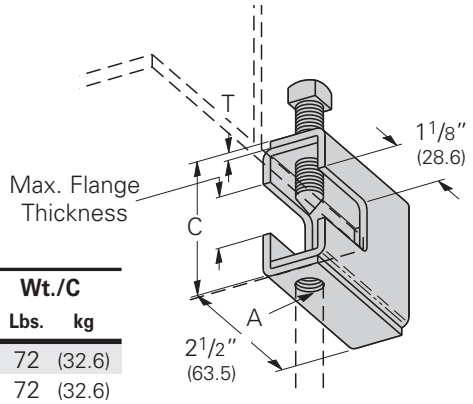
- Design Load 300 Lbs. (1.33 kN)
- Safety Factor of 5
- 3/4" (19.0) Max. Flange Thickness
- 3/8"-16 Setscrew included
- Standard finish: ZN
- Wt./C 60 Lbs. (27.2 kg)



Reference page 113 for general fitting and standard finish specifications.

B303 thru B309 Beam Clamps

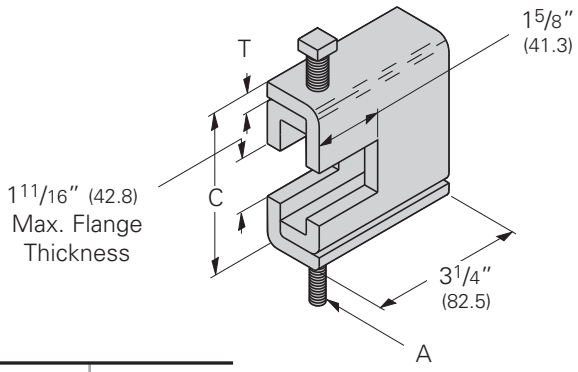
- Safety Factor of 5
- Max. Flange Thickness 1/16" (1.6) thru 7/8" (22.2)
- Setscrew included
- When Retaining Strap is required, order B312 separately
- Recommended Setscrew Torque: 3/8"-16 150 in-lbs. (16.9 N•m)
  1/2"-13 350 in-lbs. (39.5 N•m)
- Standard finishes: ZN, HDG



Part No.	Thread Size A	Set Screw	C In.	C mm	D In.	D mm	Design Load Lbs.	Design Load kN	Wt./C Lbs.	Wt./C kg
B303	1/4"-20	3/8"-16	2 5/16"	(58.7)	11 Ga.	(3.0)	400	(1.78)	72	(32.6)
B304	5/16"-18	3/8"-16	2 5/16"	(58.7)	11 Ga.	(3.0)	600	(2.67)	72	(32.6)
B305	3/8"-16	3/8"-16	2 5/16"	(58.7)	11 Ga.	(3.0)	600	(2.67)	72	(32.6)
B306	3/8"-16	1/2"-13	2 7/16"	(61.9)	7 Ga.	(4.5)	1100	(4.89)	97	(44.0)
B307	1/2"-13	1/2"-13	2 7/16"	(61.9)	7 Ga.	(4.5)	1100	(4.89)	97	(44.0)
B308	1/2"-13	1/2"-13	2 9/16"	(65.1)	1/4"	(6.3)	1500	(6.67)	133	(60.3)
B309	5/8"-11	1/2"-13	2 9/16"	(65.1)	1/4"	(6.3)	1500	(6.67)	133	(60.3)

B321 Series Beam Clamps

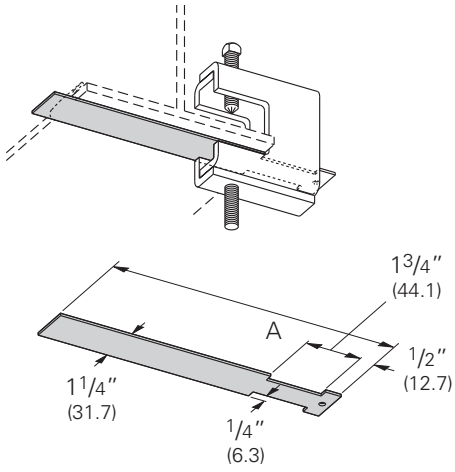
- Safety Factor of 5
- 1 11/16" (42.8) Max. Flange Thickness
- Setscrew included
- When Retaining Strap is required, order B312 separately
- Recommended Setscrew Torque: 1/2"-13 350 in-lbs. (39.5 N•m)
  5/8"-11 700 in-lbs. (79.0 N•m)
- Minimum flange thickness: B321-1 thru B321-3 1/4" (6.3)
  B321-4 and B321-5 3/8" (9.5)
- Standard finishes: ZN, HDG



Part No.	Thread Size A	Setscrew Size	C In.	C mm	D In.	D mm	Design Load Lbs.	Design Load kN	Wt./C Lbs.	Wt./C kg
B321-1	3/8"-16	1/2"-13	3 9/16"	(92.1)	1/4"	(6.3)	1300	(5.78)	187	(84.8)
B321-2	1/2"-13	1/2"-13	3 9/16"	(92.1)	1/4"	(6.3)	1400	(6.23)	186	(84.3)
B321-3	5/8"-11	1/2"-13	3 9/16"	(92.1)	1/4"	(6.3)	1600	(7.12)	185	(83.9)
B321-4	5/8"-11	5/8"-11	3 23/32"	(94.4)	5/16"	(7.9)	1800	(8.00)	239	(108.4)
B321-5	3/4"-10	5/8"-11	3 23/32"	(94.4)	5/16"	(7.9)	2000	(8.89)	238	(107.9)

B312 Series Retaining Strap for use with B303 thru B309 and B321 Series

- 3/4" (19.0) Max. Flange Thickness
- For thicker beams, step up one flange width size
- Material: 14 Gauge (1.9)
- Standard finishes: GALV, HDG

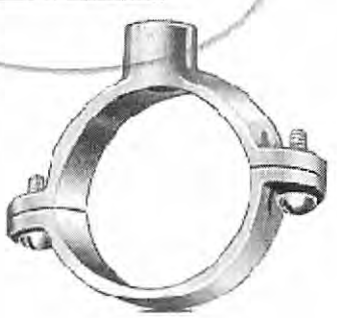


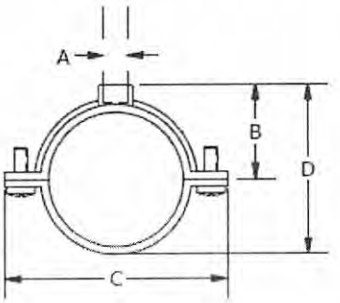
Part No.	For Flange Width In.	For Flange Width mm	A In.	A mm	Wt./C Lbs.	Wt./C kg
B312-6	6"	(152.4)	9"	(228.6)	22	(10.0)
B312-9	9"	(228.6)	12"	(304.8)	30	(13.6)
B312-12	12"	(304.8)	15"	(381.0)	40	(18.1)
B312-15	15"	(381.0)	18"	(457.2)	49	(22.2)

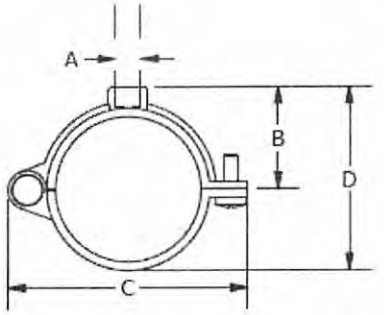
Reference page 113 for general fitting and standard finish specifications.

FIG. 100

SPLIT RING EXTENSION HANGER







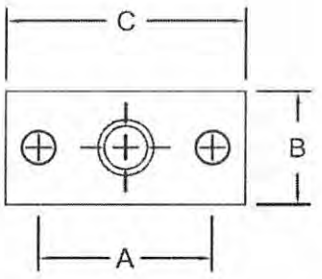
MATERIAL: Malleable iron, stainless steel.
FINISH: Black or electro galvanized.
SERVICE: For suspension of non-insulated stationary pipe lines.
ORDERING: Specify pipe size, figure number and finish.
APPROVALS: Complies with Federal Specification WW-H-171E Type 25 and Manufacturers' Standardization Society SP-58 & SP-69 Type 12.

PIPE SIZE	A	B	WEIGHT/C APPROX.	MAX REC. LOAD, LB.
3/8*	3/8	11/16	16	180
1/2	3/8	13/16	17	180
3/4	3/8	15/16	20	180
1	3/8	1 1/16	21	180
1 1/4	3/8	1 1/4	29	180
1 1/2	3/8	1 5/16	31	180
2	3/8	1 5/8	35	180
2 1/2*	1/2	1 15/16	57	300
3*	1/2	2 3/8	72	300
4*	1/2	2 7/8	116	300

*Sizes 3/8, 2 1/2, 3 and 4 are hinged style

FIG. 105

HANGER FLANGE



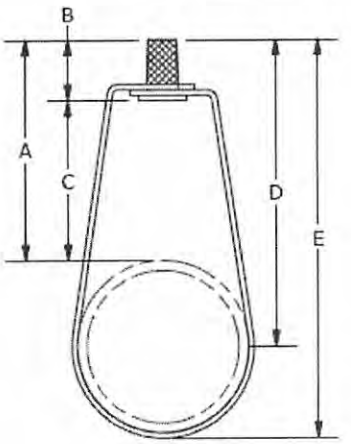
MATERIAL: Malleable iron, stainless steel.
FINISH: Black or electro-galvanized.
SERVICE: For attachment to wood beams, ceilings or floors.
ORDERING: Specify tap size, figure number and finish.

BOLT TAP	A	B	C	WEIGHT (APPROX.) PER 100
3/8	1 15/16	1 15/16	2 1/4	18
1/2	1 15/16	1 15/16	2 1/4	17

FIG. 110

ADJUSTABLE SWIVEL RING HANGER, STD. & NFPA

MATERIAL: Carbon steel.
FINISH: Electro-galvanized.
SERVICE: Recommended for suspension of non-insulated, stationary pipe lines and conduit. Approved for use without additional locking nuts normally required with pipe hangers.
ORDERING: Specify pipe size and figure number.
APPROVALS: Underwriter's Laboratories Listed for ¾"-2" and Factory Mutual Approved for ¾"-4". Complies with Federal Specification WW-H-171E Type 10 and Manufacturers' Standardization Society SP-58 & SP-69 Type 10.

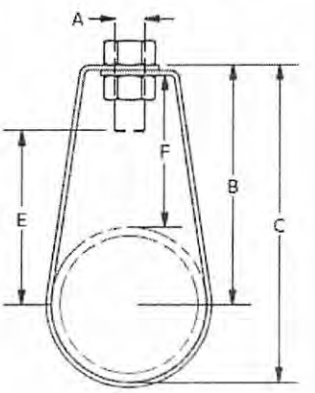


PIPE SIZE	WEIGHT PER 100	MAX. REC. LOAD LB.	DIMENSIONS					MATERIAL SIZE	ROD SIZE	NFPA ROD SIZE
			A	B	C	D	E			
½	11	400	2¼	⅞	1½	2⅝	3 3/16	16ga x ⅝	⅜	⅜
¾	11	400	2 1/16	⅞	1¼	2½	3 3/16	16ga x ⅝	⅜	⅜
1	12	600	2	⅞	1⅜	2⅝	3⅜	16ga x ⅝	⅜	⅜
1¼	13	600	2	⅞	1⅜	2¾	3¾	16ga x ⅝	⅜	⅜
1½	14	600	1⅞	⅞	1⅜	2⅞	4	16ga x ⅝	⅜	⅜
2	15	600	2⅛	⅞	1¼	3¼	4⅝	16ga x ⅝	⅜	⅜
2½	32	600	2½	1⅛	1⅜	3¾	5⅝	13ga x ¾	½	⅜
3	34	600	2⅞	1⅛	2⅞	4½	6¼	13ga x ¾	½	⅜
3½	37	600	3	1⅛	1¾	5	7	13ga x ¾	½	⅜
4	78	1250	2¾	1⅛	1¾	5	7⅜	11ga x 1	⅝	⅜
5	94	1250	3¼	1⅛	1⅞	6	9⅛	11ga x 1	⅝	½
6	120	1250	3¾	1½	2½	7¼	10⅝	11ga x 1	¾	½
8	145	1250	4½	1½	3⅛	8⅞	13⅛	11ga x 1	¾	½

FIG. 115

ADJUSTABLE BAND HANGER

MATERIAL: Carbon steel.
FINISH: Black, electro-galvanized.
SERVICE: For suspension of non-insulated, stationary pipe lines and conduit.
ORDERING: Specify pipe size, figure number and finish.
APPROVALS: Complies with Federal Specification WW-H-171E Type 7 and Manufacturers' Standardization Society SP-58 & SP-69 Type 7.

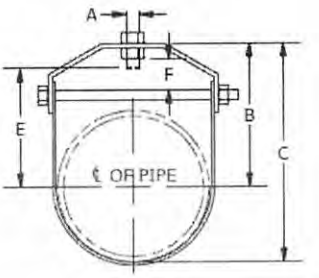


PIPE SIZE	MATERIAL SIZE	MAX. REC. LOAD LB.	A	B	C	E	F	WEIGHT PER 100
⅜	16ga x ⅞	610	⅜	2 5/16	2⅝	1 9/16	1⅜	11
½	16ga x ⅞	610	⅜	2 3/16	2⅝	1 7/16	1¼	11
¾	16ga x ⅞	610	⅜	2 1/16	2⅝	1 5/16	1	12
1	16ga x ⅞	610	⅜	2 1/16	2 11/16	1 5/16	1 5/16	12
1¼	16ga x ⅞	610	⅜	2 9/16	3 7/16	1 13/16	1¼	14
1½	16ga x ⅞	610	⅜	2¾	3 11/16	2	1 3/16	16
2	16ga x ⅞	610	⅜	3	4 3/16	2¼	1 3/16	23
2½	14ga x 1	970	½	3 3/16	4⅞	2 7/16	1¼	28
3	13ga x 1	970	½	4¼	6	3¼	1⅝	41
3½	13ga x 1	970	½	4⅛	6⅛	3⅛	1⅜	44
4	11ga x 1	1250	½	4½	6¾	3¼	1⅜	87
5	11ga x 1	1250	½	5	7¾	4¾	1¼	100
6	11ga x 1½	1600	¾	6 11/16	10	5 3/16	2⅛	160
8	11ga x 1½	1800	¾	7 9/16	11⅞	6 13/16	2	260

FIG. 200

ADJUSTABLE CLEVIS HANGER

MATERIAL: Carbon steel and 304/316 stainless steel.
FINISH: Black, electro or hot-dipped galvanized.
SERVICE: For the suspension of non-insulated, stationary pipe lines.
ORDERING: Specify pipe size, figure number and finish.
APPROVALS: Underwriters Laboratories Listed and Factory Mutual Approve ¾"-8". Complies with Federal Specification WW-H-171E Type 1 and Manufacturers' Standardization Society SP-58 & SP-69 Type 1.



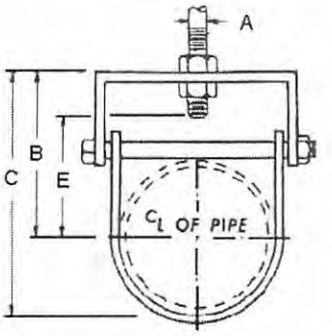
PIPE SIZE	SIZE OF STEEL		A	B	C	E	F	WGT. PER 100	MAX. REC. LOAD, LBS.
	UPPER	LOWER							
½	13ga x ⅞	13ga x ⅞	⅜	1 11/16	2 1/16	1 5/16	7/16	18	610
¾	13ga x ⅞	13ga x ⅞	⅜	1 11/16	2 3/16	1 5/16	7/16	18	610
1	13ga x ⅞	13ga x ⅞	⅜	2 1/16	2 11/16	1 5/8	5/8	22	610
1¼	13ga x ⅞	13ga x ⅞	⅜	2½	3 3/16	2 1/16	⅞	26	610
1½	12ga x ⅞	12ga x ⅞	⅜	2⅞	3 11/16	2 7/16	1 1/16	34	610
2	12ga x ⅞	12ga x ⅞	⅜	3 5/16	4 7/16	2 7/8	1¼	38	610
2½	9ga x 1 3/16	10ga x 1 3/16	½	4½	5 7/8	3 7/8	1 15/16	86	1130
3	9ga x 1 3/16	10ga x 1 3/16	½	4¾	6½	4 3/16	1¾	96	1130
3½	8ga x 1 3/16	10ga x 1 3/16	½	5⅞	7 15/16	5 5/16	2 9/16	114	1130
4	8ga x 1 3/16	10ga x 1 3/16	⅝	5 15/16	8 3/16	5 3/16	2⅛	126	1430
5	4ga x 1¼	8ga x 1¼	⅝	5 11/16	8 7/16	4 15/16	1 7/16	220	1430
6	3ga x 1½	8ga x 1½	¾	6 13/16	10⅛	5 15/16	1¾	300	1940
7	3ga x 1½	8ga x 1½	¾	7 13/16	11⅝	6 15/16	2	420	2000
8	3ga x 1¾	8ga x 1¾	¾	8 1/16	12 7/16	7⅛	1⅞	450	2000
10	⅜ x 1¾	3ga x 1¾	⅞	10	15 7/16	8⅞	2¼	806	3600
12	⅜ x 2	3ga x 2	⅞	11 9/16	18	10 7/16	2 13/16	1100	3800
14	½ x 2	¼ x 2	1	12 9/16	19 9/16	10 9/16	2 9/16	1480	4200
16	½ x 2½	¼ x 2½	1	13 15/16	21 15/16	11 15/16	2 13/16	2100	4600
18	½ x 2½	¼ x 2½	1	16	25	13⅞	3¼	2440	4800
20	⅝ x 3	⅜ x 3	1¼	17½	27½	15⅛	3¾	4700	4800
24	⅝ x 3	⅜ x 3	1¼	19¾	31¾	17⅜	4	5400	4800
30	¾ x 3	⅜ x 3	1¼	24⅛	39⅛	21½	4¾	6950	6000

NOTE: CLEVIS HANGERS FOR 20" PIPE AND LARGER ARE FURNISHED WITH PIPE SPACER ON CROSS BOLTS

FIG. 205

FLAT TOP CLEVIS HANGER

MATERIAL: Carbon steel.
FINISH: Black, electro or hot-dipped galvanized.
SERVICE: General piping, where space does not permit installation of standard figure 200 clevis hanger.
ORDERING: Specify pipe size, figure number and finish.



PIPE SIZE	SIZE OF STEEL		A	B	C	E	MAX. REC. LOAD, LBS.	WGT. PER 100
	UPPER YOKE	LOWER STRAP						
2	8ga x 1	12ga x ⅞	⅜	2½	3 11/16	2 1/16	300	46
2½	8ga x 1¼	10ga x 1 3/16	½	2⅞	4 3/16	2 5/16	500	78
3	8ga x 1¼	10ga x 1 3/16	½	3⅜	5⅜	3 1/16	500	98
3½	8ga x 1¼	10ga x 1 3/16	½	4 1/16	6 1/16	3 7/16	500	136
4	4ga x 1¼	10ga x 1 3/16	⅝	4 1/16	6 5/16	3 5/16	700	138
5	4ga x 1¼	8ga x 1¼	⅝	4⅞	7⅝	4⅛	700	208
6	3ga x 1½	8ga x 1½	¾	5½	8⅞	4⅝	900	282
8	3ga x 1¾	8ga x 1¾	⅞	6⅜	10⅞	5½	1000	434

GBR 25 Mini Digital Differential Pressure Gauge With Alarm

System alarms and monitoring made simple and affordable.

Finally a product that has what you need and can be easily installed.
The GBR 25 is a compact stand alone system gauge with an audible and visual alarm that works for VOC and Radon systems operating at system pressures greater than 2" wc. Included is a second relay that can be used to trigger additional alarms.
Includes Power supply
Optional 4-20 MA or 0-10 outputs can be used to monitor system pressure.

Contact OBAR for a quote to build custom alarm panels for your needs.

Applications and features

- Scale 0-40 inches WC eliminates need for multiple gauges.
- Visual and audible alarm included and factory set at 1" WC The alarm set point can be changed in the field.
- Second adjustable relay for triggering additional alarms.
- Optional 4-20 MA or 0-10 output for data.
- Accuracy is up to ±1% FS, with large LCD display.
- Function keys: zero reset, units select, display update time, automatic sleep time, alarm, etc.

Specifications

Medium: Non-combustible, non-corrosive air, insensitive to moisture, dust, condensation and oil
Working Temp.: 20~70°C
Medium Temp.: 0~60°C
Temp. Compensation: 0~50°C
Working Pressure: overload 10xFS, burst 15xFS
Display: 5 bits LCD, with engineering unit & backlight
Output: 0-10V / 4-20mA (3 wires)
Output load: ≤500Ω (current), ≥2KΩ (voltage)
Relay Output: 2×SPST, 3A/30VDC, 3A/250VAC or 1xBuzzer
Accuracy: up to ±1.0%FS(±2.0%FS@25Pa range)
Long term stability: ±0.5%FS /Year
Thermal effect: <0.05%FS/°C (zero), <0.08%FS/°C(FS)
Power type 16~28VDC/AC
24V Power Supply included
Process Connection: 5mm ID tubing, two pairs (left/back)
Keys: 3 touch buttons
Protection: IP54
Approval: CE
Display update time: selectable for 0.5/1/5/10s (default 1s)

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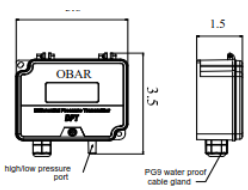
DPT(DPT-F Flush Mount) Differential Pressure Transmitter



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